



Hong Kong Academy of Medicine
Jockey Club Institute for Medical Education & Development

Formative Evaluation of the eHKAM LMS Implementation: Assessing E-Learning in Hong Kong's Postgraduate Medical Education

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Executive Summary

The implementation of the eHKAM Learning Management System (LMS) represents a major advancement in postgraduate medical education (PGME) at the Hong Kong Academy of Medicine (the Academy). The LMS was designed to address key challenges, including the need for structured online learning, faculty preparedness for digital education, and the integration of technology into competency-based training. This evaluation follows seven key areas of activity: needs analysis to assess technological and educational needs, documentation of processes and decisions related to LMS selection and course development, usability testing including pilot testing of the Learning On-Line (LOL) Educator Course, documentation of key events tracking deviations and resolutions, assessment of participant experience and satisfaction, evaluation of learning outcomes, and estimation of cost, reusability, and sustainability.

The evaluation findings highlight the significant impact of the LMS and the LOL Educator Course on faculty development and online learning effectiveness. Over six iterations, 85% of participants reported increased confidence in using e-learning technologies, and 78% felt better prepared to design interactive and engaging online content. Satisfaction levels remained consistently high across different iterations, with 80% of LOL6 participants rating the course as highly relevant to their teaching practice. The Evaluation of Technology-Enhanced Learning Materials for Learner Perceptions (ETELM-LP) questionnaire revealed strong learner satisfaction, with an overall mean score of 5.81 out of 7, and all individual items scoring above 5. Clarity of course instructions received one of the highest ratings (mean: 6.154), while engagement and collaboration were also well-rated (mean: 6.053). Additionally, participants demonstrated strong commitment to the learning process, as reflected in their investment of time and effort (mean: 6.359). A within-group comparison of LOL7 participants indicated statistically significant improvements in perception of LMS effectiveness ($p = 0.027$) and integration of LMS use into routine teaching ($p = 0.030$). Overall, LMS adoption saw a positive shift, with significant gains in total evaluation scores ($p = 0.042$).

Through an iterative approach, continuous improvements have been made to optimize the LOL Educator Course based on participant feedback. The initial pilot faced challenges related to cognitive overload, assignment workload, and technical engagement. These were systematically addressed by extending the course duration, restructuring modules, and incorporating additional support tools such as Miro and WhatsApp for communication. The course format evolved into a more flexible, interactive structure, allowing faculty to engage meaningfully with course content while managing their teaching and clinical responsibilities. Pre-course materials were expanded to ensure that essential theoretical concepts were covered before live sessions, maximizing the effectiveness of synchronous interactions.

Despite these improvements, several areas require further attention. Mobile accessibility and integration with existing College logbooks remain ongoing concerns. The lack of structured real-time technical support outside of office hours continues to be a barrier, particularly for faculty engaging with LMS functionalities beyond standard working schedules. Additionally, while structured feedback and peer discussions have been enhanced, more case-based learning and scenario-driven teaching strategies could further improve participant engagement and knowledge retention.

Moving forward, the Academy will implement targeted enhancements to further strengthen the LMS and faculty development initiatives. Efforts will focus on refining IT infrastructure, including the potential for automated troubleshooting systems and expanded mobile

compatibility. Faculty training will be expanded with structured onboarding programs and role-specific training modules to enhance both pedagogical and technological competencies. A centralized content review process will be formalized to maintain up-to-date educational materials, ensuring alignment with the latest clinical guidelines. Institutional policies on online professionalism and data security will be further refined, in collaboration with the Professionalism and Ethics Committee, to safeguard the integrity of online learning environments. Additionally, integration with College-specific logbook systems will be prioritized to reduce redundancy and streamline administrative workload.

The evaluation underscores the significant progress made in e-learning implementation at the Academy. Through continuous refinement of system usability, faculty engagement strategies, and administrative processes, the Academy is poised to establish a robust and future-ready e-learning ecosystem that effectively supports postgraduate medical education.

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Chapter 1

Context & Justification

Context and Justification for Evaluation

The digital transformation of postgraduate medical education (PGME) is no longer an option—it is an imperative. As healthcare systems become increasingly complex and the demands on clinical training environments grow, e-learning has emerged as a critical solution to bridge educational gaps, enhance accessibility, and promote lifelong learning among medical professionals. The COVID-19 pandemic served as an initial catalyst, accelerating the adoption of e-learning out of necessity. However, the long-term benefits extend far beyond crisis-driven implementation, necessitating a strategic and evidence-based approach to its integration.¹

The Need for Change in PGME

Recognizing the need for a systematic shift, the Hong Kong Academy of Medicine (the Academy) prioritized e-learning as a key component of PGME development during the HKJC Innovative Learning Centre for Medicine (ILCM) Planning Retreat on 1 November 2020. This priority aligns with global trends emphasizing the role of technology-enhanced learning in competency-based medical education (CBME), as recommended by leading medical education bodies such as the Association for Medical Education in Europe (AMEE) and the Accreditation Council for Graduate Medical Education (ACGME).^{2,3}

Theoretical Frameworks Supporting E-Learning Implementation

However, implementing e-learning in PGME is not just about adding technology to existing methods—it demands a fundamental transformation in educational philosophy. Kurt Lewin’s change theory underscores the necessity of “unfreezing” entrenched learning habits to allow meaningful change to occur.⁴ Just as previous industrial revolutions reshaped learning paradigms, the Fourth Industrial Revolution (Industry 4.0), characterized by artificial intelligence (AI), big data, and automation, is compelling medical educators to rethink how they prepare trainees for a rapidly evolving healthcare landscape.^{5, 6} The ability to “learn, unlearn, and relearn” is now a defining competency for the 21st-century medical professional.⁷

Implementation of the eHKAM LMS

In response, the Academy implemented a Learning Management System (LMS) across all its colleges, with financial support from the Hong Kong Government. The eHKAM LMS Taskforce—a multidisciplinary team comprising the Academy leaders, representatives from all 15 colleges, and ILCM members—was formed on 10 June 2021. Reporting to the Academy Council through the ILCM Operation Committee and the ILCM Advisory Committee (which has been transformed into the Jockey Club Institute for Medical Education and Development (JCIMED) Operation Committee and JCIMED Steering Committee on 1st November 2024). Under the Taskforce’s oversight, an LMS project team was formed as the executive arm responsible for executing the day-to-day activities of the project. The Taskforce guided the needs analysis, selection, and implementation of the LMS, culminating in its successful launch in July 2022 (see Appendix 1-1 for a detailed timeline).

From Substitution to Redefinition: Transforming Learning with Technology

The adoption of e-learning was initially driven by the necessity for social distancing, leading to a direct substitution of face-to-face teaching. However, it soon became clear that technology should not merely replicate traditional methods but rather enhance and redefine learning itself. The Substitution Augmentation Modification Redefinition (SAMR) Model⁸ provides a framework for this evolution, suggesting that e-learning should not only substitute but also

modify and redefine pedagogical approaches. The Academy Position Paper on PGME (2023)⁹ echoes this perspective, advocating for the use of e-learning to free up clinical teachers for bedside teaching while offering learners a more flexible, self-regulated educational environment.

The Shift to Heutagogy

Yet, this transformation extends beyond technology—it requires a shift from pedagogy (Education 1.0) and andragogy (Education 2.0) to heutagogy (Education 3.0), where learners take full ownership of their learning, actively shaping their educational pathways.^{10, 11} Heutagogy, or self-determined learning, is particularly relevant in the modern medical landscape, where professionals must continuously adapt to emerging knowledge and evolving clinical practices.¹² This necessitates not only technological literacy but also faculty training in mentorship, learner agency, and reflective practice, ensuring that trainers can facilitate heutagogical learning rather than merely deliver content.¹³

Capacity Building for Successful Implementation

To support this paradigm shift, ILCM developed and implemented the Learning On-Line (LOL) Educator Course, equipping trainers with the necessary skills to navigate the LMS and incorporate e-learning principles effectively. Additionally, targeted training sessions for administrative staff have ensured seamless system integration, optimizing usability for both trainers and learners. Despite these advancements, significant challenges remain, including faculty resistance, digital literacy gaps, and the need for continuous evaluation to ensure educational effectiveness.¹⁴

The Need for a Comprehensive Evaluation

With two years of implementation completed, the eHKAM LMS Taskforce has identified this as a critical moment for a comprehensive formative evaluation. Program evaluation—the systematic collection and analysis of data to assess program design, implementation, and outcomes—is essential for ensuring quality assurance and guiding future improvements.¹⁴ Given the foundational stage of our implementation, this evaluation focuses on formative rather than summative assessment, allowing for iterative refinement and strategic decision-making. This evaluation was commissioned by the eHKAM LMS Taskforce on 11th April 2024 and supported by Prof. Phillip Li, who was then the Vice President (Education and Examination) of the Academy and Chairman of the Education Committee of the Academy.

Objectives of the Evaluation

The primary objectives of this evaluation are to:

1. Assess the effectiveness of the LMS in meeting PGME objectives and inform decisions regarding vendor contract continuation.
2. Ensure accountability in implementation processes and outcomes.
3. Evaluate the impact on postgraduate education and identify areas requiring improvement.
4. Model best practices in quality assurance, as recommended in the Academy Position Paper on PGME (2023).⁹

Evaluation Framework

Drawing on established evaluation frameworks, including Attwell's holistic evaluation approach¹⁴ and Cook and Ellaway's guidance on technology-enhanced learning evaluation,¹³ this assessment adopts Stufflebeam's Context, Input, Process, and Product (CIPP) model¹⁵ as a structured, management-oriented framework. The CIPP model ensures a comprehensive evaluation that not only examines technological infrastructure but also considers the pedagogical and curricular principles underpinning e-learning integration. (Fig. 1-1)

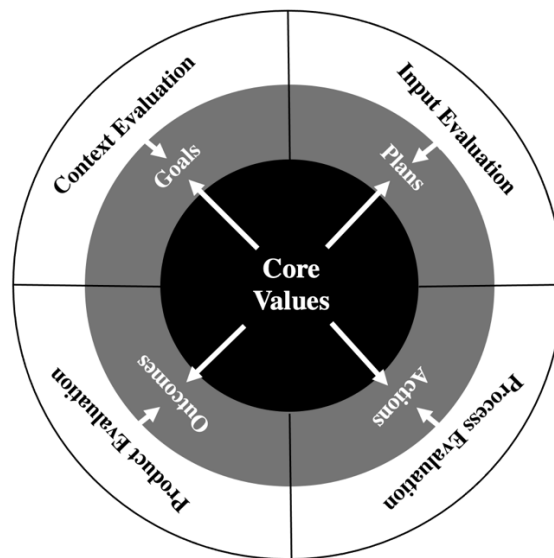


Fig. 1-1 The Context, Input, Process and Product (CIPP) Evaluation Model¹⁵

This evaluation includes seven key areas of activity:¹⁸

1. **Needs Analysis**– Identifying reasons for implementing e-learning, assessing technological and educational needs, and evaluating resource availability.
2. **Documentation of Processes, Decisions, and Final Product** – Recording the LMS selection, configuration, and development of educational and administrative training courses.
3. **Usability Testing** – Evaluating ease of use and educational quality, including pilot testing of the Learning On-Line Course.
4. **Documentation of Key Events** – Tracking intentional and accidental deviations from the planned implementation and their resolutions.
5. **Assessment of Participant Experience and Satisfaction** – Measuring subjective learner and instructor experiences, aligned with Kirkpatrick Level 1 outcomes.¹⁹
6. **Assessment of Learning Outcomes** – Evaluating objective learning outcomes (Kirkpatrick Levels 2–4), while acknowledging challenges in directly linking training events to patient care outcomes.²⁰
7. **Estimation of Cost, Reusability, and Sustainability** – Analysing the resources required for development, implementation, and long-term maintenance.

Conclusion

This formative evaluation is a decisive step in our commitment to enhancing the quality and effectiveness of e-learning in PGME. As medical education faces increasing complexity and the need for greater flexibility, this assessment provides an evidence-driven foundation for strategic improvements. The findings will inform future policy decisions, ensuring that the Academy remains at the forefront of medical education innovation while addressing the evolving needs of clinical trainees and faculty alike.

References

1. So HY. Technology, Life-long Learning, and Heutagogy. *Hong Kong J Emerg Med*. 2024;31(4):281-284.
2. AMEE Technology Enhanced Learning Committee. Technology Enhanced Learning: Guidance for Medical Educators. *Med Teach*. 2021;43(5):543-556.
3. ACGME. The Role of Digital Learning in Graduate Medical Education. *J Grad Med Educ*. 2020;12(3):345-350.
4. Lewin K. Frontiers in group dynamics. *Hum Relat*. 1947;1(1):5-41.
5. Schwab K. The Fourth Industrial Revolution. World Economic Forum; 2016.
6. Topol E. Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again. Basic Books; 2019.
7. Brown-Martin G. Learning {Re}Imagined. Bloomsbury Publishing; 2014.
8. Hamilton ER, Rosenburg JM, Akcaoglu M. The Substitution Augmentation Modification Redefinition (SAMR) Model. *TechTrends*. 2016;60:433-441.
9. So HY, Li PKT, Lai PBS, et al. Hong Kong Academy of Medicine Position Paper on Postgraduate Medical Education. *Hong Kong Med J*. 2023;29:448-52
10. Blaschke LM. Heutagogy and Self-Determined Learning. *J Adult Contin Educ*. 2021;27(1):61-78.
11. Persico D, Steffens K. Self-Regulated Learning in Technology Enhanced Learning. Springer; 2017.
12. Hase S, Kenyon C. Heutagogy: A Child of Complexity Theory. *Complicity*. 2007;4(1):111-118.
13. Cook DA, Ellaway RH. Evaluating Technology-Enhanced Learning: A Comprehensive Framework. *Med Teach*. 2015;37(10):961-970.
14. Attwell G. A Guide to the Evaluation of E-learning. Creative Commons; 2006.
15. Stufflebeam DL. The CIPP Model for Evaluation. Springer; 2000.
16. Kirkpatrick DL, Kirkpatrick JD. Evaluating Training Programs: The Four Levels. Berrett-Koehler Publishers; 2006.
17. Gillespie R. SAMR: The Power of a Useful Technology Integration Model. *Tech & Curriculum*. 2022;3(2):45-59.
18. Frye A, Hemmer P. Program Evaluation Models and Related Theories: AMEE Guide No. 67. *Med Teach*. 2012;34:e288-e299.
19. Tay BH. Transitioning from Pedagogy to Heutagogy. In: Hase S, Kenyon C, eds. Self-Determined Learning: Heutagogy in Action. Bloomsbury Publishing; 2013.
20. Links MJ. Beyond Competency-Based Continuing Professional Development. *Med Teach*. 2018;40(3):253-258.

Chapter 2

Needs Analysis

Introduction

The implementation of e-learning within postgraduate medical education (PGME) has become an essential component of modern training frameworks.^{1,2} The disruptions caused by the COVID-19 pandemic underscored the necessity for flexible and accessible learning platforms that enable continuity in medical education. As part of its commitment to advancing medical training, the Academy received government funding to introduce a Learning Management System (LMS), known as eHKAM, to support e-learning across its 15 constituent colleges.

An LMS serves as a centralized platform for educational administration, content delivery, assessment tracking, and learner engagement. The introduction of eHKAM aligns with contemporary educational strategies, including Competency-Based Medical Education (CBME) and programmatic assessment, which require systematic tracking of learner progress and robust assessment tools.³ However, the effectiveness of an LMS is contingent on its ability to meet the specific needs of learners, trainers, and administrators within the Academy. Given the diversity in training methodologies, assessment frameworks, and levels of readiness for CBME adoption among different colleges, a thorough needs analysis was essential to ensure that the LMS would be fit for purpose.

Beyond identifying LMS functionalities, the Needs Analysis examined three critical areas to support the implementation of e-learning within the Academy:

1. **Technology Needs** – The specific features required in an LMS to support e-learning, assessment, and competency tracking.
2. **Educational Needs** – The pedagogical requirements necessary to optimize e-learning, including faculty training and learner engagement strategies. These findings provided the foundation for designing the Learning On-Line (LOL) Educator Course, which aimed to equip faculty with the necessary skills to leverage e-learning effectively.
3. **Technical and Administrative Support Needs** – The IT infrastructure, technical resources, and administrative support mechanisms required to sustain LMS implementation, ensure system reliability, and provide a seamless user experience for both faculty and learners.

Methodology

A qualitative approach was ultimately adopted after initial survey response rates were insufficient to support a mixed-methods study. Hence, while a sequential exploratory mixed-methods approach was initially planned, the study proceeded with a qualitative focus, utilizing the Community of Inquiry (CoI) framework to structure and analyse data collected through focus groups.⁴

Ethical Considerations

Ethical approval for the study was obtained from the Survey and Behavioural Research Ethics Committee at The Chinese University of Hong Kong. Participation was voluntary, and informed consent was obtained from all respondents prior to data collection.

Focus Group Discussions

Participants and Recruitment

Eight focus groups were conducted to gain deeper insights into LMS and e-learning requirements. The groups included:

- Two focus groups of trainers
- Two focus groups of administrators
- Four focus groups of trainees

Participants were recruited through college and HKJC ILCM representatives within the eHKAM Taskforce.

Interview Guide

A structured interview guide was developed based on a literature review of e-learning effectiveness, CBME, and programmatic assessment (Appendix 1-1). The guide included questions on:

- Current training and assessment workflows
- Challenges in e-learning adoption
- Features required for an effective LMS
- Strategies to optimize system usability and learner engagement
- Faculty development needs for digital teaching
- Administrative and technical support expectations

Data Collection

To minimize hierarchical bias, trainers, trainees, and administrators participated in separate focus groups. Each session was facilitated by our research staff after training by Drs. Albert Chan, Abraham Wai and HY So and was audio-recorded, transcribed verbatim, and anonymized to protect participant confidentiality.

Data Analysis

A qualitative analysis using thematic analysis was conducted to identify emergent themes.⁵ Findings from this phase were cross-referenced with survey results to refine LMS feature requirements, faculty training needs, and support system expectations.

The Needs Analysis provided critical insights into the expectations and functional requirements for the eHKAM LMS. By broadening the scope beyond LMS functionalities to encompass educational, technical, and administrative support needs, the findings guided both the selection of the LMS and the development of the LOL Educator Course. This course was designed to equip faculty with the necessary skills to integrate e-learning effectively into postgraduate medical education.

By incorporating qualitative data and applying the Community of Inquiry framework, this study established a stakeholder-driven approach to e-learning development, fostering a more effective and sustainable digital learning ecosystem within the Academy. Given that LMS implementation, the LOL Educator Course, and the provision of technical and administrative support are distinct processes, the results and discussion are structured into three separate sections for clarity.

Section 2A
Technology Need

Results

Focus Group Interviews of Trainees

Social Presence

Real-time chat and discussion forums

Trainees felt that discussion boards were underutilized due to a lack of faculty engagement. They suggested integrating real-time chat features and better faculty participation to encourage interaction.

“現在的討論區沒有人用，如果有即時聊天功能，或者讓導師參與進來，會更有吸引力。”

(The current discussion boards are rarely used. If there were a real-time chat function or more instructor involvement, it would be more engaging.) (Interview 2, Trainee 5)

Interactive faculty-led engagement tools

Trainees found passive learning through webinars insufficient and emphasized the need for more dynamic and engaging faculty-led interactions. They suggested incorporating real-time Q&A sessions, interactive case discussions, and polling features to enhance participation and engagement. These tools would make online learning more interactive rather than resembling a one-way lecture.

“單純的線上講座太單向了，像是看錄影。如果能加入互動討論、Q&A 或即時投票，就更有參與感。”

(Simple online lectures feel too one-way, like watching a recording. If we could have interactive discussions, Q&A, or real-time polling, it would feel more engaging.) (Interview 5, Trainee 6)

Structured peer interaction tools

Trainees preferred structured formats for peer collaboration rather than freeform discussion boards, which they found unstructured and disengaging. They suggested features such as case debates and problem-solving forums to facilitate guided discussions with clear objectives. These tools would encourage meaningful peer learning while providing a structured framework for discussions.

“如果有類似案例討論或辯論的工具，比起自由發言的討論區，可能會更吸引我們。”
(If there were tools for structured case discussions or debates, they would be more engaging than open-ended discussion threads.) (Interview 3, Trainee 4)

Integration with Messaging Platforms

Some programs effectively used WhatsApp or similar platforms for discussions. Trainees suggested LMS integration with common messaging tools to improve communication and engagement.

“我們的課程用 WhatsApp 來討論，比 LMS 討論區好用很多。如果 LMS 能和這些平台整合，可能更方便。”

(Our program uses WhatsApp for discussions, which is much more effective than the LMS discussion boards. If the LMS could integrate with these platforms, it would be more convenient.) (Interview 2, Trainee 8)

Improved Chat and Q&A Features

The current chat function was not intuitive, leading to disjointed interactions. Trainees suggested structured Q&A tools where faculty could respond centrally to improve communication.

“LMS 的聊天功能很難用，對話常常斷掉。如果能有一個結構化的提問工具，老師可以集中回應，會更好。”

(The LMS chat function is difficult to use, and conversations often get disjointed. A structured question submission tool where instructors could respond centrally would be much better.) (Interview 6, Trainee 9)

Hybrid Learning Preference

Trainees valued online learning but felt it should complement rather than replace face-to-face interactions. They preferred a blended learning model for better engagement.

“網上學習很方便，但不能完全取代面對面的討論，最好是結合兩者。”

(Online learning is convenient, but it shouldn't completely replace face-to-face discussions. A combination of both would be best.) (Interview 4, Trainee 1)

Cognitive Presence

Case-sharing across hospitals

Trainees expressed a need for a platform where they could access clinical cases from various hospitals, particularly rare cases, to broaden their learning experience.

“如果能有一個平台讓我們看到其他醫院的病例，對我們的學習會更有幫助，特別是一些少見的案例。”

(If there were a platform where we could see cases from other hospitals, it would be more helpful for our learning, especially for rare cases.) (Interview 3, Trainee 3)

Integration with Clinical Imaging Systems

Trainees wanted LMS integration with radiology scans, pathology slides, and other imaging systems to enhance case-based learning with real-world clinical visuals.

“如果能直接在 LMS 上查看影像，比如放射科的掃描或病理切片，會讓學習更貼近臨床實踐。”

(If we could directly view images like radiology scans or pathology slides in the LMS, it would make learning more clinically relevant.) (Interview 3, Trainee 5)

Image and Video Annotation for Discussion

The ability to annotate shared clinical images or videos would help facilitate interactive discussions and case analysis among trainees and faculty.

“如果能在影像上標記重點，然後讓大家討論，會比單純看圖學習更有效。”

(If we could highlight key areas on images and discuss them, it would make learning more effective than just looking at static images.) (Interview 4, Trainee 2)

Structured Question Banks with Updated Guidelines

Trainees wanted a well-organized question bank linked to current clinical guidelines, ensuring that assessments and practice questions remained relevant.

“題庫應該和最新的臨床指引同步更新，這樣做模擬測驗時才能學到最新的標準。”
(*The question bank should be regularly updated with the latest clinical guidelines so that we can learn the most current standards while practicing.*) (Interview 2, Trainee 7)

Adaptive Learning Pathways

Trainees suggested an LMS that tracks progress and recommends content based on past performance, allowing for more personalized learning experiences.

“如果 LMS 能根據我們的學習進度推薦適合的內容，會更有針對性。”
(*If the LMS could recommend content based on our learning progress, it would be more tailored and effective.*)(Interview 5, Trainee 4)

Links to Up-to-Date Clinical Resources

Rather than creating entirely new content, trainees preferred LMS integration with established clinical databases like UpToDate and specialty guidelines.

“LMS 不需要重新製作內容，如果能直接連結 UpToDate 或各專科指引，學習起來會更方便。”
(*The LMS doesn't need to create new content—if it could link directly to UpToDate or specialty guidelines, it would make learning much more convenient.*)
(Interview 3, Trainee 6)

Powerful Search Function

Trainees wanted a Google-like search function within the LMS to quickly find lecture notes, PowerPoint slides, and past discussions using keywords.

“如果 LMS 的搜尋功能像 Google Drive 或論文資料庫那樣，可以快速找到講義和討論內容，會更好。”
(*If the LMS search function worked like Google Drive or research databases, allowing us to quickly find lecture notes and discussions, it would be much better.*)
(Interview 1, Trainee 8)

AI-Powered Learning Recommendations

Some trainees suggested using AI to recommend learning materials based on specialty, past quiz performance, or areas of interest for a more customized experience.

“如果 LMS 能用 AI 根據我們的專科方向或測驗成績推薦學習內容，會讓學習更有效率。”
(*If the LMS could use AI to recommend learning content based on our specialty or past quiz performance, it would make learning more efficient.*) (Interview 4, Trainee 9)

Teaching Presence

More Interactive Assessments

Trainees felt that MCQs alone were insufficient and suggested virtual patient simulations and open-response case evaluations for deeper learning.

“選擇題測驗太單一，如果有虛擬病人案例或開放性臨床問題作答，會讓學習更貼近真實環境。”

(MCQ assessments are too limited. If we had virtual patient cases or open-ended clinical evaluations, it would make learning more realistic.) (Interview 3, Trainee 6)

Automated Assessment Tools

Trainers requested **automated MCQs and interactive quizzes** to enhance learner engagement and streamline assessment processes.

“如果 LMS 能提供自動評分的測驗，比如選擇題或互動測驗，會減輕導師的工作量，讓學習更有效率。”

(If the LMS could offer automated assessments like MCQs or interactive quizzes, it would reduce trainer workload and improve learning efficiency.) (Interview 2, Trainer 3)

E-Portfolio for Tracking Progress

Trainees and trainers wanted an e-portfolio system to track progress, achievements, and feedback systematically.

“如果能有一個電子學習檔案，記錄學習進度和導師的反饋，會讓我們更清楚自己在哪裡需要改進。”

(An e-portfolio that tracks learning progress and trainer feedback would help us better understand areas for improvement.) (Interview 4, Trainee 5)

AI-Driven Learning Analytics

Trainers suggested **AI-powered analytics** to identify **struggling trainees early** and tailor teaching strategies accordingly.

“如果 LMS 能分析學習數據，幫助導師找出學習困難的學員，提供個性化的教學建議，會更有幫助。”

(If the LMS could analyse learning data to help trainers identify struggling trainees and provide personalized teaching recommendations, it would be more effective.) (Interview 5, Trainer 2)

Customizable Learning Pathways

Trainees wanted a personalized tracking system that allowed them to monitor progress across modules, ensuring efficient learning without redundancy.

“如果 LMS 能記錄我們已學過的內容，並推薦還需要補充的部分，就不會浪費時間重複學習。”

(If the LMS could track what we've already learned and suggest what we still need to cover, it would prevent unnecessary repetition.) (Interview 5, Trainee 1)

Mobile accessibility

Trainees highlighted difficulties navigating the LMS on mobile devices and emphasized the need for a mobile-friendly platform for learning on the go.

“LMS 在手機上不好操作，但我們經常在休息或通勤時學習，應該優化行動版體驗。”
(*The LMS is difficult to use on mobile, but we often study during breaks or commutes. A mobile-friendly experience would be much better.*) (Interview 6, Trainee 7)

Flexibility in E-Learning requirements

Some trainees worried about mandatory e-learning adding to their workload without flexibility or clear educational benefits.

“如果強制要求完成 LMS 課程，但沒有彈性安排，反而會增加負擔，影響學習動機。”
(*If LMS courses were mandatory without flexibility, it would increase workload and reduce motivation to learn.*) (Interview 2, Trainee 8)

On-Demand Scheduling for Live Sessions

Trainees found scheduling tutorials difficult and suggested an integrated LMS tool for booking and coordinating live sessions with trainers.

“很難找到適合的時間參加線上課程，如果 LMS 有內建的預約系統，就能更方便安排時間。”
(*It's difficult to coordinate live tutorial sessions. If the LMS had a built-in scheduling tool, it would be much easier to arrange sessions.*) (Interview 4, Trainee 9)

Focus Group Interviews of Trainers

Social Presence

Better Mechanisms for Encouraging Trainer Engagement in LMS Discussions

Trainers noted that discussion forums were underutilized, partly due to faculty workload and unclear expectations on participation. They suggested automated notifications, structured discussion prompts, and role-based permissions to encourage trainer interaction.

“我們確實有 LMS 討論區，但導師的參與度低，因為沒有系統地通知或者指定角色來負責討論。”
(*We do have LMS discussion boards, but trainer participation is low because there are no structured notifications or assigned discussion roles.*) (Interview 1, Trainer 2)

Privacy Controls for Trainer Discussions and Feedback

Trainers requested private discussion spaces for faculty within the LMS to discuss trainee performance, assessment alignment, and course adjustments without trainees seeing the conversations.

“如果 LMS 內有一個專屬導師的討論區，讓我們可以討論評估標準或學員進展，那會更有幫助。”

(If the LMS had a dedicated trainer-only discussion area where we could talk about assessment criteria or trainee progress, it would be much more useful.) (Interview 2, Trainer 3)

Automated notifications for participation in online discussions

Trainers noted that faculty engagement in LMS discussion forums was low, partly due to unclear expectations and lack of time. They suggested automated notifications, structured discussion prompts, and assigned moderation roles to encourage participation.

“LMS 討論區的參與度低，部分原因是導師沒有收到提醒或不確定應該回應哪些內容。”

(Engagement in LMS discussion forums is low, partly because trainers don't receive notifications or are unsure about which discussions require their input.)

(Interview 1, Trainer 2)

Trainer Collaboration Tools Across Institutions

Some trainers suggested a cross-institutional faculty discussion area within LMS for trainers from different hospitals or specialties to share best practices, assessment approaches, and training strategies.

“如果 LMS 可以讓不同醫院的導師一起討論培訓方法，我們可以更好地協調標準。”

(If the LMS allowed trainers from different hospitals to collaborate on training methods, we could better align assessment standards.) (Interview 1, Trainer 1)

Cognitive Presence: Enhancing trainers' role in learning design and critical thinking

AI-Driven Learning Analytics for Trainer Insights

Trainers wanted AI-powered analytics to track how trainees engage with course materials, quizzes, and discussions. This would allow them to identify struggling trainees early and adjust their teaching strategies accordingly.

“如果 LMS 能分析學員的學習行為，例如哪些內容學員最常卡住，導師就能更有針對性地指導。”

(If the LMS could analyse trainee learning behaviours, like which topics they struggle with most, trainers could provide more targeted support.) (Interview 2, Trainer 1)

Assessment Blueprinting and Standardization Tools

Trainers emphasized the need for LMS-integrated tools to map assessments against learning objectives and competency frameworks. This would ensure that exam content aligns with training goals.

“我們需要一個系統化的評估設計工具，能夠對應培訓目標，確保測驗和學習內容一致。”

(We need a structured assessment blueprinting tool that aligns with training objectives, ensuring tests are well-mapped to the curriculum.) (Interview 1, Trainer 3)

Clinical Case Library with Trainer Annotations

Trainers wanted a case-based learning repository where they could annotate clinical images, radiology scans, and pathology slides, allowing them to share expert insights with trainees.

“如果 LMS 能讓導師標註病例影像，提供診斷線索或治療選項，那將大幅提升學習效果。”

(If the LMS allowed trainers to annotate clinical images and highlight diagnostic clues or treatment options, it would greatly enhance learning.) (Interview 2, Trainer 2)

Teaching Presence: Supporting Trainers in Instruction and Feedback Delivery

E-Portfolio for Competency Tracking and Feedback Delivery

Trainers emphasized the need for a structured e-portfolio system that would allow them to track trainee competencies, provide structured feedback, and monitor progress in real-time.

“學員的學習進展應該可以在 LMS 裡有一個完整的記錄，這樣導師能更容易給出具體的反饋。”

(Trainee progress should be fully recorded in the LMS so that trainers can provide more specific feedback.) (Interview 1, Trainer 2)

Automated and Customizable Feedback Forms

Trainers wanted automated feedback templates with customizable rubrics for different assessment types, making it easier to provide consistent and structured feedback.

“如果 LMS 可以提供可自訂的評估反饋表，讓導師快速填寫，那會減少我們的行政負擔。”

(If the LMS had customizable feedback templates for different assessments, it would reduce our administrative workload.) (Interview 2, Trainer 3)

Mobile-Friendly Trainer Dashboard

Trainers highlighted that current LMS dashboards were difficult to navigate on mobile devices, making it hard to review trainee progress or provide quick feedback when away from their workstation.

“LMS 的管理界面在手機上不夠友善，我們不可能總是用電腦，應該有更方便的行動端設計。”

(The LMS management dashboard isn't mobile-friendly. We can't always be at a computer, so it needs a better mobile interface.) (Interview 1, Trainer 1)

On-Demand Scheduling for Trainer-Led Sessions

Trainers found coordinating tutorial sessions time-consuming and suggested LMS-integrated scheduling tools that allow trainees to book available slots with trainers.

“學員經常找不到時間與導師討論，如果 LMS 能提供課程預約功能，就能更有效地安排教學時間。”

(Trainees often struggle to find time for discussions with trainers. If the LMS had a scheduling tool, it would make session planning much easier.) (Interview 2, Trainer 2)

Concerns About Rigid LMS Workflow Requirements

Trainers were concerned that LMS workflows were too rigid, requiring them to follow strict course structures. They preferred more flexibility in course design and assessment scheduling.

“LMS 的課程設計流程過於固定，有時候我們需要靈活調整測驗或學習進度，系統應該更彈性。”

(The LMS course structure is too rigid. Sometimes we need to adjust assessments or pacing, and the system should allow more flexibility.) (Interview 1, Trainer 3)

Discussion

The findings from both trainee and trainer focus groups highlight key technology needs across social presence, cognitive presence, and teaching presence that should inform the selection of a Learning Management System (LMS) for the Academy.

In terms of social presence, trainees and trainers both emphasized the importance of enhancing interaction and engagement. Trainees wanted real-time chat, structured discussion forums, and integration with messaging platforms to facilitate more dynamic peer and faculty interactions. Trainers, on the other hand, sought mechanisms to encourage their participation in discussion boards, privacy controls for faculty discussions, and tools for collaboration across institutions. Both groups identified the need for improved chat and Q&A features to structure discussions and ensure meaningful engagement.

Regarding cognitive presence, trainees requested case-sharing features, integration with clinical imaging systems, and structured question banks linked to updated clinical guidelines. They also expressed interest in adaptive learning pathways and AI-powered learning recommendations. Trainers, meanwhile, highlighted the importance of assessment blueprinting tools, AI-driven learning analytics, and a clinical case library with trainer annotations, which would allow them to better align assessments with competency frameworks and provide case-based learning support.

For teaching presence, trainees found traditional MCQ-based assessments insufficient and suggested interactive assessments, including virtual patient simulations and open-response case evaluations. Trainers supported automated assessment tools, structured e-portfolios, and customizable feedback forms to streamline the evaluation process. Additionally, both groups identified mobile accessibility as a key need, particularly for accessing learning materials and providing feedback on the go. Trainers also requested greater flexibility in LMS workflows and on-demand scheduling tools to better coordinate tutorial sessions.

LMS Selection Considerations

Given the Academy's early stage of LMS adoption and limited experience with system development, a commercial LMS was chosen over a custom-built solution. This decision ensures access to a proven, scalable, and well-supported platform, reducing the risks and resource burdens associated with in-house development. A commercial system provides robust baseline functionalities, ongoing technical support, and compatibility with evolving educational needs, making it a practical choice for the Academy's current stage of implementation.

Additionally, the Academy's existing e-portfolio systems will continue to function independently from the LMS. While some trainees and trainers identified progress tracking as a critical feature, it was determined that e-portfolio functions should remain separate, ensuring

that the LMS remains focused on content delivery, assessments, and interactive learning experiences rather than duplicating functionalities already covered by dedicated systems.

Subsequent sections will delve into the LMS selection process in greater detail, outlining the criteria used to evaluate available platforms, considerations for long-term scalability, and integration strategies to ensure alignment with the Academy's broader educational objectives.

Conclusion

The insights gathered from focus groups with both trainees and trainers underscore essential technological requirements across social, cognitive, and teaching presences, vital for informing the Academy's Learning Management System (LMS) selection. Social presence needs emphasized enhancing interactive and collaborative capabilities through robust real-time communication tools, structured forums, and privacy-controlled environments. Cognitive presence requirements highlighted the importance of integrating case-sharing resources, adaptive learning technologies, and AI-enhanced analytics to align learning content and assessments effectively with clinical practice. For teaching presence, there was consensus on the need for advanced interactive assessment modalities, automated evaluation systems, and mobile-accessible platforms facilitating flexible and efficient learning and feedback processes.

Given the Academy's current stage of digital transformation, a commercial LMS has been identified as the optimal choice, offering proven stability, comprehensive support, and adaptability to evolving educational demands. Maintaining a distinct e-portfolio system complements this approach, allowing the LMS to remain focused on delivering targeted learning experiences without redundant functionalities. Moving forward, careful consideration of long-term scalability and strategic integration will ensure the selected LMS aligns seamlessly with the Academy's overarching educational vision.

Section 2B
Education Need

Results

Focus Group Interviews of Trainees

Social Presence

Limited interactivity and lack of engagement

Trainees expressed that online discussions often lack the dynamic exchange present in face-to-face interactions. In live discussions, they could quickly clarify doubts and engage in meaningful case-based learning. However, online learning felt static, with limited spontaneous interaction. Additionally, many trainees noted that virtual Q&A sessions often resulted in silence. Participants felt hesitant to ask questions due to a lack of immediate response or fear of judgment. Large virtual classes also led to disengagement, with some trainees feeling like passive listeners rather than active participants.

"在線上講習時很難交流，沒有現場那種辦法能夠驗證自己的思考。"

(Online teaching makes interaction difficult; we lack the ability to validate our thinking on the spot.) (Trainee 1, Interview 1)

Unclear expectation and fear of giving the wrong answer

Trainees reported that the purpose and expectations of online discussions were not always clearly communicated, leading to passive participation. Many also feared being judged when posting questions in discussion forums, preferring private communication or skipping questions altogether. Participants felt hesitant to ask questions due to a lack of immediate response or fear of judgment.

"對著師長，自己在線上問很像是被關注，誰想要被看見呢？"

(When asking online, it feels like you're being singled out. Who wants that?) (Trainee 4, Interview 4)

Challenges in fostering discussion and peer learning

Online platforms often do not facilitate casual peer discussions, which are essential for collaborative learning. Some trainees suggested structured online forums but mentioned that participation remained inconsistent.

"雖然有討論區，但大家都沒有能動力回應。"

(Although we have discussion boards, people lack motivation to respond.) (Trainee 3, Interview 3)

Cognitive Presence

Inconsistent Quality and Need for Enhanced Digital Resources

Trainees noted inconsistencies in the depth and clarity of online learning materials across different specialties. Some departments provided well-structured case-based learning, while others relied on passive lecture-style content. Additionally, some online modules contained outdated clinical guidelines, leading trainees to question their reliability. To address these issues, trainees suggested the development of structured case libraries, interactive resources, and a centralized repository of updated, high-quality learning materials to reduce discrepancies across hospitals and departments.

"不同科目的線上學習內容質量差異很大，有些很好，但有些就只是 PPT 播放。"
(*The quality of online learning materials varies greatly across specialties—some are excellent, while others are just PowerPoint slides.*) (Trainee 2, Interview 3)

Need for structured learning pathways

Trainees wanted clearer guidance on which online resources were essential rather than having to choose from an overwhelming pool of content. A structured roadmap would help them focus on key learning priorities.

"有太多資源，不知道該從哪裡開始，應該有系統地指導我們。"
(*There are too many resources, and we don't know where to start. There should be a structured guide.*) (Trainee 4, Interview 1)

Self-paced learning preferences

Some trainees valued the ability to control the speed of pre-recorded lectures (e.g., watching at 1.2x speed) and skip to relevant sections. This flexibility allowed them to revisit complex concepts at their own pace and avoid wasting time on content they already understood. They found this particularly useful for theoretical topics but acknowledged that self-paced learning alone was insufficient for practical, hands-on training.

"自己控制速度，可以隨時回頭看不懂的地方，比線上講習好。"
(*Being able to control playback speed and rewind when I don't understand is better than live lectures.*) (Trainee 3, Interview 2)

Limitation for learning psychomotor skills

Trainees emphasized that certain skills, particularly in surgery and emergency response, require physical practice that cannot be replaced by online modules. While some found theoretical training useful, they struggled with applying these skills in real settings without hands-on experience.

"手術技巧還是得靠親手做，光是看影片沒有太大幫助。"
(*Surgical skills must be practiced hands-on; just watching videos isn't very helpful.*) (Trainee 1, Interview 3)

Gaps in clinical decision-making and clinical application

Trainees expressed uncertainty about whether online learning sufficiently prepared them for clinical decision-making and real-world application. While online platforms provide theoretical knowledge, many trainees highlighted the absence of structured exercises that simulate real clinical scenarios. They preferred case-based learning to help bridge this gap between theory and practice.

"線上學習的確能讓我們學知識，但沒有臨床決策的實戰機會。"
(*Online learning helps us acquire knowledge, but there's no real chance to practice clinical decision-making.*) (Trainee 3, Interview 4)

Challenges in self-regulated and asynchronous learning

While flexibility in asynchronous learning was valued, some trainees struggled with motivation and self-regulation. Many expressed difficulty in prioritizing learning topics and requested more curated learning paths rather than an overwhelming number of independent resources.

Without structured guidance, trainees found it challenging to stay on track and fully engage with the material.

"在線學習雖然自由，但有時候會讓人拖延，因為沒有人監督進度。"

(Online learning provides flexibility, but sometimes it leads to procrastination since there's no one overseeing progress.) (Trainee 1, Interview 4)

Teaching Presence

Faculty development for effective online teaching

Faculty members require structured support in transitioning to online teaching, particularly in developing interactive and engaging digital lessons. Many faculty members appeared reluctant to engage in asynchronous discussions or respond to trainee queries, making e-learning feel isolating. Additionally, trainers require guidance on the effective use of e-learning tools for assessment and feedback to ensure that trainees receive meaningful evaluations and support. Without proper training, faculty struggle to integrate digital tools effectively into their teaching.

"老師們不太願意在線上互動，我們問問題時往往沒有人回應。"

(Trainers are often unwilling to interact online, and when we ask questions, there's no response.)

(Trainee 1, Interview 4)

"我們需要更有系統的反饋機制，而不是學完課程後就沒有後續指導。"

(We need a more structured feedback system instead of just completing courses with no follow-up guidance.) (Trainee 3, Interview 2)

Need for faculty resource support

Trainees observed that faculty members faced significant challenges in managing the additional workload of online teaching, especially while balancing their clinical duties. They noticed that developing digital teaching materials, organizing online content, and facilitating asynchronous interactions demanded substantial time and effort from trainers. The lack of dedicated administrative and technical support made it difficult to maintain high-quality online education. Trainees recognized the importance of institutional backing to prevent online teaching from becoming an unsustainable burden on faculty.

"線上教學加重了我們的 workload，沒有額外資源，很難持續下去。"

(Online teaching increases our workload, and without additional support, it's hard to sustain.)

(Trainee 2, Interview 3)

Need for structured feedback mechanisms

Trainees highlighted that receiving feedback in online settings was often sporadic and unstructured, making it difficult to track their progress. They suggested the implementation of structured feedback loops to ensure consistent guidance from trainers.

"我們很少能在網上獲得即時反饋，這讓學習進展變得困難。"

(We rarely receive timely feedback online, which makes tracking our learning progress difficult.) (Trainee 4, Interview 2)

Lack of alignment between online courses and assessments

Some trainees felt that online materials were not directly linked to their assessments, reducing motivation to engage with the content. They suggested better integration between e-learning modules and formal evaluations.

"網上課程與考試內容不匹配，學習的動力自然會下降。"

(Online courses don't align with exams, so our motivation to engage drops.) (Trainee 3, Interview 4)

Focus Group Interviews of Trainers

Social Presence

Challenges in online engagement and interaction

Trainers expressed concerns that online teaching reduces spontaneous interactions and active engagement. Unlike in-person training, it is difficult to gauge trainees' understanding or encourage real-time discussions.

"其實我哋成日都系習慣咗 face-to-face 非常問問題答問題啦，其實會唔會係 online 嘅世界裡邊咧就更加闊啲喇?"

(We are used to face-to-face question-and-answer sessions. In the online world, is it possible to create a more interactive environment?) (Trainer 3, Interview 1)

Variation in participation across different training styles

Some colleges noted higher participation in online case discussions, while others experienced low engagement, depending on the specialty and training format.

"其實個 response rate 係高過 attendance 真係出席嘅，咁可能我哋... 我都唔知點解喇。"

(Actually, the response rate in online sessions was higher than for in-person attendance, but I don't know why.) (Trainer 2, Interview 1)

Need for training in online discussion facilitation

Trainers noted that while discussion boards exist, they do not facilitate deep engagement. Many participants remain passive, leading to ineffective discussions. Trainers highlighted that they would benefit from training in how to foster meaningful discussions in an online environment.

"雖然有討論區，但大家都沒有動力回應。"

(Although we have discussion boards, people lack motivation to respond.) (Trainer 5, Interview 1)

Cognitive Presence

Need for structured digital resources

Trainers emphasized the importance of structured case libraries to aid knowledge application and clinical decision-making.

"如果有一個有系統的案例資料庫，能讓我們反覆練習，學習效果會更好。"

(If there were a structured case library where we could repeatedly practice, learning outcomes would improve.) (Trainer 4, Interview 2)

Ensuring consistency and updating online materials

Some trainers noted variability in the quality of materials across different departments. Standardized guidelines should be implemented to ensure trainees receive up-to-date, high-quality content.

"有啲教材質量參差，唔同部門提供嘅資源唔一樣，應該要有統一標準。"
(Some materials vary in quality, and different departments provide different resources. There should be a standardized guideline.) (Trainer 1, Interview 1)

Challenges in teaching practical and clinical decision-making online

Trainers raised concerns that online learning does not fully prepare trainees for real-world applications, particularly for hands-on procedural skills.

"純理論學到，但臨床上點樣應用？呢個仲係個問題。"
(Trainees learn the theory, but how to apply it clinically remains a challenge.) (Trainer 2, Interview 1)

Teaching Presence

Faculty development for effective online teaching

Trainers highlighted that there was no formal institutional training for transitioning to online teaching. Many had to figure it out on their own, leading to inconsistent quality in online teaching delivery.

"我哋 college 好似有任何 formal 嘅 training session，大家都靠自己摸索。"
(Our college doesn't seem to have any formal training sessions; everyone just figures it out on their own.) (Trainer 4, Interview 3)

Sustainability challenges in online teaching for faculty

Trainers found online teaching to be an additional burden on top of their clinical responsibilities. Some faculty noted that the extra workload was unsustainable without proper institutional support, particularly in terms of course preparation, content creation, and responding to trainees asynchronously.

"其實我哋好難抽時間去準備啲網上內容，已經臨床上夠忙啦，有支援嘅話，真係好難長期堅持。"

(It's really difficult to find time to prepare online content—we're already busy with clinical work. Without additional support, it's hard to sustain in the long run.) (Trainer 3, Interview 2)

Lack of faculty engagement in online learning

Some trainers were reluctant to engage in asynchronous discussions or respond to Q&A forums, making e-learning feel impersonal and ineffective.

"好多老師其實有習慣回覆網上問題，變相學生都唔敢問。"
(Many faculty members are not used to responding to online questions, which discourages students from asking.) (Trainer 5, Interview 1)

Challenges in online assessment and feedback

Many trainers struggled with providing structured feedback online, as existing systems lacked mechanisms for tracking trainee progress over time. Some noted that trainees rarely received personalized feedback, making it difficult for them to improve.

"其實 online feedback 唔容易做，尤其是要有系統地 track 住每個學生。"

(Providing online feedback isn't easy, especially when there's no system to track each student properly.) (Trainer 6, Interview 1)

Discussion

The findings reveal several challenges in the current e-learning environment for postgraduate medical education. Trainees experience limited interactivity and passive engagement, which reduces the effectiveness of online discussions. There is inconsistency in the quality of online learning materials, contributing to cognitive overload and difficulty in self-directed learning. Many trainees prefer case-based learning and structured feedback, but these elements are lacking in most online modules. Trainers, on the other hand, struggle with adapting to online teaching, citing increased workload and a lack of faculty development in effective e-learning practices. Furthermore, both trainees and trainers lack proficiency in educational technology, limiting their ability to fully utilize digital platforms for meaningful learning. Addressing these challenges requires a shift in both pedagogy and technological competence, supported by structured faculty development.

Designing Digital Content and Cognitive Theory of Multimedia Learning

One of the primary issues identified is the inconsistent quality and structure of online learning materials, leading to cognitive overload and disengagement. Research in multimedia learning highlights that poorly designed instructional content can overwhelm learners, reducing retention and engagement.⁶ To address this, faculty must be trained in the principles of the Cognitive Theory of Multimedia Learning (CTML), which emphasizes segmenting information, integrating visuals effectively, and minimizing extraneous cognitive load.⁷ The LOL Educator course should equip trainers with skills in designing high-quality, structured digital content that aligns with cognitive processing capabilities to enhance comprehension and retention.

The Need to Master Technology for Effective E-Learning

Another key challenge is the lack of proficiency in educational technology among both trainees and trainers. Many participants reported difficulty using digital tools to facilitate interaction and assessment. Studies show that technology-enhanced learning is most effective when faculty can integrate digital tools with active learning strategies.⁸ The LOL Educator course must provide hands-on training in utilizing online discussion forums, implementing formative assessments, and integrating digital resources into structured learning activities. Trainers must also learn how to use learning analytics to monitor engagement and provide targeted feedback.⁹

The Need for a Paradigm Shift: From Cognitivism to Social Constructivism

Beyond technical challenges, the findings highlight a more fundamental issue: the dominant pedagogical model remains content-driven and instructor-centred (Education 1.0). However, trainees expressed a preference for case-based learning, peer collaboration, and structured feedback, which align more closely with adult learning theory and social constructivism.^{10, 11} The Community of Inquiry (CoI) framework provides a strong theoretical basis for this shift, emphasizing the importance of social presence (peer interaction), cognitive presence (critical thinking), and teaching presence (effective guidance) in e-learning.⁴

To address this, the LOL Educator course should train faculty to shift from passive content delivery to active, learner-centred strategies. Faculty should develop structured online discussions, peer collaboration exercises, and formative feedback mechanisms that foster active participation and deeper learning.¹² Research has shown that when online learning is designed with strong social and cognitive presence, learners engage more deeply and retain knowledge more effectively.¹³

Experiential Learning as a Mechanism for Change

A critical gap identified is the lack of structured decision-making exercises in e-learning. Many trainees noted that online learning focuses on knowledge acquisition rather than clinical application. Experiential learning theory suggests that learning is most effective when learners actively engage in experiences, reflect on them, and apply their learning in practice.¹⁴ Studies in medical education confirm that problem-based and experiential learning improve clinical reasoning and decision-making skills.¹⁵

To address this, faculty must be trained in designing experiential learning activities such as interactive case-based discussions, virtual simulations, and reflective learning exercises. The LOL Educator course should provide faculty with tools and methodologies for creating structured experiential learning opportunities that bridge the gap between theoretical knowledge and clinical application.

Faculty Development: Time Constraints and Practical Training Solutions

A recurring concern among trainers is the time required to create, manage, and deliver online learning. Research suggests that faculty development programs must be practical, modular, and immediately applicable to ensure uptake.¹⁶ The LOL Educator course should adopt a microlearning approach, offering short, focused training modules that provide faculty with immediately applicable skills in online teaching, content creation, and learner engagement. Peer mentorship and ongoing support should also be incorporated to reinforce best practices and provide continuous development opportunities.

Conclusion

The findings highlight a clear need to shift from Education 1.0 to a more interactive, social constructivist approach or Education 2.0 that aligns with adult learning principles. Trainees require case-based learning, structured feedback, and active engagement, while trainers must develop the pedagogical and technological skills necessary to facilitate these experiences. The CoI framework provides a strong theoretical basis for this transformation, emphasizing the need for enhanced social, cognitive, and teaching presence in e-learning. The LOL Educator course must equip faculty with the competencies to create interactive, technology-enhanced, and experiential learning environments. By incorporating social constructivist principles, technology mastery, and multimedia learning strategies, postgraduate medical education can maximize the impact of e-learning and improve trainee engagement, knowledge retention, and clinical skill development.

Section 2C
Support Need

Results

Focus Group Interviews of Trainees

Social Presence

Data privacy, security, and copyright Protection

Trainees and faculty members expressed concerns about patient confidentiality, data protection, and intellectual property rights in virtual learning environments. Many worried about how real patient cases, clinical images, and educational materials were shared and stored online. Specialties like radiology and pathology, which rely heavily on medical imaging and case discussions, were particularly concerned about secure access control and anonymization tools to prevent unauthorized data exposure. Additionally, trainees and faculty raised copyright concerns regarding recorded lectures and shared slides, fearing that materials could be redistributed, modified, or used without consent, discouraging faculty from sharing high-quality content.

“我們需要明確的規範，知道什麼資料可以分享，什麼不能分享，確保符合醫療保密標準。”

(We need clear guidelines on what can and cannot be shared to ensure compliance with medical confidentiality standards.) (Interview 2, Trainee 6)

Clear guidelines on data protection and professional conduct

Trainees highlighted a lack of clear institutional policies on data security, online professionalism, and best practices for virtual learning environments. Many were uncertain about what could be shared, how to communicate respectfully, and what behaviours might be considered unprofessional in a virtual setting. They sought explicit guidelines on the acceptable use of patient information, ethical engagement in online discussions, and professional conduct when expressing clinical opinions in digital forums.

“有時候討論病人病例，但如果沒有限制，可能會涉及不適當的信息分享。”
(Sometimes, we discuss patient cases, but without clear restrictions, there could be inappropriate information sharing.) (Interview 5, Trainee 7)

Ethical Concerns Regarding Patient Data

Specialties like radiology and pathology rely heavily on clinical images and diagnostic reports, making patient data security a top concern. Trainees requested encrypted access controls and anonymization tools to prevent data misuse while still allowing for effective case-based learning.

“對於我們這些需要用病理或放射影像學習的專業，確保數據安全是最基本的要求。”
(For those of us in specialties like pathology or radiology, ensuring data security is a fundamental requirement.) (Interview 6, Trainee 5)

Cognitive/Teaching Presence

Multi-Device Access Compatibility

Trainees experienced technical difficulties when accessing LMS content on different devices, particularly mobile phones and tablets. Many reported that certain features, such as interactive quizzes, videos, or discussion forums, did not function properly on mobile interfaces, limiting their ability to study on the go. Given their busy clinical schedules, trainees emphasized the importance of seamless multi-device accessibility, ensuring that LMS materials work consistently across desktops, tablets, and smartphones.

“LMS 在手機上不好操作，某些功能會出錯，但我們經常需要在移動中學習。”
(*The LMS is difficult to use on mobile, and some features don't work properly, but we often need to study while on the move.*) (Interview 3, Trainee 7)

24/7 IT Support

Since many trainees study outside regular working hours, they often encountered technical issues, such as login failures, access problems, or system crashes, without available IT assistance. Trainees emphasized the need for round-the-clock IT support to help troubleshoot urgent technical problems, ensuring uninterrupted access to learning materials. They suggested at least partial after-hours support or automated self-help tools to address common LMS-related issues.

“我們經常在非工作時間學習，但 IT 支援只在上班時間可用，遇到技術問題時很難得到即時幫助。”

(*We often study outside of regular working hours, but IT support is only available during office hours, making it difficult to get immediate help with technical issues.*) (Interview 2, Trainee 8)

Regular Content Updates & Verification

Trainees expressed concerns about outdated online learning materials, noting that some content had not been updated to reflect the latest clinical guidelines. They highlighted the lack of a structured content review process, which led to inconsistencies across different modules and uncertainty about whether they were learning the most current practices. Without regular content verification and updates, trainees feared they might be studying obsolete or conflicting information, which could negatively impact their clinical decision-making.

To address this, trainees suggested that dedicated administrative resources be allocated to systematically review and update learning materials. They emphasized the need for a formalized review cycle to ensure content remains accurate, consistent, and aligned with evolving medical standards.

“有些線上課程內容明顯過時了，但我們不知道什麼時候會更新，這樣學起來沒有保障。”

(*Some online course content is clearly outdated, but we don't know when it will be updated, which makes learning unreliable.*) (Interview 2, Trainee 5)

Need for LMS Technical Support and Troubleshooting

Both trainees and trainers emphasized the need for reliable technical support to resolve LMS-related issues and ensure seamless teaching and learning experiences. Trainers noted that technical disruptions during online teaching could significantly hinder engagement, while trainees requested quick troubleshooting assistance to prevent delays in accessing materials, completing assessments, or participating in discussions.

“當 LMS 出現技術問題時，我們需要快速獲得支持，否則會影響學習進度。”

(When the LMS encounters technical issues, we need quick support; otherwise, it disrupts the learning process.) (Interview 2, Trainee 6)

Administrative Assistance in Course Development and Content Management

Trainers struggled with the administrative workload associated with developing e-learning content and managing online courses. They requested dedicated support staff to help with course structuring, content updates, and assessment management, allowing them to focus on teaching rather than logistical challenges.

“開發線上課程的行政工作太多，導師需要專門的支持來處理內容管理，否則會影響教學投入。”

(The administrative work for developing online courses is overwhelming. Trainers need dedicated support to handle content management so they can focus on teaching.) (Interview 3, Trainer 2)

Simplified LMS Interface and Onboarding Support

New users, particularly trainees who had just started using the LMS, found it difficult to navigate, highlighting the need for a simplified interface and structured onboarding process. Trainees suggested an introductory training module to help them familiarize themselves with key LMS functions, reducing frustration and improving early adoption.

“剛開始使用 LMS 的時候很難上手，如果有簡單的入門培訓，會幫助新學員更快適應。”

(When first using the LMS, it was difficult to navigate. A simple onboarding training would help new users adapt more quickly.) (Interview 1, Trainee 4)

Integration of Administrative Processes to Reduce Paperwork

Trainees and trainers supported using the LMS to streamline documentation, logbooks, and assessments, reducing administrative burdens and improving tracking of progress. They suggested that digital logbooks, automated reporting, and integrated assessment tools would enhance efficiency and reduce reliance on manual paperwork.

“如果 LMS 可以幫助簡化文書工作，例如數字化評估和自動記錄學習進度，那會提高效率。”

(If the LMS could help simplify paperwork, such as digital assessments and automated tracking of learning progress, it would improve efficiency.) (Interview 4, Trainee 5)

Integration with Existing College Logbooks

Several trainees noted that their Colleges already used separate systems for logging clinical cases and training activities. They recommended that the LMS connect with these existing logbook systems rather than duplicating efforts, ensuring a more seamless and centralized approach to tracking trainee progress.

“我們的學院已經有病例記錄系統，LMS 應該與這些系統整合，而不是再建一個重複的系統。”

(Our College already has a logbook system. The LMS should integrate with these rather than creating another redundant system.) (Interview 6, Trainee 2)

Focus Group Interviews of Trainers

Social Presence

Privacy and Professionalism in Online Interactions

Trainers were concerned about professionalism in online discussions, particularly regarding how they provided feedback and discussed sensitive cases in a digital setting. They wanted clear guidelines on professional online conduct and privacy controls to limit access to faculty-only discussions.

“線上討論和面對面交流不同，導師需要知道如何適當地提供反饋，同時確保隱私。”
(Online discussions are different from face-to-face interactions. Trainers need to know how to provide appropriate feedback while maintaining privacy.) (Interview 2, Trainer 3)

Cognitive/Teaching Presence

Dedicated Technical Support for Online Discussions and Live Teaching

Trainers needed real-time IT support to ensure smooth facilitation of synchronous online discussions and live teaching sessions. They reported difficulties with managing discussions, troubleshooting technical glitches, and ensuring smooth multimedia integration.

“線上教學時，技術問題讓我們難以專注於教學，需要專門的 IT 支持。”
(Technical issues during online teaching make it hard for us to focus on instruction. We need dedicated IT support.) (Interview 3, Trainer 1)

Assistance in Structuring Course Content and Online Assessments

Trainers found it difficult to structure online course content and requested administrative support for curriculum design, assessment alignment, and learning analytics interpretation. They noted that understanding how trainees engage with online content would help them refine their teaching approach.

“我們需要幫助來組織 LMS 課程，確保學習目標和評估方法一致。”
(We need assistance in structuring LMS courses to ensure alignment between learning objectives and assessments.) (Interview 2, Trainer 3)

Support for Integrating Existing External Resources

Trainers questioned whether the Academy should develop custom LMS materials or integrate with existing educational resources (e.g., specialty guidelines, UpToDate, and clinical databases). They suggested that administrative assistance be provided to streamline integration with external resources rather than duplicating content.

“我們的課程應該與現有的臨床資料庫連結，而不是重新建立內容。”
(Our courses should link to existing clinical databases rather than creating redundant content.) (Interview 4, Trainer 2)

Administrative Assistance for Course Development and Content Management

Trainers found e-learning content development time-consuming and requested administrative support for tasks like uploading materials, managing course structures, and verifying content updates.

“開發線上課程的工作量很大，需要有專門的團隊來處理內容管理。”

(Developing online courses is a heavy workload. We need a dedicated team to manage content administration.) (Interview 1, Trainer 1)

Concerns About Faculty Workload and Incentives for Online Teaching

Trainers raised concerns about the additional workload of preparing digital learning materials and moderating online discussions. Some suggested that formal recognition, workload adjustments, or incentives could help sustain faculty engagement.

“如果沒有額外的支持或獎勵，導師可能會不願意投入更多時間到線上教學。”

(Without additional support or incentives, faculty may be reluctant to invest more time in online teaching.) (Interview 2, Trainer 3)

Technical Support for Managing Assessments and Logbooks

Trainers noted that many Colleges already had separate digital logbooks and assessment platforms. They requested technical support for integrating LMS functionalities with existing College assessment systems to prevent redundant administrative work.

“如果 LMS 能與現有的學院記錄系統整合，會減少導師的額外工作。”

(If the LMS could integrate with existing College record systems, it would reduce extra work for faculty.) (Interview 4, Trainer 2)

Focus Group Interviews of Administrators

Onboarding and LMS Training for Administrative Staff

Administrators highlighted that they required structured training programs to familiarize themselves with the LMS. Many found the platform difficult to navigate, especially in managing enrolments, uploading course materials, and handling assessments. They requested hands-on tutorials, video guides, and structured workshops tailored to their administrative roles.

“我們需要 LMS 使用培訓，特別是在註冊管理和內容上傳方面。”

(We need LMS training, especially on managing enrolments and uploading content.) (Interview 1, Administrator 3)

Some administrators noted that each college had different administrative workflows, making it difficult to apply standardized training. They suggested that training should be flexible and adaptable to individual college processes.

“每個學院的行政流程不同，因此培訓應該能夠適應不同需求。”

(Each college has different administrative workflows, so training should be adaptable to specific needs.) (Interview 2, Administrator 5)

Technical Support for System Issues

Administrators expressed concerns about the availability of IT support, particularly for resolving system issues that occur outside regular working hours. Many colleges had limited in-house IT support and relied heavily on external help when dealing with LMS-related technical problems. They also emphasized that while some administrative staff were tech-

savvy, others lacked the technical skills to troubleshoot LMS-related problems. This created bottlenecks in handling routine administrative tasks, such as resetting passwords or troubleshooting login issues.

“我們的 IT 支援有限，如果 LMS 出問題，往往需要等待很長時間才能解決。”
(*Our IT support is limited, and if there is an LMS issue, we often have to wait a long time for a resolution.*) (Interview 1, Administrator 2)

Administrative Assistance in LMS Course Management

Many administrators found that managing LMS courses added significant workload to their existing responsibilities. They were responsible for tasks such as uploading content, handling enrolments, scheduling assessments, and managing discussion forums, all of which required additional time and effort. Some suggested that dedicated LMS support staff be assigned to assist with administrative tasks, particularly during peak training periods when course enrolments and updates were most demanding.

“LMS 的管理工作額外增加了行政人員的負擔，讓我們很難兼顧其他職責。”
(*Managing the LMS adds extra workload for administrative staff, making it difficult to balance other responsibilities.*) (Interview 1, Administrator 6)

Integration with Existing College Systems

Administrators were concerned about whether the LMS would integrate with existing college systems, including e-portfolios, logbooks, and databases for tracking training progress. Many colleges already used separate platforms, and duplicating these functions within the LMS could lead to inefficiencies. Additionally, they emphasized that some colleges had long-standing systems for documenting clinical training and case logs. Any transition to a new LMS needed to be seamless to avoid disruptions in record-keeping.

“我們的學院已經有自己的記錄系統，LMS 應該與它們整合，而不是創建重複的系統。”
(*Our college already has its own record-keeping system. The LMS should integrate with it rather than duplicating efforts.*) (Interview 1, Administrator 1)

Workload Concerns and Need for Additional Administrative Support

Administrators reported that implementing and maintaining the LMS required more administrative effort than initially anticipated. Many felt that their current workload did not allow sufficient time to manage LMS-related tasks effectively. Some suggested that additional administrative support staff be hired or reallocated to assist with LMS implementation, especially in the initial phases when new processes were still being established.

“我們的工作已經很繁忙，如果還要處理 LMS 相關事務，會超出我們的能力範圍。”
(*Our workload is already heavy, and adding LMS-related tasks makes it difficult to manage everything effectively.*) (Interview 1, Administrator 5)

Data Security and Confidentiality Concerns

Administrators expressed significant concerns regarding data security and confidentiality when using an LMS, particularly with patient information and faculty privacy. They pointed out that these issues had not been adequately addressed in previous discussions and emphasized the need for clear security protocols and transparency on cloud storage and data protection.

Additionally, administrators highlighted that both patient data and faculty members' own personal privacy were areas of concern, requiring stringent security measures.

“呢啲咁嘅 system，最 concern 梗係個 data security，基本上好似從來都有 address 過，開咗咁多次會都未聽過。”

(The most concerning issue with this system is data security. It seems like this has never been properly addressed, despite many meetings.) (Interview 1, Administrator 7)

Communication and Notifications for Administrators

Administrators noted challenges in communication between trainers, trainees, and administrative staff when using digital platforms. They emphasized the need for integrated messaging tools, automated notifications, and a structured way to manage discussions within the LMS. They also discussed the importance of having multiple communication channels within the LMS, beyond just email or WhatsApp, to facilitate structured interactions, automated reminders, and discussion boards. Administrators suggested that an LMS-integrated messaging and announcement system would help streamline communication across different colleges and facilitate information-sharing.

“如果學院 develop 呢個 LMS，應該確保 communication 功能完善，例如 email、discussion forum 等。”

(If the Academy develops this LMS, it should ensure that communication features are well-designed, including email and discussion forums.) (Interview 2, Moderator)

Discussion

The needs analysis revealed a broad range of support requirements for implementing an effective Learning Management System (LMS) at the Academy. These needs are diverse and involve multiple stakeholders, including administrative staff, IT personnel, faculty, and trainees. Addressing these needs requires a structured approach in three key areas: policy and guidelines, technical infrastructure, and administrative support.

Policy and Guidelines:

Establishing a Secure and Professional Virtual Learning Environment

Both trainees and administrators emphasized the importance of data security, copyright protection, and online professionalism. Concerns were raised about the handling of patient data and clinical images, particularly in specialties such as radiology and pathology, which rely on sensitive medical imaging. Administrators expressed the need for stronger security measures, including encrypted access controls and anonymization tools to prevent privacy breaches.

Another key concern was intellectual property protection. Faculty members were hesitant to upload teaching materials due to the risk of unauthorized redistribution or modification, while administrators noted that clear policies on copyright and content ownership were needed to encourage faculty participation. Additionally, administrators stressed the need for guidelines on professional conduct in online discussions, as improper communication or sharing of sensitive cases could lead to unintended ethical and legal issues.

To address these challenges, ILCM will formally incorporate copyright and IT security training into the LOL Educator Course, ensuring faculty understand best practices for content protection and compliance. Additionally, ILCM may need to liaise with the Professionalism and Ethics Committee to assess whether formalized guidelines on online professionalism, patient confidentiality, and ethical digital engagement are necessary. Administrators also emphasized the importance of integrated communication tools within the LMS, such as discussion boards and messaging systems, to facilitate structured professional interactions and prevent the misuse of informal communication channels. These will be included in the specifications of the LMS.

Technical Infrastructure: Ensuring Reliability and Accessibility

Trainees and administrators raised technical concerns about system reliability, mobile accessibility, and IT support availability. Many trainees rely on mobile devices to access course materials between clinical duties, yet some LMS features, such as interactive quizzes, discussion forums, and multimedia content, were not fully optimized for smaller screens. Ensuring seamless multi-device compatibility is crucial for supporting flexible learning.

Administrators further emphasized concerns about data security and cloud storage. While the LMS relies on cloud-based infrastructure, there were uncertainties regarding where data would be stored and how security risks would be managed. Given the sensitivity of clinical and personal data, robust data protection policies and compliance measures are necessary to address security concerns.

A major technical challenge identified was IT support availability. Many trainees and administrators work beyond regular office hours, and login failures, system crashes, or content access issues can significantly disrupt learning and workflow. While the Academy has employed additional IT personnel to support LMS implementation, current staffing may not be sufficient to provide 24/7 support.

To address these technical issues, the Academy will prioritize mobile optimization to ensure full functionality across devices, enabling a consistent and seamless learning experience. The institution will review data security protocols and provide greater transparency on cloud storage policies to alleviate administrator concerns. IT support staffing will be evaluated to determine whether existing resources are sufficient, with potential solutions including automated troubleshooting tools, extended support hours, or outsourced technical assistance during peak usage times.

Administrative Support: Reducing Faculty and Trainee Workload

Administrative staff play a critical role in ensuring the smooth operation of the LMS, yet the needs analysis revealed significant gaps in training, workload management, and system integration.

Many administrators reported difficulty navigating the LMS, particularly in course setup, enrolment management, and assessment coordination. They highlighted the need for structured onboarding programs, including hands-on tutorials, workshops, and video guides, to help them manage LMS-related tasks efficiently.

LMS-related tasks have also added to the already high workload of administrators, requiring them to manually upload materials, track enrolments, and manage assessments. Additionally,

concerns were raised about outdated content, as no structured content review process was in place. Regular verification of learning materials is necessary to ensure alignment with the latest clinical guidelines.

Administrators also expressed concerns about whether the new LMS would integrate with existing college logbooks, assessment platforms, and record-keeping systems. Many colleges already use separate platforms for tracking trainee progress, and duplicating these efforts within the LMS would create inefficiencies. Seamless integration would enhance efficiency, minimize redundancies, and improve data consistency.

To strengthen administrative support, the Academy's LMS project team will conduct structured training for administrative and secretarial staff to enhance their LMS management skills, particularly in content updates, enrolment tracking, and assessment coordination. A content review framework will be introduced to ensure that learning materials remain current and that outdated content is systematically replaced. Efforts will also be made to integrate LMS functionalities with existing College logbooks and assessment platforms, streamlining workflow and reducing duplication of administrative work.

Conclusion

The implementation of the LMS must address diverse needs across multiple stakeholders, including trainees, trainers, administrators, and IT personnel. The findings highlight that policy development, technical infrastructure, and administrative support must be simultaneously strengthened to ensure an effective system rollout.

Key priorities include establishing security, copyright, and professionalism guidelines in collaboration with the Professionalism and Ethics Committee to protect patient data and ensure ethical online engagement. The Academy will enhance LMS technical infrastructure to improve mobile compatibility, data security, and IT support availability, ensuring accessibility for all users. Administrative training and support structures will be introduced to reduce workload pressures and enhance LMS management, with an emphasis on system integration and content maintenance.

By aligning these efforts with institutional priorities, the Academy can build a sustainable LMS that meets the evolving needs of postgraduate medical education, ensuring a secure, efficient, and user-friendly virtual learning environment.

Reference

1. AMEE Technology Enhanced Learning Committee. Technology Enhanced Learning: Guidance for Medical Educators. *Med Teach*. 2021;43(5):543-556.
2. ACGME. The Role of Digital Learning in Graduate Medical Education. *J Grad Med Educ*. 2020;12(3):345-350.
3. So HY, Li PKT, Lai PBS, et al. Hong Kong Academy of Medicine Position Paper on Postgraduate Medical Education. *Hong Kong Med J*. 2023;29:448-52
4. Garrison DR. *E-learning in the 21st century: A framework for research and practice*. Routledge; 2016.
5. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77-101.
6. Sweller J. Cognitive load during problem-solving: Effects on learning. *Cogn Sci*. 1988;12(2):257-85.
7. Mayer RE. Applying the science of learning: Evidence-based principles for the design of multimedia instruction. *Am Psychol*. 2008;63(8):760-69.
8. Cook DA, Levinson AJ, Garside S. Internet-based learning in the health professions: A meta-analysis. *JAMA*. 2010;300(10):1181-96.
9. Ifenthaler D, Widanapathirana C, Scheiter K, et al. Learning analytics: Supporting the use of learning strategies. *Comput Hum Behav*. 2016;66:156-65.
10. Knowles M. The adult learner: A neglected species. Gulf Publishing; 1984.
11. Merriam SB. Andragogy and self-directed learning: Pillars of adult learning theory. *New Dir Adult Contin Educ*. 2001;89:3-13.
12. Kolb DA. *Experiential learning: Experience as the source of learning and development*. Prentice Hall; 1984.
13. Garrison DR, Cleveland-Innes M. Facilitating cognitive presence in online learning: Interaction is not enough. *Am J Distance Educ*. 2005;19(3):133-48.
14. Hmelo-Silver CE. Problem-based learning: What and how do students learn? *Educ Psychol Rev*. 2004;16(3):235-66.
15. Yardley S, Teunissen PW, Dornan T. Experiential learning: Transforming theory into practice. *Med Teach*. 2012;34(2):161-4.
16. Steinert Y, Mann K, Centeno A, et al. A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education. *Med Teach*. 2006;28(6):497-526.

Chapter 3

Documentation of Processes, Decisions, and Final Product

Introduction

A structured and well-documented approach is essential for the successful implementation of a Learning Management System (LMS) at the Academy. This section provides a comprehensive account of the processes, decisions, and final outcomes related to the selection, configuration, and development of training initiatives supporting the LMS rollout. By systematically recording these steps, the evaluation ensures transparency, facilitates future refinements, and provides a reference for similar projects within the Academy or other institutions.

This section is divided into three parts. The first part details the process of **LMS selection and configuration**, outlining the criteria used in evaluating available platforms, key decisions made during system customization, and the alignment of technical specifications with user needs. The second part focuses on the **design and development of the LOL Educator Course**, which serves as a faculty development initiative aimed at equipping trainers with essential competencies for integrating the LMS into postgraduate medical education. The final part documents the **training of administrative staff** from the 15 Colleges, highlighting efforts to ensure they are equipped to support LMS-related functions, including content management, user support, and assessment administration.

Through this structured documentation, the Academy aims to capture key lessons learned, provide a foundation for continuous improvement, and enhance the long-term sustainability of the LMS implementation.

Section 3A
**Learning Management System Selection, Vetting, &
Configuration**

Initial Demonstrations and Needs Analysis

Under the oversight of the eHKAM LMS Taskforce (“Taskforce”), the LMS project team initiated the LMS selection process by organizing demonstrations from several leading suppliers, including Blackboard, Brightspace, Canvas, Cyberwisdom, Google Workspace for Education, and Moodle. These vendors were identified through an extensive search and evaluation of available options in the market.

The demonstration sessions provided a comprehensive overview of each platform’s features and functionalities, enabling members of the Taskforce to gain a clear understanding of the capabilities and suitability of the different systems. These sessions marked the first step in a structured and thorough evaluation process to identify the most appropriate LMS for the Academy’s needs.

Following the demonstrations, a detailed needs analysis (see Chapter 2) was conducted to gather input from trainers, trainees, and administrative staff. Data were gathered through online surveys and focus groups, enabling a broad and inclusive perspective. The feedback was systematically analysed using the template analysis method to consolidate and prioritise user requirements.

In parallel, the IT team developed a set of technical requirements, focusing on critical areas such as information security, hardware and software compatibility, and system maintenance. By combining these technical insights with the user feedback, project team established a robust foundation for the subsequent stages of the LMS selection process. This dual approach ensured that both user needs and technical considerations were thoroughly addressed, paving the way for an informed and strategic decision.

Shortlisting and Second Round of Demonstrations

Following the initial demonstrations and a comprehensive analysis of both user and technical requirements, the Taskforce narrowed down the selection to four LMS products for further evaluation: Blackboard, Brightspace, Canvas, and Moodle. These platforms were chosen because their demonstrated capabilities aligned closely with the identified user needs and technical requirements.

The shortlisted vendors were invited to deliver in-depth demonstrations, enabling the Taskforce to assess each platform more closely against the identified specific requirements from users. After the second round of demonstrations, the Taskforce engaged in detailed deliberations and conducted a vote to refine the selection further. As a result, Canvas and Moodle emerged as the top two candidates, advancing to the next stage for user evaluation.

The Tendering Process

The Taskforce proceeded to the tendering phase by sending invitations to the two shortlisted vendors, Instructure (Canvas) and Master Concept (Moodle), requesting them to submit detailed technical and fee proposals for their respective LMS platforms.

The tender process required vendors to submit their proposals in two distinct parts: technical and fee. The technical proposals were weighted at 70% of the overall score, while the fee proposals contributed to the remaining 30%.

As part of the technical assessment, the vendors provided demo sites for Canvas and Moodle, enabling trainers, trainees, and administrative staff from the Colleges and Academy to evaluate the platforms. Users performed a series of e-Learning tasks, such as uploading learning materials, creating online quizzes, viewing grade reports, and grading assignments. To support the evaluation, vendors also provided demonstrations and user guides. After testing the platforms, trial users submitted their feedback and ratings, which were incorporated into the technical assessment scores.

Additionally, tender panel members independently assessed the technical proposals and conducted tender interviews to further evaluate the vendors' platforms and clarify their capabilities. The panel members' ratings, combined with the user ratings, were used to calculate the technical assessment scores, which accounted for 70% of the total score.

For the fee assessment, the proposals were evaluated based on costs related to system setup, functionalities, user licenses, and maintenance over a three-year period. Following clarifications with the vendors, the final scores were determined. Canvas scored 69.92 (technical) and 30 (fee), while Moodle scored 70 (technical) and 28.36 (fee). With an overall score of 99.92 for Canvas and 98.36 for Moodle, Canvas was recommended by the tender panel due to its higher score. This recommendation was subsequently approved by the Council of the Hong Kong Academy of Medicine in April 2022, marking the conclusion of the tendering process.

Service Agreement

The Academy has entered into a service agreement for 8,000-user licenses, valid for a period of five years, with an option to exit after the third year. This decision was made to strike a balance between the anticipated number of users and ensuring sufficient account availability for potential users. The agreement offers flexibility and scalability to accommodate future growth, while also allowing the Academy to reassess its needs after three years if required. This approach ensures the Academy can adapt to changing demands while maintaining cost-effectiveness and operational efficiency.

Implementation and Customization of eHKAM LMS

Following the decision to adopt Canvas LMS, a series of customization and configuration efforts were undertaken to ensure the system aligns with the Academy's organizational needs and enhances the user experience for teaching, learning, and administrative purposes.

The LMS is named eHKAM LMS and a custom URL (<https://lms.hkam.org.hk>) was established for the eHKAM LMS, providing a branded and easily accessible entry point for users while reinforcing the Academy's identity within the platform.

To facilitate a smooth transition, three dedicated online training sessions were organized exclusively for the Academy and Colleges' users, ensuring focused and relevant training tailored to their schedules. During these sessions, Instructure instructors demonstrated essential skills for navigating and utilizing the system effectively for online teaching and course administration. They also addressed questions and concerns raised by participants, ensuring a comprehensive understanding of the platform.

In addition to live training, self-learning resources—including training recordings and online courses—were made available to users for independent learning and revisiting key functions. A sandbox course was also created, allowing interested users to explore and experiment with the platform's features from a teacher's perspective.

The LMS log-in page was customized to reflect the Academy's branding, incorporating the organization's logo, theme, and background images. To accommodate the two distinct log-in processes based on user account categories, a dedicated webpage was created to guide users to the appropriate log-in method. This webpage also serves as a central hub, providing updates on the latest learning resources within the system and offering easy access to user support information for added convenience.

Canvas Catalog, an online platform designed to streamline course administration—including course enrolment and certificate issuance—was also customized. A custom URL and a web theme consistent with the Academy's branding were implemented to ensure a cohesive user experience.

To further enhance usability, dedicated homepages and administrative accounts were created for each of the 15 Colleges. These homepages were customized with individual themes, colours, and logos, while administrative accounts and permissions were configured based on information provided by the Colleges. This ensures that each College has the necessary access and control over their respective sections of the LMS.

To support users in navigating the system and resolving technical issues, the Help menu was customized to include links to user guide resources and an online form for reporting technical problems. This ensures users have easy access to the support they need, fostering a seamless and efficient experience with the Canvas LMS.

User Account Registration

The eHKAM LMS mainly provides three types of user account namely eHKAM account, trainee and temporary account.

- **eHKAM accounts** were first established in 2022 for Academy fellows to use the online services within the eHKAM platform. A self-registration process was set up for fellows and CSR to apply their accounts for using the eHKAM platform including the LMS. Since the Q4 of 2024, eHKAM account has been extended to the use by specialist trainees for Academy to provide more supports to them.

- **Trainee account** tailors for College’s specialist trainees for using the LMS. Trainee accounts are created on request by Colleges with their submission of required information.

Temporary account facilitates users with the need of accessing the LMS temporarily mainly for the purpose of studying the course material due to taking of training courses by the users who fall into the above user categories.

Integrations

To enhance user experience and ensure seamless connectivity between the LMS and the broader eHKAM ecosystem, single sign-on (SSO) was implemented in 2022. This integration allows eHKAM account users to log in once and navigate effortlessly between the LMS, eHKAM, and its associated online platforms without the need for multiple logins.

It is important to clarify that the LMS is one key component of the eHKAM ecosystem, which also includes other platforms such as iCMECPD. Before the launch of the LMS, iCMECPD served as the primary platform for fellows to earn CMECPD points by completing online quizzes. With the transition of CMECPD quizzes to the LMS—leveraging its advanced quiz features—a seamless integration was established between the LMS and iCMECPD. This integration enables fellows to query and view the CMECPD points they have earned by completing quizzes on the LMS.

Furthermore, through the integrations across the eHKAM ecosystem, CMECPD points are also accessible via the eHKAM portal and mobile app, allowing fellows to conveniently track and monitor their progress. This interconnected approach ensures a cohesive and user-friendly experience across all platforms under the eHKAM umbrella.

Section 3B
**Design & Development of the
Learning On-Line (LOL) Educator Course**

Introduction & Rationale

The LOL Educator Course was designed using Backward Design Theory, ensuring that learning objectives drove the assessment strategy, instructional approach, and content development¹. The course was developed in response to challenges identified in the needs analysis outlined in Chapter 2, which highlighted several key issues in postgraduate medical education's e-learning environment. Trainees reported limited interactivity, passive engagement, and cognitive overload, while trainers faced difficulties in adapting to online teaching, managing workload, and effectively using educational technology². Furthermore, the dominance of a content-driven, instructor-centred approach did not align with the learner-centred, interactive methods preferred by trainees³.

Design of the LOL Educator Course

To bridge these gaps, the LOL Educator Course was structured to ensure faculty can acquire knowledge, apply it through experiential learning, and reflect on their learning process⁴. The instructional approach was guided by Backward Design Theory, ensuring alignment between learning objectives, instructional strategies, and assessment¹. Adult Learning Theory, following Malcolm Knowles' principles of self-directed, problem-based learning, emphasized relevance and active participation⁵. Experiential Learning Theory incorporated two experiential learning cycles, allowing faculty to first engage as learners, then as teachers designing and implementing an online course⁶. This design ensures that faculty develop technical proficiency, pedagogical expertise, and reflective teaching skills, enabling them to create structured, engaging, and learner-driven online learning environments.

Learning Objectives

The LOL Educator Course aims to prepare faculty to integrate e-learning into postgraduate medical education by mastering essential knowledge, applying it in authentic learning contexts, and reflecting on their experiences. By the end of the course, faculty will be able to navigate and manage courses within the Academy's LMS (Canvas), including content organization, discussion facilitation, and learner engagement. They will demonstrate understanding of the Cognitive Theory of Multimedia Learning (CTML) principles by applying them in presentation slide design⁷. Faculty will apply the Community of Inquiry (CoI) framework and educational technology, including Canvas, Edpuzzle, Mentimeter, and Miro, to design and implement a short online course⁸. They will ensure compliance with data security, copyright, and online professionalism guidelines when sharing content and discussing clinical cases online. Finally, they will engage in reflective practice, evaluating their course design based on the CoI Model and the integration of technology tools they learned in the course⁸. These objectives ensure that faculty develop both theoretical knowledge and practical teaching competencies, aligning with the Academy's strategic goal of enhancing faculty readiness for e-learning.

Assessment Strategy

Following Backward Design Theory, assessment was determined before designing instructional activities, ensuring alignment between learning outcomes and learning methods¹. The LOL Educator Course uses formative assessment only, focusing on knowledge acquisition, application, and reflective learning. Knowledge acquisition is assessed through MCQs

embedded in instructional videos, which evaluate faculty understanding of key concepts before engaging in experiential learning⁷.

Application is facilitated through two experiential learning cycles. In the first experiential learning cycle, faculty engage as learners in Module 2 by applying CTML principles to design slides and reflect on their learning process as students⁷. In the second experiential learning cycle in Module 10, faculty take on the role of teachers by applying the CoI framework and educational technology, including Canvas, Edpuzzle, Mentimeter, and Miro, to design, develop, and implement a short online course⁸.

Reflection on application occurs in two stages. The first is in Module 2, where faculty evaluate their experience as learners when designing slides using CTML principles. The second is in Module 10, where they reflect on their role as teachers, focusing on the application of the CoI framework and technology in course design and implementation⁸. This assessment approach ensures that faculty progress from knowledge mastery to application, culminating in structured reflective practice.

Instructional Design Principles

The LOL Educator Course was structured using Adult Learning Theory and Experiential Learning Theory, ensuring that faculty learn by doing, engage in problem-solving tasks, and reflect on their experiences⁵⁶. Adult Learning Theory, based on Malcolm Knowles' model, emphasizes that learning is self-directed, meaning faculty complete interactive online videos before engaging in experiential learning. It also ensures that learning is problem-based and relevant, as faculty practice real-world teaching applications, ensuring alignment with their teaching roles⁵.

Experiential Learning Theory is implemented through two distinct experiential learning cycles. In the first experiential learning cycle in Module 2, faculty experience CTML-designed learning as students and apply CTML principles in slide design⁷. Reflection occurs in Module 2, where they analyse their experience as learners. In the second experiential learning cycle in Module 10, faculty apply the CoI framework and technology tools, including Canvas, Edpuzzle, Mentimeter, and Miro, to design, develop, and implement an online course⁸. Reflection occurs in Module 10, focusing on their experience as teachers⁸. This progressive experiential learning approach ensures that faculty first experience e-learning from the learner's perspective before applying their knowledge in a teaching context, reinforcing deep learning⁶.

Course Structure and Content (Appendix 3-1)

The LOL Educator Course follows a blended learning model, integrating self-paced learning, interactive live sessions, and experiential application². Pre-course preparation occurs one week before the course start, during which faculty complete eight instructional videos covering LMS navigation, instructional design, multimedia learning, and digital assessment strategies². These videos provide foundational knowledge, allowing faculty to familiarize themselves with key concepts before engaging in discussions and exercises.

On Day 1, faculty participate in an online workshop that focuses on deepening their understanding of theories and technology through exercises and group discussions. Since participants have already been introduced to CTML, CoI, and various educational technologies through the interactive videos, the workshop is structured to reinforce their learning through application-based activities. Group discussions and exercises help them critically engage with

theoretical models, while practical demonstrations enhance their confidence in using tools such as Canvas, Edpuzzle, Mentimeter, and Miro. The goal of this session is not content delivery but active engagement, ensuring that faculty are prepared for the experiential learning cycles that follow.

From Day 2 to Day 10, faculty engage in group-based e-learning module development, where they apply the CoI framework and technology to design, develop, and implement a short online course⁸. Peer discussions and WhatsApp support groups allow faculty to exchange ideas and receive feedback. On Day 11, faculty participate in a structured reflection session, where they analyse their experience as teachers, focusing on CoI and technology application in their course design.

Development of Course Material

The development phase of the LOL Educator Course involved the careful selection of faculty members, the creation of teaching materials, and the integration of both theoretical and technological components to ensure a structured and engaging learning experience. A dedicated group of faculty members was identified to lead the course design and delivery, ensuring that participants received expert guidance in both pedagogy and e-learning technology.

Faculty Selection and Expertise

The faculty team was composed of experienced educators, many of whom were already actively engaged in teaching activities at the Hong Kong Jockey Club Innovative Learning Centre for Medicine (HKJC ILCM). These faculty members had extensive experience in faculty development, simulation-based education, and postgraduate medical education. The Course Director, Dr. So Hing Yu, led the team, which included:

- Dr. Albert Chan
- Dr. Phoon Ping Chen
- Dr. Ralph Cheung
- Prof. George Wong
- Dr. Abraham Wai
- Dr. Tanya Yau

These faculty members were actively involved in courses such as the Comprehensive Simulation Educator Course (CSEC) and the Procedural Sedation Safety Course, contributing their expertise in educational design, simulation, and faculty development. Additionally, three faculty members—Dr. So Hing Yu, Dr. Albert Chan, and Dr. Abraham Wai—held master's degrees in medical education, further strengthening the team's capacity to design and deliver a high-quality online faculty development program.

Recognizing the importance of online teaching expertise, these faculty members were also sponsored by HKJC ILCM to attend the "Teach Online: Engage with Confidence" Course organized by the Center for Medical Simulation in Boston. This experience equipped them with advanced skills in online teaching strategies, digital pedagogy, and learner engagement techniques, which were integrated into the LOL Educator Course.

To further enhance the course, additional faculty and technical support were brought in:

- Dr. Kenny Chan, a faculty member of the CSEC Course, contributed his expertise in IT security to address issues related to data protection and copyright in online learning.
- Mr. Tony Fung, the Project Manager of the eHKAM LMS Team, along with his e-learning technology team, provided technical training and support, ensuring faculty and participants could effectively use the LMS and digital learning tools.

Development of Teaching Materials

The faculty members were responsible for preparing teaching materials for both pre-course asynchronous learning and synchronous virtual teaching sessions. The content was structured to ensure alignment with the Community of Inquiry (CoI) framework, Cognitive Theory of Multimedia Learning (CTML), and principles of instructional design for e-learning. Each faculty member contributed to a specific area of expertise, ensuring comprehensive coverage of essential topics.

Pre-course instructional videos and synchronous teaching content were assigned as follows:

- Dr. So Hing Yu: CTML, Introduction to E-learning, and Cognitive Presence
- Dr. Albert Chan: Introduction to Initial Assignment and Experiential Learning
- Dr. Kenny Chan: Information Security and Copyright in Online Learning
- Dr. Phoon Ping Chen: Teaching Presence 2 – Facilitating Discourse
- Dr. Abraham Wai: Teaching Presence 1 – Design and Organization, and Teaching Presence 3 – Direct Instruction
- Prof. George Wong: Introduction to the Community of Inquiry Model and Social Presence
- Dr. Tanya Yau: Assessment for Community of Inquiry (CoI)

Integration of Pedagogy and Technology

To ensure an interactive and effective online learning experience, the faculty team incorporated a blend of asynchronous and synchronous learning strategies, leveraging multiple e-learning technologies to facilitate engagement. The teaching materials were designed to include:

- Pre-course instructional videos that introduced key concepts, allowing participants to engage with foundational knowledge before the synchronous sessions.
- Synchronous Zoom sessions that used interactive discussions and exercises to deepen understanding of theoretical models and e-learning technologies.
- Hands-on application of LMS tools, such as Canvas, Edpuzzle, Mentimeter, and Miro, to help faculty members practice and integrate digital teaching strategies.

Through this structured development process, the LOL Educator Course provided faculty participants with a comprehensive and applied learning experience, ensuring they could confidently implement technology-enhanced, interactive e-learning in postgraduate medical education.

Conclusion

By structuring the LOL Educator Course using Backward Design Theory, faculty are guided through a progressive learning experience, moving from knowledge acquisition to application and reflective practice¹. The formative assessment approach ensures that learning is self-directed, iterative, and practice-oriented, reinforcing deep learning⁵. The integration of Adult Learning Theory and Experiential Learning Theory ensures that faculty develop the necessary skills, confidence, and insights to transition from traditional content delivery to interactive, technology-enhanced teaching⁵⁶. Faculty first experience e-learning as students in Module 2 through CTML before applying their knowledge as teachers in Module 10 through CoI and technology, reinforcing their understanding through direct application⁷⁸.

References

1. Wiggins G, McTighe J. *Understanding by Design*. 2nd ed. Alexandria, VA: ASCD; 2005.
2. Garrison DR, Anderson T, Archer W. Critical inquiry in a text-based environment: Computer conferencing in higher education. *Internet and Higher Education*. 2000;2(2-3):87-105.
3. Bates AW. *Teaching in a Digital Age*. 2nd ed. BCcampus; 2019.
4. Merrill MD. *First Principles of Instruction: Identifying and Designing Effective, Efficient, and Engaging Instruction*. San Francisco: Pfeiffer; 2012.
5. Knowles MS, Holton EF, Swanson RA. *The Adult Learner*. 8th ed. Routledge; 2015.
6. Kolb DA. *Experiential Learning: Experience as the Source of Learning and Development*. 2nd ed. Pearson Education; 2015.
7. Mayer RE. *Multimedia Learning*. 3rd ed. Cambridge University Press; 2020.
8. Garrison DR. *E-Learning in the 21st Century: A Framework for Research and Practice*. 3rd ed. Routledge; 2017.

Section 3C

Training of Administrative Staff of Colleges

Dedicated Training Sessions for Administrative Staff to Master LMS Essentials

In addition to the training sessions provided by Instructure, the LMS project team organized specialized training for administrative staff from the Colleges to enhance their operational proficiency in using the LMS. These dedicated training sessions, conducted between December 2022 and May 2023, were tailored to address the specific needs of College staff.

The training content covered a wide range of essential topics, including:

- Functionalities of eHKAM ID,
- Scope of administrative roles,
- Hierarchy of College accounts,
- Configuration of course settings,
- Course enrollment,
- Management of course materials,
- Creation of CMECPD quizzes, and
- Integration with iCMECPD for updating CMECPD points.

Each session included dedicated Q&A segments, allowing College staff to seek clarification on areas of interest and address any questions related to the LMS.

These training sessions were scheduled after the creation of dedicated College accounts and administrative roles, enabling staff to immediately apply their learning by practicing on the system during or shortly after the training. To further support their learning, the LMS project team provided comprehensive user guides and video resources. Additionally, at the request of some Colleges, the training sessions were recorded, allowing staff to revisit the material as needed.

To assist Colleges in communicating the migration of CMECPD quizzes from iCMECPD to the LMS, the project team developed an introductory video, FAQs, and a user guide specifically for completing CMECPD quizzes on the LMS. These resources were shared with Colleges to facilitate effective dissemination of information to their fellows.

The training and resources were designed to empower College staff to independently create course materials and CMECPD quizzes, ensuring a smooth transition from iCMECPD to the LMS. Following the training, the project team continued to provide ongoing support through on-site demonstrations and phone assistance, helping College staff gradually build their confidence and expertise in using the system.

Chapter 4

Usability Testing

Section 4A

Learning Management System Usability Test

Testing the Usability of LMS by Users

After the system demonstration, a usability test was organized to collect user's feedback of using the two LMS, Canvas and Moodle.

LMS project team collected sample e-Learning materials from colleges and Hong Kong Jockey Club Innovative Learning Centre for Medicine (HKJC ILCM) to provide to trial users. The team also designed an evaluation workflow for guiding users the tasks for them to complete in both systems.

Specialist trainers, trainees and administrative staff from 15 colleges and HKJC ILCM were asked to complete the tasks suggested in the evaluation workflow in both LMS. Then, they submitted the ratings and feedback to online survey form based on their experiences of using the systems on the following aspects:

1. Create and upload course materials
2. Course enrolment
3. Online communication
4. Online collaboration
5. Assessment and feedback
6. Student grades or completion status
7. Reports
8. Course evaluation
9. Overall rating
10. Other comments/suggestions

A total of 25 and 26 responses were received for the evaluation of Canvas and Moodle respectively. The participants included specialist trainers, trainees and administrative staff. Below are the summarized likes and dislikes submitted by the trial users categorized by their roles.

Summary of Likes and Dislikes for Canvas:

Trainers

Likes:

- **Integration with Tools:** Trainers appreciate the seamless integration with Google Drive and Office 365, making it easy to embed multimedia.
- **Quiz System:** The quiz system is convenient, though they suggest improvements like allowing students to provide feedback or report issues with quiz questions.
- **User-Friendly Interface:** The platform is overall user-friendly, intuitive, and has a familiar interface similar to social media platforms like Facebook or Instagram.

Dislikes:

- **Lack of Templates:** Trainers find it inconvenient that Canvas does not provide templates for evaluation forms.

- **Difficulty in Finding Solutions:** Some trainers struggle to find solutions for specific functions, such as enrolling new students, indicating a need for better support or documentation.

Trainees

Likes:

- **Multimedia and Collaboration:** Trainees enjoy the ability to post text, videos, and real-time videos, as well as the seamless integration with Google Docs for collaborative work, including edit history.
- **Variety of Assessment Formats:** They appreciate the wide range of assessment formats (e.g., multiple choice, fill-in-the-blanks, essays) and the ability to use videos and audios as answer choices.
- **Resource Diversity:** Trainees value the platform's ability to host diverse learning resources (documents, audios, videos) and find the layout aesthetically pleasing.
- **Ease of Use:** The system is easy to navigate, with a clear format that allows trainees to quickly find what they need after a briefing.

Dislikes:

No significant dislikes were submitted by trainees.

Administrative Staff

Likes:

- **New Quiz Interface:** Administrative staff find the new quiz interface easy to use.
- **Overall Experience:** Some staff members describe their overall experience as "okay," indicating moderate satisfaction.

Dislikes:

- **Confusing Interface:** Many administrative staff find the interface cluttered and confusing, with too many buttons and unclear page functionalities.
- **Reporting Limitations:** A major pain point is the lack of a comprehensive and timely completion activity report. The current system only provides a simple grades report, and the New Analytics Function, which offers more detailed reports, is delayed by 24 hours and generates counterintuitive Excel formats.
- **Learning Curve:** The interface is perceived as complicated, requiring more time for users to learn and become familiar with the system.

Conclusion

Trainers and trainees were generally satisfied with Canvas LMS, particularly its user-friendly interface, multimedia capabilities, and integration with tools like Google Drive and Office 365. However, trainers face challenges with the lack of templates and difficulty in finding solutions for specific functions.

Administrative staff struggled with the platform's complexity, particularly the confusing interface and inadequate reporting features, which hinder their ability to generate timely and comprehensive reports.

The usability test revealed that Canvas received a slightly higher average rating score of 3.8 compared to Moodle's 3.64. These scores were subsequently incorporated as one of the evaluation criteria in the technical assessment of the tendering process.

Section 4B

Learning On-Line Educator Course Piloting

Pilot Run of the First Learning On-Line Educator Course

The first pilot run of the LOL Educator Course was conducted as an online program from December 19, 2021, to January 17, 2022. The course aimed to prepare faculty members to integrate e-learning into postgraduate medical education through interactive, technology-enhanced teaching strategies. The course was approved by the HKJC ILCM Operations Committee, and within the eHKAM LMS Taskforce, funding support was secured from the Academy Administration to support the first five courses. Participants were primarily members of the eHKAM LMS Taskforce or their nominees, ensuring that those involved in shaping the LMS were among the first to experience and provide feedback on the educator training program. All members of the eHKAM LMS Taskforce were invited to participate in the first LOL course as a pilot and evaluate the course before it was opened to all Colleges of the Academy.

The instructors for the pilot run included Dr. SO Hing Yu, Dr. CHEUNG Koon Ho Ralph, Mr. Tony FUNG, Dr. CHAN King Chung Kenny, Prof. WONG Kwok Chu George, Dr. CHAN Albert Kam Ming, Dr. YAU Wing Sze Tanya, Dr. CHEN Phoon Ping, and Dr. WAI Ka Chung Abraham.

The course was structured as follows:

1. **Pre-course preparation** (December 12, 2021): Participants received eight instructional videos covering LMS navigation, instructional design, multimedia learning, and digital assessment strategies.
2. **Day 1** (December 19, 2021): A full-day online workshop via Zoom that introduced experiential learning, the Community of Inquiry (CoI) framework, e-learning technologies, cognitive presence, and teaching presence, incorporating group exercises and discussions to deepen understanding.
3. **Day 2–10** (December 20–28, 2021): Participants engaged in group discussions and designed a short e-learning module.
4. **Day 11** (December 29, 2021): A half-day reflection session was conducted to review experiences and discuss key takeaways.
5. **Extended e-learning module production and teaching period** (December 30, 2021 – January 17, 2022): Participants were expected to apply their learning in practice.

Modifications Based on Feedback from Learners & Faculties

1. **Extended Duration:** The course was expanded to three months, allowing faculty more time to absorb content, complete assignments, and engage in experiential learning.
2. **Restructured Modules:** The pre-course phase was renamed as Modules 1-7, ensuring that all learning activities were integrated into the formal course structure. (Appendix 4-1)

3. Zoom Session for Relationship Building: A synchronous session was added at the beginning (Module 1) to facilitate interaction among participants and build a supportive learning community.
4. Slack as a Communication Tool: Slack was introduced to support ongoing discussions, share resources, and enable peer feedback.
5. Incorporation of Miro: Miro was included as a collaborative workspace to facilitate interactive course design activities.
6. Refinement of Pre-Course Videos: The pre-course materials were standardized in format to enhance clarity and ensure alignment across modules.
7. More Time for Assignments: The initial assignment was given two weeks (Module 2), and Modules 3 and 4 were also extended to two weeks each, ensuring faculty had adequate time to engage with content and complete tasks.

Chapter 5

Documentation of Key Events

Section 5A
Learning Management System (LMS)

Key Events from Subscription Year 1 to 3

Upon the 5-year contract (with opt-out after year 3) was signed, the LMS project team started to work with Instructure to set up the LMS by customizing settings and providing user training.

Below are the key events of the achievements and enhancements made to the LMS recorded from the system set-up (May 2022) to the date of this report is being drafted (March 2025).

Year 1

Contract Signing and Implementation Program Launch (May – June 2022)

- Contract signed with Instructure.
- A 6-week implementation program began, including:
 - **Weeks 1-2:** Online lecture-led training sessions, covered the topics of administering and teaching with Canvas
 - **Weeks 3-6:** Self-paced learning and system exploration, with resources like training recordings, online courses and sandbox courses provided by Instructure.

System Customization and Pilot Testing (June-July 2022)

- Instructure customized the system, including:
 - URLs, log-in page, user role permissions, college-specific sections, user support forms, and Catalog.
- Pilot user accounts were created for interested colleges and ILCM to try using the system before full launch.
- Basic functionality (e.g., user account creation, course creation, and material upload) was established by the end of July.

Year 1 Subscription Period Begins (1 August 2022)

- Year 1 subscription period officially started.

Release of User Guides and Resources (September 2022)

- LMS project team uploaded user guide and FAQs to facilitate users to operate the system
- The resources were enhanced from time to time. For example, a step-by-step video was uploaded later for guiding users how to set up various kinds of course material in the LMS.

Official LMS Launch with eHKAM Integration (6 October 2022)

- Official launch of the LMS.
- Single Sign-On (SSO) integration with the eHKAM portal was implemented.
- Since user accounts are primarily categorized into two types, eHKAM and non-eHKAM, a customized log-in page was implemented to streamline the log-in process for both user groups.

- The customized log-in page was later utilized to post updated information about newly uploaded learning resources and the ongoing development of the eHKAM platform.

Launch of Expert Witness Training Course (6 October 2022)

- The Expert Witness training course was launched on the same day as the official LMS launch.
- This marked the Academy's first online course developed specifically for delivery through the LMS.
- Instructure's Catalog system was utilized to automate the below key processes for the Expert Witness training course:
 - Participants were automatically enrolled in the next module upon completing the previous one.
 - Course certificates were issued automatically to participants upon completion.

eHKAM Logo Competition (October 2022 – January 2023)

- To promote the launch of the eHKAM platform and its online services, including the LMS, an eHKAM Logo Competition was conducted from October to December.
- The winning logo design was integrated into the platform, featuring on both the website and mobile app.

e-Learning Production Services Pricing (November 2022)

- To support college in developing e-Learning and online learning material, the Academy established e-Learning production services pricing, outlining the costs for creating various types of e-Learning content.

Migration of CMECPD Quizzes to LMS (November 2022)

- Migration of CMECPD quizzes from iCMECPD to the LMS was completed.
- User guides for completing CMECPD quizzes in the LMS and promotional leaflets about the LMS were disseminated to Colleges in November 2022 to encourage adoption and usage by fellows.

Transition Period for CMECPD Quizzes (November 2022 – June 2023)

- To accommodate users who were not yet ready to register for an LMS account but needed to do CMECPD quizzes, a transition period was set up until June 2023. During the period, CMECPD quizzes were available on both the iCMECPD platform and the LMS.
- Starting from July 2023, the LMS became the exclusive system for providing CMECPD quizzes.

Admin User Training (December 2022 – May 2023)

- Admin accounts were created for college secretariat staff, enabling them to maintain and administer their courses in the LMS.
- Training sessions were organized to demonstrate the steps and functions of the LMS, including how to set up CMECPD quizzes, to facilitate college staff in operating the LMS effectively.

Guidelines for Housekeeping of Courses (May 2023)

- To address the growing number of courses accumulating in the LMS, a Course Housekeeping Guideline was established. This guideline provides admin users with best practices for maintaining an organized and tidy course database within their colleges.

Year 2

Year 2 Subscription Started (1 August 2023)

- 3,263 user licenses were utilized during the first year of subscription.

Integration of H5P for Interactive Content Development (August 2023)

- H5P is a HTML5 format supports creation of interactive learning materials such as videos, quizzes, presentations and games etc.
- It was integrated into the LMS to enhance the system's capabilities for developing engaging and interactive e-Learning content.

Official Launch of eHKAM App (November 2023)

- eHKAM app acts as the centralised access point of Academy's membership services and news.
- This mobile application brings convenience to Fellows with several useful features including access to the LMS To-do list.

Year 3

Year 3 Subscription Started (1 August 2024)

- 4,030 user licenses were utilized during the second year of subscription.
- 24% growth compared to the first year of subscription.

Last eHKAM LMS Task Force meeting (21 October 2024)

- Established in June 2021, the eHKAM LMS Task Force played a pivotal role in the setup and implementation of the LMS.
- As the system has been smoothly and widely adopted by the Academy and colleges, the Task Force convenor, Dr. HY So, announced the dissolution of the Task Force during the 12th meeting.
- With the establishment of the Jockey Club Institute for Medical Education and Development (JCIMED), the formation of a new eLearning and Technology Subcommittee was announced to oversee several technology-related initiatives.

Launch of Introduction to eHKAM LMS (for trainers) (November 2024)

- LMS Project Team developed this online course for helping users (primarily in the teacher role) learn essential LMS operation skills, focusing on the common course material types. It features videos, interactive presentations, and quizzes to enhance engagement. CMECPD points will be awarded to eligible users who complete the course and pass the final quiz.

Evaluation of e-Learning Programme of the Academy (April 2024 – Present)

- **April – May 2024:** The evaluation proposal was drafted and shared with the eHKAM LMS Task Force members for feedback. An updated version was submitted to the Task Force in May 2024 after incorporating their comments.
- **July 2024:** With the ethical approval for the research was received, the evaluation questionnaires were distributed to course participants and LMS administrative users to collect their feedback and insights of using the LMS.
- **September – November 2024:** Interviews were conducted with course participants, administrative users, and College leads in e-Learning to gain deeper insights into the programme's effectiveness.

Section 5B

Learning On-Line Educator Course (LOL)

The Learning Online (LOL) Educator Course underwent continuous refinement through multiple iterations, informed by participant feedback, evaluation findings, and evolving educational needs. Below is a summary of the course schedule, evaluation results, and modifications implemented across LOL2 to LOL6.

LOL2 (August 20 – November 2022)

Following the pilot course (LOL1), several refinements were made to improve the structure, pacing, and participant experience. LOL2 adopted a three-month timeline to address concerns of cognitive overload and insufficient time for assignments. The course retained its blended learning approach, integrating asynchronous modules (self-paced interactive videos) with live Zoom discussions and peer collaboration activities.

Evaluation Findings

Feedback from LOL2 participants highlighted several strengths and areas for improvement:

- The extended course duration was well received, allowing participants to absorb and apply learning more effectively.
- Some participants struggled with new tools such as Miro, citing usability challenges and the need for additional support.
- There were concerns about the clarity of assignment deadlines, with some participants unsure about submission timelines.
- Interaction between faculty and participants improved, but some still felt engagement in discussion forums was inconsistent.

Changes Implemented for LOL3

- Provided clearer instructions on assignment expectations and submission deadlines.
- Strengthened technical support for tools like Miro, with additional tutorial resources.
- Maintained the three-month course structure, reinforcing the pacing strategy.
- Enhanced structured discussions in Slack and other platforms to increase faculty engagement.

LOL3 (October 15, 2022 – January 2023)

LOL3 retained the refinements made in LOL2 and focused on further improving engagement and usability. The course structure remained unchanged, but additional support mechanisms were introduced.

Evaluation Findings

- The clarity of course expectations improved, with participants reporting that the structured format was easier to follow.
- There was a stronger demand for more hands-on practice with digital teaching tools, particularly LMS functionalities and assessment strategies.
- Some participants found it difficult to keep up with online discussions, suggesting that the volume of Slack messages and assignments was overwhelming.

- Participants appreciated the interactive nature of the live sessions, though some suggested incorporating more case-based applications to strengthen relevance.

Changes Implemented for LOL4

- Increased hands-on practice for LMS tools, integrating activities that allowed participants to experiment with course design and assessment strategies.
- Stopped use of Slack, use WhatsApp as communication tool
- Refined online discussions to streamline interactions and reduce the cognitive load on participants.
- Expanded case-based learning in the course, integrating practical teaching scenarios to make learning more applicable.

LOL4 (March – June 2023)

LOL4 aimed to further enhance interactivity and balance self-paced learning with live discussions. The course format was adjusted to improve faculty-participant engagement and reduce cognitive overload during Zoom sessions.

Evaluation Findings

- The interactive nature of the course was well received, with many participants appreciating the balance between live and asynchronous learning.
- Some participants suggested that certain technology-related discussions could be moved to pre-course materials to allow more time for instructional design discussions in live sessions.
- There were requests for more detailed instructions for assignments, as some participants still found submission expectations unclear.
- A few participants noted that the Zoom day was too long, making it difficult to stay engaged throughout the session.

Changes Implemented for LOL5

- Shifted technology-focused discussions into pre-course materials, freeing up live session time for interactive discussions.
- Refined assignment instructions by including step-by-step guidance and examples.
- Restructured the Zoom session format to introduce shorter, more focused sessions over multiple days instead of a single long session.

LOL5 (August – November 2023)

LOL5 continued refining participant engagement strategies and pacing adjustments. The course integrated more case-based learning activities to enhance the practical application of online teaching concepts.

Evaluation Findings

- Participants found the structured format effective and the content highly relevant to their teaching roles.
- Some struggled with the full-day Zoom session, reinforcing the feedback from LOL4 that shorter, more focused sessions were preferable.
- There were requests for more real-world examples to illustrate course expectations, particularly in instructional design and assessment strategies.
- Some participants expressed difficulties managing Slack discussions, suggesting an alternative method for engagement.

Changes Implemented for LOL6

- Divided the Zoom sessions into multiple shorter segments, reducing cognitive fatigue.
- Added more real-world teaching examples to clarify expectations in course design.
- Explored alternative engagement methods for discussion forums to enhance usability.

LOL6 (April – July 2024)

LOL6 represented the most refined version of the course to date, incorporating key adjustments based on previous evaluations. The course structure was designed to optimize engagement, practical application, and flexibility for participants.

Evaluation Findings

- Participants appreciated the improved balance between self-paced learning and live sessions, stating that the pacing allowed for deeper engagement.
- There were requests for more opportunities to apply learning through case-based activities, reinforcing the trend from previous iterations.
- Some minor technical issues with LMS integration were reported, suggesting the need for improved troubleshooting resources.
- Faculty engagement was reported as highly effective, but some participants requested more personalized feedback on their assignments.

Changes Implemented for LOL7

- Strengthened case-based learning components to further enhance practical application.
- Refined LMS troubleshooting resources to minimize technical barriers.
- Introduced strategies for providing more individualized feedback, ensuring participants receive meaningful guidance on their work.
- The same topic was used for both Assignment 1 and the final assignment to allow participants to contrast the effects of cognitivism and social constructivism through experiential learning.

Chapter 6
**Assessment of Learner & Instructor Experience
and Satisfaction**

Section 6A

Learning On-Line Educator Course

Introduction

Assessing participant (learners and instructors) experience and satisfaction is a crucial component of evaluating the effectiveness of the **Learning On-Line (LOL) Educator Course** and the broader implementation of e-learning within the Academy. Understanding how learners and instructors perceive the course, the value and meaning they attribute to their experiences, and their engagement with the learning materials and technology provides essential feedback for refining and optimizing future iterations of e-learning initiatives.

This section of the evaluation report focuses on **subjective participant experiences**, corresponding to **Kirkpatrick Level 1 (reaction) outcomes**.¹ While objective learning outcomes are important, subjective experiences shape learner motivation, engagement, and acceptance of e-learning, all of which influence the long-term sustainability of digital learning in postgraduate medical education.

The assessment includes:

1. **Learner experience with the LOL Course**, including its structure, content, technological interface, and facilitation.
2. **Instructor experience**, with particular attention to challenges in delivering e-learning, supporting learners, and engaging with the LMS.
3. **Perceived usefulness and relevance** of the LOL Course and LMS in supporting collaborative, competency-based learning in postgraduate medical education.

Method

To capture these perspectives, a mixed-method approach using a sequential explanatory design was employed, incorporating quantitative survey data and qualitative insights from participant feedback. The findings will inform future enhancements to e-learning design, faculty development, and LMS optimization to ensure that the system not only functions technically but also supports effective and engaging medical education.

Ethical Approval

Ethical approval for the study was obtained from the **Survey and Behavioural Research Ethics Committee of The Chinese University of Hong Kong**. Participants were informed about the purpose of the study, assured of confidentiality, and provided with the option to withdraw at any time. Data were anonymized and securely stored to protect participant privacy.

Quantitative Phase

Participant recruitment:

1. **Learners:**
All learners from the 2nd to 7th Learning On-Line (LOL) courses were invited to participate via email and WhatsApp. A total of 39 learners completed the questionnaire, including 9 from LOL7 and 30 from LOL2-6. LOL7 was specifically highlighted because the evaluation was conducted during this course, allowing for pre- and post-assessments to measure acceptance as part of the outcome evaluation.
2. **Instructors:**

All instructors of the Learning On-Line Course will be invited to participate by e-mail and WhatsApp. 4 out of 9 instructors of the course completed the questionnaire.

Survey Instrument:

1. For learners, the Evaluation of Technology-Enhanced Learning Materials for Learner Perceptions (ETELM-LP) questionnaire².
2. For instructors: the Evaluation of Technology-Enhanced Learning Materials for Instructor Perceptions (ETELM-IP) questionnaire².

Data Analysis:

The mean score and coefficient of variation for each item on the questionnaire were calculated. Items with low satisfaction (scoring of 4 or below) will be identified.

Qualitative Phase

Participant recruitment:

Nine learners with the highest number of items scoring 4 or below, along with all three instructors who agreed to participate, were selected for interviews conducted via virtual meetings.

Data collection:

Semi-structured interviews were conducted using the interview guide (Appendix 6-1). All interviews were audio-recorded and transcribed verbatim using PLAUD note. The transcripts were anonymized while retaining identifiers for the respective courses in which learners and instructors participated.

Analysis

Template analysis as describe by King & Brooke³ was used for analysis.

Findings related to technological aspects were provided as feedback to the vendor, considered for potential improvement by the LMS Project Team, and used to inform contract management decisions.

Findings related to educational aspects were used to refine the Learning On-Line Educator Course.

Results

Quantitative Data

Results of the ETELM-LP questionnaire and ETELM-IP questionnaire results are listed in tables 6-1 and 6-2 respectively.

Table 6-1

Evaluation of Technology-Enhanced Learning Materials for Learner Perceptions (ETELM-LP) Questionnaire

How well do you agree with the following?	Mean (N=39)	CV %
Instructions provided a good introduction to the course (e.g. how to get started, where to find various course components, how to obtain technical support if needed, etc.)	6.154	12.36
Course objectives, expectations, and policies were clearly stated.	6.052	12.03
The course was well organized.	5.949	14.15
Course objectives were relevant to my needs	5.769	17.42
Navigation of the technology-based components of the course was logical, consistent, and efficient.	5.769	14.65
The course technologies and media supported the learning objectives.	5.897	13.68
This course did NOT require inappropriately high technology skills.	5.641	17.47
I did NOT have significant computer/technical problems during this course.	5.359	20.10
The educational activities encouraged engagement with course materials/content.	5.744	16.70
The educational activities promoted achievement of the course objectives	5.872	13.06
There was a strong instructor presence/personal touch in the course.	5.641	17.16
Educational activities encouraged interaction and collaboration with other participants. (Omit if there was not a collaborative element in the course)	6.053	12.34
Requirements for interaction and collaboration with other participants were clearly articulated. (Omit if there was not a collaborative element in the course)	5.820	14.81
The course effectively blended online and face-to-face elements. (Omit if there was not a face-to-face element in the course)	5.211	17.89
Face-to-face activities contributed meaningfully toward achieving the course learning objectives (Omit if there was not a face-to-face element in the course)	5.769	14.47
Assessments (e.g. tests and self-assessments) were appropriate for the course objectives, content, and activities. (Omit if there were no assessment opportunities in the course).	5.706	14.09
I had sufficient opportunity to assess and reflect upon my learning progress.	5.706	15.19
I received adequate feedback on my learning progress.	5.949	13.57
I had sufficient opportunity to evaluate/provide feedback on the course.	5.513	20.37
I received adequate support for any technical issues encountered during this course.	5.795	14.55
I received adequate support for any questions or concerns I had about my learning.	5.897	13.17
I did NOT encounter any culture or language-related problems.	5.845	14.76
I invested enough time and energy to meet/exceed the course expectations.	6.359	10.27
This course will change my practice.	5.974	11.19
The overall quality of this course was excellent.	5.692	18.63
The overall effectiveness of the instructor was excellent.	6.051	12.84

Table 6-2

Evaluation of Technology-Enhanced Learning Materials for Instructor Perceptions (ETELM-IP) Questionnaire

How well do you agree with the following?	Mean (N=4)	CV %
Instructions provided a good introduction to the course (e.g. how to get started, where to find various course components, how to obtain technical support if needed, etc.)	5.75	8.70
Course objectives were relevant to participant needs	6.25	15.32
Navigation of the technology-based components of the course was logical, consistent, and efficient.	5.75	8.70
The course technologies and media supported the learning objectives.	6.00	0.00
This course did NOT require participants possess inappropriately high computer skills.	5.50	18.18
The educational activities encouraged participants' engagement with course materials/content.	6.25	8.00
The educational activities promoted participants' achievement of the course objectives	6.00	0.00
I was able to contribute a personal presence/personal touch in the course.	5.50	10.50
Educational activities encouraged participants' interaction and collaboration. (Omit if there was not a collaborative element in the course)	6.00	0.00
The course effectively blended online and face-to-face elements. (Omit if there was not a face-to-face element in the course)	6.50	10.88
Face-to-face activities contributed meaningfully toward achieving the course learning objectives (Omit if there was not a face-to-face element in the course)	7.00	0.00
Assessments (e.g. tests and self-assessments) were appropriate for the course objectives, content, and activities. (Omit if there were no assessment opportunities in the course).	5.67	10.19
Learner assessment and provision of feedback proceeded smoothly (i.e., no unforeseen problems). (Omit if there were no assessment opportunities in the course)	6.00	0.00
I am able to keep track of learners' progress and engagement easily.	5.75	8.70
I plan to use learner feedback to improve the course.	6.00	0.00
The course will be easy to maintain and deliver again.	6.50	8.88
It will be easy to re-use of all or part of the course materials in other, future courses..	6.50	8.88
I had access to needed tools during course development and delivery.	6.25	8.00
I did not have significant computer/technical problems while developing or delivering this course..	5.75	16.65
I received adequate support for any technical issues encountered while developing and delivering this course.	6.25	8.00
I was able to provide adequate support to students for questions or concerns about their learning.	6.50	8.88
The course as a good use of time and resources.	6.00	13.61
The overall quality of this course was excellent.	6.25	8.00

The **Evaluation of Technology-Enhanced Learning Materials for Learner Perceptions (ETELM-LP)** questionnaire provided insights into learners' experiences with the online course. The overall mean was 5.81 and all items scored >5, with the lowest item of 5.211.

Key Strengths of the Course

1. Course Structure and Clarity:

Learners appreciated the clarity of instructions (mean: 6.154, CV%: 12.36) and the articulation of course expectations and policies (mean: 6.052, CV%: 12.03).

The course was well-organized (mean: 5.949, CV%: 14.15), with objectives deemed relevant to learners' needs (mean: 5.769, CV%: 17.42).

2. Engagement and Collaboration:

The course encouraged participant engagement with learning materials (mean: 5.744, CV%: 16.70) and facilitated collaboration among participants (mean: 6.053, CV%: 12.34).

3. Relevance and Impact:

Learners found the course practical and impactful, with many indicating it could influence their practice (mean: 5.974, CV%: 11.19).

Participants demonstrated a strong commitment to the learning process, reflected in their investment of time and effort (mean: 6.359, CV%: 10.27).

4. Support and Accessibility:

Technical and learning support were generally well-rated (mean: 5.795 and 5.897, CV%: 14.55 and 13.17, respectively), and cultural or language-related challenges were minimal (mean: 5.845, CV%: 14.76).

A **cutoff value of 5.8** on the 7-point Likert scale was used to identify areas needing improvement, ensuring a high standard of satisfaction. Scores below 5.8 indicated opportunities for enhancement. Additionally, the coefficient of variation (CV%) was used to assess response consistency, with **CV values >20%** signifying greater variability in learner perceptions.

For **items with mean scores below 5.8**, qualitative feedback was analysed to explore underlying issues and guide targeted improvements. The identified items served as frameworks for qualitative analysis, helping to contextualize learner experiences and refine the course accordingly.

The following areas were examined in qualitative analysis:

- 1. Relevance of course objectives** to learners' needs (**Q4, mean: 5.769**)
- 2. Navigation of technology-based components** was logical, consistent, and efficient (**Q5, mean: 5.769**)
- 3. Course did not require excessively high computer skills** (**Q7, mean: 5.641**)
- 4. Learners did not experience significant technological problems** (**Q8, mean: 5.359, CV: 20.10%**)
- 5. Engagement** with course material/content was effectively promoted (**Q9, mean: 5.744**)
- 6. Instructor presence** and personal touch were evident (**Q11, mean: 5.641**)
- 7. Blended learning** approach effectively integrated online and face-to-face elements (**Q14, mean: 5.211**)
- 8. Assessments aligned** with course objectives, content, and activities (**Q16, mean: 5.706**)
- 9. Opportunities for self-assessment and reflection** were sufficient (**Q17, mean: 5.706**)
- 10. Learners had adequate opportunities to provide course feedback** (**Q19, mean: 5.513**)
- 11. Technical support** was adequate for resolving issues (**Q20, mean: 5.795**)
- 12. The overall quality** of the course was excellent (**Q25, mean: 5.692**)

The **Evaluation of Technology-Enhanced Learning Materials for Instructor Perceptions (ETELM-IP)** questionnaire provided insights into instructors' experiences with facilitating the course. The overall mean of 6.08 and all items scored >5 with the lowest of 5.50.

Key Strengths of the Course

1. Course Content and Objectives:

Instructors found the course objectives to be well-aligned with participants' needs (mean: 6.25, CV%: 15.32).

Educational activities effectively promoted participant engagement (mean: 6.25, CV%: 8.00) and supported the achievement of course objectives (mean: 6.00, CV%: 0.00).

2. Support and Accessibility:

Instructors reported having access to necessary tools during course development and delivery (mean: 6.25, CV%: 8.00).

Support for technical issues and addressing student concerns was rated positively (mean: 6.25 and 6.50, CV%: 8.00 and 8.88, respectively).

3. Course Sustainability and Resource Efficiency:

The course was seen as easy to maintain and deliver in future iterations (mean: 6.50, CV%: 8.88) and was regarded as a good use of time and resources (mean: 6.00, CV%: 13.61).

A **cutoff value of 6.0** on the 7-point Likert scale was used to identify areas needing improvement, ensuring a high standard of satisfaction. Scores below **6.0** indicated opportunities for enhancement. Additionally, the coefficient of variation (CV%) was used to assess response consistency, with **CV values >20%** signifying greater variability in learner perceptions.

The following items guided the qualitative analysis:

- 1. Instructions provided a good introduction to the course (Q1, mean: 5.75)**
- 2. Navigation of the technology-based components** was logical, consistent, and efficient **(Q3, mean: 5.75)**
- 3. The course did not require excessively high computer skills (Q5, mean: 5.50)**
- 4. Instructors were able to establish a personal presence/personal touch** in the course **(Q8, mean: 5.50)**
- 5. Assessments aligned** with course objectives, content, and activities **(Q12, mean: 5.67)**
- 6. Instructors could easily track learners' progress and engagement (Q14, mean: 5.75)**
- 7. Instructors did not experience significant technical problems** during course development or delivery **(Q19, mean: 5.75)**

While some items related to face-to-face activities received high ratings, it is important to clarify that the course **does not include face-to-face components**. These ratings likely reflect the **perceived effectiveness of interactive online elements** rather than in-person interactions.

Qualitative Data

The interviews with nine learners and three instructors were analysed using template analysis, guided by the survey questions outlined above. The findings are summarized in Tables 6-3 and 6-4. Given the overlap between the two analyses, the results are presented below using the **Quality Matters Rubric for Higher Education Course Design** as a framework for synthesis.

Course Introduction

1. Insufficient opportunities for building connections

The introductory session was primarily focused on delivering information, offering few opportunities for participants to interact, ask questions, or discuss assignments. This lack of interaction may have made it harder for participants to establish the connections needed for effective collaboration. Without an early sense of engagement, they struggled to form peer networks, which could have impacted their ability to navigate the course and learn together.

“很多時候有些人可能就都不夠時間給他做，或者他有問題的時候，都可能礙於那個上課時間太緊。” (*Participants needed more direct engagement to clarify expectations during the first session*) — **Instructor C.**

2. Limited preparedness in using technical tools

Some participants do not have opportunities to practice how to navigate the technology and assignments or connect with the instructors in the introductory session, limiting their ability to start effectively. The absence of hands-on experience hindered learners' ability to fully utilize the course platform effectively.

“一些學員未有機會實際練習操作技術工具。” (*Participants lacked opportunities to practice navigating the LMS and tools during the introduction*) — **Instructor C.**

3. Unclear guidance for collaborative learning

A lack of clear instructions on how to begin group work created confusion about collaboration expectations. Without clear initial guidelines, learners struggled to structure discussions, coordinate efforts, and establish effective group dynamics, making it difficult to engage in meaningful shared learning.

“我多次經驗，就 assign 了我去組導師，在我的 WhatsApp group 裡完全沒有對話，完全不知道發生了什麼事。我非常擔心，你們搞什麼都沒有說，會不會最後交不到功課。” (*In my experience, I was assigned to guide a group, but there was no conversation in my WhatsApp group at all, and I had no idea what was happening. I was very worried that they had no clear instructions and might not complete the assignment.*) — **Instructor A.**

Learning Objectives

1. Challenges in bridging theory and practice

Learners struggled to grasp the significance of the theoretical components, particularly in the later modules, and found it difficult to connect them to their practical applications in professional settings.

“後期的 module 過於理論化，難以和實際工作聯繫起來。” (*Later modules were overly theoretical and hard to connect with practical work*) — **Participant 3.**

2. Weak identification with the educator role

The course did not fully help participants recognize their role as clinical educators. While teaching and learning are integral to specialist practice, some modules may not have effectively reinforced this identity, leading some clinicians to perceive certain content as less relevant to their professional needs.

“一些module的目標似乎更針對醫學教育，而不太適合我的臨床背景。” (*Some modules seemed more focused on medical education rather than my clinical background.*) — **Participant 8**

3. Unclear learning trajectory across modules

The learning outcomes for each module were not always clearly defined, making it challenging for participants to understand how individual modules contributed to the overall course structure. This lack of clarity hindered their ability to connect new knowledge to their existing expertise and effectively plan their learning progression.

“可以在課程目標中明確每個 module 的學習成果，幫助我們更好地規劃。” (*Clearly defining the learning outcomes for each module would help us plan better*) — **Participant 7.**

Assessment

1. Misalignment between assessments and learning objectives

Some assessments, particularly multiple-choice questions embedded within interactive videos, did not always align with the course objectives and content. This misalignment created challenges for learners in relating the assessments to their broader learning goals. Without a clear connection between assessments and course content, participants found that these assessments did not effectively support their learning, making it harder to reinforce key concepts and apply new knowledge in practice.

“測驗的題目有時候和課程的重點不完全匹配。” (*The test questions didn't always match the course's key focus areas*) — **Participant 2.**

2. Limited and Delayed Feedback on Assessments

Feedback was sometimes limited to right/wrong responses without explanations in detail, making it difficult for learners to understand their mistakes and improve. Additionally, feedback was delayed to after completion of the entire video, rather than immediately, and re-attempting questions required watching the video again, which some found inefficient and frustrating.

“有些活動完成後，我並不知道自己是否理解正確。” (*After completing some activities, I wasn't sure if I had understood them correctly*) — **Participant 6.**

3. Delayed reflection and limited opportunities for iterative improvement

Reflection opportunities were concentrated toward the end of the course, leaving few chances for participants to assess their progress and refine their learning strategies in real time. With minimal interim assessments, learners struggled to track their development throughout the course. As a result, feedback often came too late for them to apply it meaningfully to improve their work.

“反思活動主要集中在課程末期，感覺過程中缺少檢視的機會。” (*The reflection activities were mostly at the end, and I felt there were few opportunities to evaluate during the course*) — **Participant 8.**

“如果能增加更多階段性的評估，可能效果會更好。” (*More periodic assessments could improve the overall learning experience*) — **Participant 5.**

4. Lack of structured reflection tools

The course provided insufficient structured reflection activities, making it difficult for learners to systematically evaluate their understanding and learning progress. Without tools such as guided questionnaires or learning journals, participants struggled to organize their thoughts and consolidate key takeaways.

“缺少結構化的反思工具，比如問卷或日記，來幫助我們整理思路。” (*There were no structured reflection tools, like surveys or journals, to help us organize our thoughts*) — **Participant 3.**

Instruction Materials

1. Cognitive overload from extensive content

Participants found some instructional videos too lengthy, leading to loss of focus and reduced retention of key concepts. Additionally, the volume of pre-course materials was overwhelming, making it difficult for learners to identify key points and prioritize essential content. This combination of extensive pre-course materials and lengthy instructional videos resulted in cognitive overload and reduced retention of key concepts, creating an initial barrier to engagement and comprehension.

“有些視頻內容偏長，容易讓人失去專注力。” (*Some video content was too long, making it hard to stay focused*) — **Participant 1.**

2. Limited opportunities for practical application

Some course materials lacked practical application, making it difficult to connect theoretical concepts to real-world scenarios. The absence of hands-on activities limited learners' ability to transfer knowledge into practice.

“活動的設計過於理論化，沒有提供實際應用的機會。” (*The activities were too theoretical and didn't offer opportunities for practical application*) — **Participant 9.**

Learning Activities

1. Difficulty in understanding and applying theories

Some activities were not easy to understand, making it challenging for participants to grasp theoretical concepts and see their relevance to practice. The lack of clear, relevant examples and discussions limited their ability to connect theory with real-world applications, making the learning process less effective.

“案例和討論應該能更好地連結我們的實際工作經驗。” (*Examples and discussions should better connect to our practical work experience*) — **Participant 4.**

2. Variability in instructor engagement and interaction

Instructor engagement varied throughout the course, contributing to differences in learner support and interaction. The absence of face-to-face sessions may have made it more challenging for instructors to establish a strong presence, while differing views on adult learning further influenced their level of participation. Some instructors believed in giving learners autonomy, acting as facilitators rather than taking a directive role, while others felt a stronger need to provide guidance. Additionally, learners' varying levels of engagement—due to their professional responsibilities—may have contributed to instructors feeling uncertain about how involved they should be. As a result, interactions were often minimal and tended to increase only near assignment deadlines, leaving some learners without timely support for deeper discussions and collaborative learning.

“課程中的活動更集中於小組，導師的參與感不強。”

(*The activities were more group-focused, and the instructors' involvement didn't feel strong.*) — **Participant 7**

“其實 instructor 當然都有責任，即是你怎樣去 lead 那些同學，我自己亦在學習，有時會否太過 dominate，叫同學們這樣做，但是 adult learning 看起來都不是很主張老師的主導，我們的位置就是要重新學習作為一個 facilitator 怎樣定位，然後就要交給同學主動怎樣去參與，有時同學都是正在上班的，他們都有自己的 priority，他有多 involve 在 project 上，功課上，自己有一種感覺是老師是被動。未必是他們交功課的進度，不是我們所想的，這裡有些困難，我自己也在學習，作為老師，我著緊程度應該去到哪裡呢。”

(*As instructors, we do have a responsibility in guiding learners, but I'm also learning. Sometimes I wonder if I dominate too much by telling learners what to do. However, adult learning doesn't seem to emphasize teacher control. Our role is to reposition ourselves as facilitators and then leave it to learners to take initiative in their participation. Since learners are working professionals with their own priorities, how involved they are in projects and assignments varies. As instructors, we sometimes feel passive, as their progress doesn't always align with our expectations. This is a challenge, and I'm still learning—how much should I care as an instructor?*) — **Instructor B**

3. Time constraints and fast-paced synchronous online discussions

The virtual meeting covered a substantial amount of content, and despite its long duration, the time allocated for discussion was limited and often insufficient. As a result, participants found it difficult to engage meaningfully, reflect on key points, and contribute effectively to conversations. The fast-paced nature of online discussions further compounded this challenge, leaving some learners struggling to keep up with the rapid flow of interactions.

“線上討論的進行速度太快，有時候難以跟上。” (*The pace of online discussions was too fast, making it difficult to keep up*) — **Participant 8.**

4. Unequal participation in group projects

Uneven contributions in group assessments resulted in disparities in workload, leading to both ineffective learning and frustration among team members. Some participants contributed significantly less, shifting the burden onto more engaged team members, which affected the overall group dynamic and fairness in evaluations.

“這個就是我剛才所說的，真的要看看那些組員，他們有幾願意去 involve。...但是有一些你會明顯知道的，例如他明顯會在群組裡說，哎呀，我很沒空，另外一個，哎呀，我又很沒空，哎呀，我又剛剛開了。就是你會覺得.....我只是說很個別的，參與者他們的 involvement 未必很高，我又不明白為什麼他們這麼忙又要去上這個堂。” (*Some participants were noticeably less engaged, frequently mentioning that they were too busy, which frustrated their teammates*) — **Instructor C**

Course Technology & Learner Support

1. Challenges in navigating and integrating technology

Participants encountered difficulties in mastering the existing technological tools, with challenges ranging from navigating the learning platform to integrating different tools, which created barriers to engagement. While some learners struggled to adapt to unfamiliar digital interfaces, others found the complexity of incorporating multiple technological elements into their learning workflow overwhelming. There were also differing expectations regarding the technological sophistication of the platform, with some finding the tools insufficiently advanced while others struggled with their complexity.

“將 Edpuzzle 嵌入 Canvas 很麻煩。” (*Embedding Edpuzzle into Canvas was troublesome*) — **Participant 6.**

“對於那些沒有使用過 Canvas 的人來說，需要一些時間去適應。” (*For those who hadn't used Canvas before, it took time to adapt*) — **Participant 3.**

2. Isolated delays in technical support

While most participants found the technology support to be helpful in general, some individuals still faced challenges when encountering technical issues. In particular, delayed responses to technical queries caused frustration, as timely assistance was not always available when needed. These delays not only disrupted the learning process but also discouraged some learners from fully engaging with the digital tools provided.

“有一次我的技術問題花了很長時間才得到解決，感覺有些挫敗。” (*One time, my technical issue took a long time to resolve, which was frustrating*) — **Participant 9.**

3. Challenges in mastering and utilizing technology for teaching

Some instructors faced difficulties with technology, which extended beyond tracking learner engagement. Many found mastering the required tools challenging, requiring significant time for material preparation and additional training. The underutilization of LMS features,

such as tracking learner progress and providing structured feedback, further contributed to these challenges. Ironically, the very tools that could have helped instructors monitor student engagement and streamline their workload were not fully leveraged, indicating a need for further training and system optimization.

“Canvas 的功能其實有很多未被完全使用。” (*Canvas features for tracking and assessment were underutilized*) — **Instructor C.**

Discussion

The evaluation of the Learning On-Line (LOL) Educator Course provided valuable insights into both its strengths and areas for refinement. With an average learner rating of 5.81 out of 7 and an instructor rating of 6.08 out of 7, the course was generally well-received, with participants appreciating its structured objectives, interactive learning activities, and facilitation approaches. However, the purpose of this evaluation extends beyond assessing satisfaction; it aims to enhance the course's effectiveness by identifying challenges and implementing targeted improvements.

By intentionally selecting participants who provided lower survey ratings for qualitative analysis, we were able to uncover meaningful insights that might not have been evident from the numerical ratings alone. Key areas identified for improvement included learner motivation, initial engagement, integration of theory and practice, instructor presence, optimization of asynchronous and synchronous learning, and enhancements to the capstone project. These findings are synthesized in the following discussion, integrating our understanding of course design, adult learning theories, and evidence-based educational strategies to guide refinements.

Strengthening Motivation and Engagement: Enhancing Role Alignment, Instructor Presence, and the Application of Theory and Technology

Motivation plays a critical role in learner engagement and performance. Self-Determination Theory highlights three core psychological needs: autonomy, competence, and relatedness.⁴ Autonomy refers to learners perceiving the course as relevant to their professional roles and having control over their learning. Competence encompasses their ability to understand theoretical concepts, confidently navigate technological tools, and effectively apply both to fulfill their teaching tasks. Relatedness refers to a sense of connection with peers and instructors, fostering a collaborative learning environment.

Findings revealed that some participants struggled to see the relevance of certain educational theories, particularly those based on social constructivism, to their clinical responsibilities. Additionally, difficulties in understanding complex educational concepts, particularly among participants without a formal education background, created barriers to engagement. Technical challenges in navigating the LMS and interactive tools further compounded these issues. Instructor presence also varied, with some instructors providing structured facilitation while others adopted a more hands-off approach, leading to uncertainty regarding when and how learners could seek support.

To address these issues, the following improvements would be introduced.

1. Reinforcing Role Alignment and Relevance⁵⁻⁷

Some participants expressed difficulty in recognizing how educational theory applied to their clinical responsibilities, particularly in modules focused on social constructivism. To address this, theoretical concepts will be explicitly linked to real-world clinical scenarios. Course content will be revised to include case-based discussions and concrete examples from clinical teaching to illustrate how theories translate into practice. Additionally, complex educational terminology will be replaced with clinician-friendly language, such as referring to “learning together” instead of “cognitive presence.” These refinements aim to help learners see how education is embedded in their clinical roles rather than a separate domain.

2. **Establishing a Coherent Learning Framework with Explicit Learning Objectives**^{8, 9}
Participants noted that while the course’s overall objectives were clear, the learning outcomes at the module level were not always well articulated. This lack of clarity made it difficult for some learners to see how individual modules contributed to the broader course framework. To address this, each module will now begin with an explicit overview of its learning objectives and expected outcomes, clearly connecting them to previous and future content. This approach will provide a structured roadmap that helps learners track their progression and understand how each component contributes to their development as clinical educators.
3. **Providing Structured Scaffolding for Theory and Technology Application**^{10, 11}
Several learners reported challenges in understanding theoretical concepts and navigating the LMS. To address these concerns, structured scaffolding will be introduced in early modules to gradually build learners’ confidence in applying theoretical principles and using technology effectively. Early modules will now incorporate reflection exercises that prompt learners to relate theoretical concepts to their own teaching experiences. Additionally, step-by-step technology tutorials will be introduced in modules 2, 3 and 4, allowing learners to practice using key digital tools before they engage with learning activities.
4. **Ensuring Consistent Instructor Presence and Support**^{12, 13}
Instructor engagement varied across the course, affecting learners’ motivation and engagement. To enhance consistency, facilitation guidelines will be established outlining clear expectations for instructor interactions. These guidelines will recommend structured check-ins, regular engagement in discussions, and clear response timeframes for learner inquiries. Additionally, peer learning opportunities will be created for instructors, allowing them to share best practices and refine their online teaching approaches collaboratively.

Strengthening Initial Engagement: Enhancing Social Presence, Collaboration, and Technical Readiness

The course follows an experiential learning design, where participants first engage as students before transitioning into the role of educators. The first assignment was intended to help learners reflect on online learning from a student’s perspective before shifting to their teaching role. However, findings revealed that initial engagement strategies were not fully effective, resulting in challenges with peer interaction, technical readiness, and collaborative learning expectations.

In earlier course iterations, WhatsApp groups were used as the primary tool for engagement, but this was found to be insufficient for building strong peer connections. A Zoom session and

pre-recorded introduction videos were then introduced to address these issues. While these additions allowed learners to become familiar with their peers, many remained passive observers, with only brief, surface-level interactions during the introductory session. The lack of structured engagement activities at this stage meant that participants did not develop strong enough connections for effective collaboration later in the course.

Additionally, while participants were introduced to the first assignment early on, most of the explanation relied on a video in Module 2, which may not provide enough clarity on the purpose of the task. Many did not realize that the assignment was not just a deliverable but a way to reflect on their own experiences as learners, helping them later understand student perspectives when they transition into their teaching role.

The technical aspect of navigating the LMS was another underestimated challenge. Although demonstrations were provided, participants did not have hands-on practice using Canvas, which led to initial confusion in locating materials and completing tasks. Furthermore, while the course emphasized collaborative learning, cognitive presence was only introduced in Module 3, meaning participants completed their first assignment without a clear framework for effective teamwork and discussion.

To address these challenges, the following refinements will be implemented:

1. Facilitating Stronger Peer Interaction ^{14, 15}

Instead of large-class introductions, participants will be placed in small groups of six for more meaningful peer interactions. A structured interactive introduction activity will be implemented, where participants navigate the LMS to find their group members' introduction videos, introduce them via WhatsApp, and later present their assigned peer in the Zoom session.

2. Clarifying the Purpose of the First Assignment and Experiential Learning Design ¹⁶⁻¹⁸

The experiential nature of the course will be explicitly introduced, ensuring participants understand the two-phase experience of learning as a student first, then as a teacher. The first assignment will be framed as a reflective experience, not just a task, helping participants engage more meaningfully with the learning process. A structured discussion will replace reliance on a pre-recorded video, clearly explaining the assignment's purpose.

3. Introducing Collaborative Learning Principles Early ¹⁹⁻²⁰

Instead of waiting until Module 3, the Practical Inquiry Model will be introduced at the start of the course, providing participants with a structured approach to effective teamwork, discussion, and collaborative problem-solving.

4. Establishing a Team Charter and Task Allocation ^{21, 22}

To address workload distribution concerns, participants will engage in a structured group discussion to create a team charter, define roles and expectations, and begin brainstorming and allocating tasks for their first assignment. This will ensure early team formation, prevent unequal workload distribution, and give learners more opportunities to engage with instructors

5. Improving Technical Readiness Through Hands-On Practice ²³

Instead of passive demonstrations, participants will actively practice logging in, locating course materials, and submitting assignments, ensuring technical proficiency from the start.

6. AI Chatbots for Learning and Technical Support ²⁴⁻²⁶

In response to participant recommendations for technical training before the course, AI chatbots will be introduced to assist with brainstorming assignment topics and troubleshooting technical issues. A guide to constructing AI prompts will help participants use chatbots effectively, promoting self-directed learning and problem-solving.

7. Providing a Course Roadmap for Better Orientation ²⁷⁻²⁹

After the initial engagement activities, a guided walkthrough of the remaining five modules will provide participants with a clear roadmap, ensuring they understand how each stage of the course builds upon the previous one.

Optimizing Asynchronous Learning: Enhancing Video-Based Content, Assessments and Feedbacks

Asynchronous learning plays a central role in the course, but the evaluation identified several challenges, including long video durations, excessive cognitive load, limited flexibility in content engagement, and inadequate feedback on assessments. Some learners struggled to stay engaged with lengthy instructional videos, while others found the volume of pre-course materials overwhelming. The limited ability to control video playback speed and difficulty in navigating content further hindered learner autonomy. Additionally, assessments were sometimes perceived as misaligned with course objectives and did not always provide meaningful formative feedback.

To address these concerns, several enhancements will be implemented:

1. Refining Video Content for Better Engagement and Cognitive Load Management ³⁰⁻³³

One of the most common concerns raised was the length of instructional videos and the overwhelming amount of pre-course content. Research in multimedia learning highlights that cognitive overload reduces learner retention and engagement, particularly when excessive information is presented in a single session.

To optimize content delivery, videos will be shortened into digestible segments of 15 minutes or less, allowing learners to focus on key concepts without experiencing information fatigue. The total volume of pre-course content will also be reduced, ensuring that only essential materials are included. To further promote active engagement, guiding questions will be embedded within videos, prompting learners to reflect on key takeaways before proceeding.

Additionally, a text-to-speech (TTS) narration feature will be introduced, allowing learners to choose between listening or reading the content. This enhancement will accommodate different learning preferences, providing greater flexibility and accessibility.

2. Strengthening the Application of Cognitive Theory of Multimedia Learning in Video and Learning Resource Design ³⁰

The Cognitive Theory of Multimedia Learning (CTML) has guided the refinement of instructional materials, with multiple iterations improving the alignment of visuals, narration, and text. However, applying CTML effectively remains challenging, and further refinements are needed to enhance comprehension and engagement.

3. **Enhancing Video Playback Controls for Learner Flexibility**^{33, 34}

The lack of control over video playback speed and navigation was another factor contributing to disengagement. Learners reported that they were unable to pause, rewind, or skip to relevant sections efficiently, making it difficult to review content at their own pace. To resolve this issue, the course will transition from Edpuzzle to H5P, a tool that provides greater learner autonomy in adjusting playback speed, pausing, rewinding, and skipping to relevant sections. This change will enable learners to engage with video content in a way that best suits their individual learning needs, improving retention and comprehension.

4. **Aligning MCQs with Learning Objectives and Emphasizing Application**^{35, 36}

Assessments play a vital role in reinforcing learning, but some participants felt that multiple-choice questions (MCQs) were not always aligned with course objectives or did not adequately test application of knowledge. Additionally, some assessments focused on factual recall rather than problem-solving, limiting their effectiveness in promoting deeper learning.

To enhance assessment quality, scenario-based MCQs will be introduced, shifting the focus from simple recall to application-focused problem-solving. These questions will present learners with realistic case scenarios, requiring them to apply key concepts to clinical or teaching situations

5. **Enhancing Feedback and Formative Assessment Mechanism**³⁷⁻³⁹

Meaningful formative feedback is essential for guiding learners' progress, but the evaluation highlighted that some assessments provided only right/wrong responses without detailed explanations. Additionally, delays in feedback restricted opportunities for immediate improvement.

To strengthen formative assessment mechanisms, all assessments will provide immediate feedback with clear explanations of correct and incorrect answers, helping learners understand their mistakes and refine their understanding. Self-assessment tools will also be introduced, allowing learners to track their own progress and identify areas where they need further reinforcement. Furthermore, structured peer feedback mechanisms will be implemented, promoting collaborative learning and reflection through guided review activities.

6. **Diversifying Asynchronous Learning Activities for Active Engagement**^{29, 40, 41}

Over-reliance on video-based learning may limit opportunities for critical thinking and collaborative engagement. To create a more interactive and reflective learning environment, additional asynchronous learning activities will be incorporated.

Interactive case-based discussions will be introduced, encouraging learners to analyze real-world teaching and learning scenarios and engage in peer discussions. Reflection activities will be embedded within modules, prompting learners to consolidate their understanding and consider how they can apply key principles in their professional contexts. Additionally, structured peer learning opportunities will be provided through discussion forums, allowing learners to share insights and learn from one another in a collaborative setting.

Reimagining Synchronous Learning: Transitioning to Face-to-Face Sessions for More Interactive Engagement

Synchronous learning plays a crucial role in reinforcing concepts introduced in asynchronous modules, providing opportunities for real-time discussion, clarification, and collaborative

engagement. However, feedback from participants indicated that previous virtual synchronous sessions were tiring, lacked opportunities for meaningful relationship-building, and did not allocate sufficient time for discussion. Some participants felt that the sessions were too didactic, repeating content that had already been covered asynchronously, rather than focusing on interactive engagement. Additionally, the lack of structured activities for fostering connections with peers and instructors contributed to a weaker sense of engagement.

To address these concerns, the structure of synchronous learning will be redesigned to prioritize interaction, discussion, and practical application, shifting away from an information-heavy approach to a more learner-centred experience.

1. Shifting to Face-to-Face Sessions for Deeper Engagement ⁴²⁻⁴⁴

Recognizing that virtual synchronous sessions may not be the most effective format for fostering engagement, the course will transition to face-to-face sessions where possible. In-person interactions allow for stronger relationship-building, more natural discussions, and better engagement with instructors and peers. This change aims to reduce fatigue associated with long virtual meetings while providing a more dynamic and interactive learning environment.

2. Reducing Didactic Teaching and Maximizing Discussion Time ⁴⁵

One key refinement is to minimize didactic teaching during synchronous sessions by ensuring that core content is effectively covered in asynchronous materials. Instead of repeating theoretical concepts, synchronous time will be devoted to interactive discussions, case-based learning, and Q&A sessions that allow learners to apply concepts in a practical, real-world context. This shift will ensure that synchronous sessions are engaging and purposeful, providing deeper learning opportunities rather than duplicating existing content.

3. Facilitating Hands-On Technology and Teaching Practice ^{23, 46}

Another challenge identified was the lack of hands-on practice with LMS tools and interactive learning technologies during synchronous sessions. To address this, structured activities will be introduced where learners actively engage with technology, such as practicing AI-assisted learning, navigating the LMS in real time, and using interactive assessment tools. This will ensure that learners gain confidence in using digital resources while applying them in a structured learning environment.

Strengthening the Capstone Project: Providing Scaffolding, Instructor Support, and Progress Tracking

The capstone project serves as the culmination of the course, allowing learners to apply theories, technological tools, and teaching strategies in an authentic context. However, the evaluation revealed challenges in translating learned concepts into practice, with some participants struggling to integrate theoretical frameworks into their project design. Additionally, unequal workload distribution within groups created frustration, and insufficient instructor oversight left some learners uncertain about expectations and progress.

To enhance the effectiveness, structure, and support for the capstone project, several refinements will be implemented, focusing on early scaffolding, structured instructor engagement, explicit comparative reflection, and progress tracking mechanisms.

1. Embedding Scaffolding Activities in Early Modules^{11, 47}

One of the key challenges was that learners only began engaging with the capstone project in the later stages of the course, leaving limited time to develop and refine their work. To address this, scaffolding activities will be integrated into earlier modules to ensure that learners gradually build the necessary skills and knowledge needed for their final project. Early brainstorming sessions and structured discussions will be introduced in synchronous meetings, allowing learners to explore potential project ideas while still progressing through course content.

Reflective exercises on the first assignment will be added to explicitly highlight the differences between cognitivist and social constructivist learning before transitioning into the capstone project.

Incremental application of theoretical concepts in prior modules will prevent last-minute struggles with unfamiliar frameworks.

2. Strengthening the Connection Between Cognitivist and Social Constructivist Approaches¹⁶

A recent change introduced in the last course iteration required learners to use the same topic from their first assignment for their capstone project. This change aimed to provide a contrast between cognitivist and social constructivist approaches, as the first assignment is structured around cognitive learning principles, whereas the capstone project is designed based on social constructivism. By using the same content and the same peer group in both assignments, learners can directly experience the different effects of these two approaches, gaining deeper insight into how learning theories shape instructional design. However, additional refinements are needed to help learners reflect explicitly on these differences and integrate their insights into their teaching practice.

3. Enhancing Instructor Support and Structuring Guidance^{48, 49}

Learners also expressed the need for more structured instructor engagement during the capstone project. Some teams struggled with minimal feedback, while others had difficulties aligning their projects with course objectives. To address this, instructors will provide regular structured check-ins at key milestones to monitor team progress and offer timely feedback. Additional feedback sessions will focus on refining project alignment with learning objectives and ensuring practical applicability. Instructors will also facilitate discussions on workload distribution, helping teams establish clear roles and responsibilities to promote fairness and collaboration.

4. Introducing Interim Zoom Sessions for Progress Monitoring⁵⁰

A mid-course virtual check-in will be introduced as an interim measure to support progress tracking and real-time discussions between learners and instructors. These Zoom sessions will provide a platform for peer-to-peer discussions and idea exchange, allow instructors to identify struggling teams early, and offer targeted support to refine project directions before final submission.

Limitations

While this evaluation provided valuable insights into the Learning On-Line (LOL) Educator Course, several limitations should be acknowledged. First, the study relied on self-reported data from participants, which, while rich in detail, may be influenced by personal biases or recall limitations. Participants who provided lower survey ratings were specifically selected

for qualitative analysis, which may have introduced a sampling bias toward identifying challenges rather than capturing a fully representative range of experiences. However, this approach was intentional, as the primary goal was to identify areas for improvement rather than merely assess satisfaction.

Second, the evaluation primarily focused on short-term participant perceptions rather than long-term learning outcomes. While feedback highlighted areas for immediate enhancement, further research is needed to assess whether the proposed refinements translate into improved learning retention, application of educational theories, and long-term engagement in teaching practices. A longitudinal follow-up study could provide more comprehensive insights into the sustained impact of the course.

Additionally, the variation in instructor engagement was identified as an issue, but the evaluation did not include a structured analysis of instructor perspectives beyond the survey. Understanding the challenges faced by instructors in facilitating online learning—such as competing clinical responsibilities, technological barriers, and differing views on adult learning facilitation—would provide deeper insights into how to support them more effectively. Future studies could incorporate structured focus groups with instructors to explore their experiences in greater depth.

Finally, while the proposed refinements are designed to address identified challenges, their effectiveness will need to be reassessed following implementation. A follow-up evaluation should systematically measure the impact of these changes, ensuring that they lead to tangible improvements in learner engagement, motivation, and application of knowledge.

Conclusion and Recommendations

The Learning On-Line (LOL) Educator Course has demonstrated substantial strengths, with participants recognizing its structured objectives, interactive learning elements, and facilitation approaches. However, the purpose of this evaluation was to go beyond assessing overall satisfaction and critically examine areas for further refinement. By focusing on qualitative insights from participants who reported lower survey ratings, we identified key challenges related to motivation, engagement, instructor presence, assessment design, and the application of theory in practice. These findings provide a strong foundation for targeted improvements aimed at enhancing the learning experience and aligning the course more effectively with the needs of clinician-educators.

A key takeaway from this evaluation is the need to reinforce motivation by strengthening role alignment, ensuring clearer links between educational theory and clinical practice, and providing structured scaffolding for both theoretical and technological competencies. The onboarding experience will be refined to improve social presence, foster stronger peer collaboration, and introduce collaborative learning principles earlier in the course. Asynchronous learning will be optimized through more concise videos, interactive elements, and improved assessment-feedback mechanisms to enhance engagement and retention. Meanwhile, synchronous sessions will transition to face-to-face formats where possible, shifting the focus from didactic teaching to interactive discussions, hands-on practice, and deeper engagement with instructors. Finally, the capstone project will benefit from structured scaffolding, progress tracking, and more active instructor support to help learners integrate and apply their learning effectively.

These refinements reflect a commitment to continuous quality improvement in online medical education. While the proposed changes are grounded in participant feedback and educational theory, their effectiveness will need to be reassessed following implementation. Future evaluations will monitor how these refinements impact learner engagement, motivation, and long-term application of knowledge. By continuously iterating based on data-driven insights, the LOL Educator Course will remain a dynamic and effective program that supports clinician-educators in their teaching and professional development.

Table 6-3
Template Analysis of Learner Experience & Satisfaction

Challenges	Recommendation
Question 4: "Course objectives were relevant to my needs"	
1. Content Too Theoretical “後期的 module 過於理論化，難以和實際工作聯繫起來。” <i>(Later modules were overly theoretical and hard to connect with practical work.)</i> — Participant 3 2. Lacked Alignment with Diverse Professional Needs “一些 module 的目標似乎更針對醫學教育，而不太適合我的臨床背景。” <i>(Some modules seemed more focused on medical education rather than my clinical background.)</i> — Participant 8 “我們的專業背景不同，課程應該更靈活地考慮這一點。” <i>(Our professional backgrounds are diverse, and the course should better reflect this.)</i> — Participant 9	1. Use Examples and Experiences “加入更多實例來幫助我們理解理論。” <i>(Incorporate more examples to help us understand the theory.)</i> — Participant 5 “案例和討論應該能更好地連結我們的實際工作經驗。” <i>(Examples and discussions should better connect to our practical work experience.)</i> — Participant 4 2. Align Content with Roles and Needs “希望課程設計能更多考慮臨床需求，加入一些與臨床實踐相關的內容。” <i>(The course design should consider clinical needs more and include content relevant to clinical practice.)</i> — Participant 8 3. Clearly Define Learning Outcomes “可以在課程目標中明確每個 module 的學習成果，幫助我們更好地規劃。” <i>(Clearly define the learning outcomes for each module within the course objectives to help us plan better.)</i> — Participant 7
Question 5: "Navigation of the technology-based components of the course was logical, consistent, and efficient."	
1. Technical challenges “將 Edpuzzle 嵌入 Canvas 很麻煩。” <i>(Embedding Edpuzzle into Canvas was troublesome.)</i> — Participant 6 “第一次使用 Canvas 時，我花了很長時間才找到模組區域。” <i>(It took me a long time to find the module area the first time I used Canvas.)</i> — Participant 2	1. Provide Tool-Specific Tutorials: “增加簡短的 video guide，幫助我們快速熟悉工具。” <i>(Add short video guides to help us quickly get familiar with the tools.)</i> — Participant 3 2. Centralize Tool Access: “希望所有工具都可以直接從 Canvas 訪問，減少跳轉。” <i>(It would be better if all tools could be accessed directly from Canvas to reduce switching.)</i> — Participant 1

Question 7: “This course did NOT require inappropriately high technology skills.”	
1. Misinterpretation of Question: “我當時可能誤解了這個問題，技術技能實際上不需要太高。” <i>(I might have misunderstood this question; the required tech skills weren't actually that high.)</i> — Participant 8 2. Steep Learning Curve for New Users: “對於那些沒有使用過 Canvas 的人來說，需要一些時間去適應。” <i>(For those who hadn't used Canvas before, it took time to adapt.)</i> — Participant 3 3. Insufficient Pre-Course Guidance: “如果在課程開始前有更詳細的技術介紹就好了。” <i>(It would have been better to have more detailed technical introductions before the course started.)</i> — Participant 1	1. Provide Pre-Course Technical Training: “課程前可以考慮安排一個現場的技術指導環節。” <i>(A live technical guidance session before the course would be helpful.)</i> — Participant 7 2. Use Tutorials for Key Tools: “對於像 Edpuzzle 這樣的新工具，需要更多指導和範例。” <i>(For new tools like Edpuzzle, more guidance and examples are needed.)</i> — Participant 4 3. Ongoing Technical Support: “即時的技術幫助對於新手非常重要。” <i>(Real-time technical help is crucial for beginners.)</i> — Participant 8 4. Incorporate Peer Mentorship: “我經常和其他學員討論技術問題，這對於我們來說很有幫助。” <i>(I often discussed technical issues with other learners, which was very helpful.)</i> — Participant 4
Question 8: “I did NOT have significant computer/technical problems during this course.”	
Device Compatibility Issues “Zoom 在某些設備上運行不穩定，會影響直播課程的流暢性。” <i>(Zoom was unstable on some devices, affecting the smoothness of live sessions.)</i> — Participant 9 “在平板設備上使用 Canvas 時，有些按鈕無法正常運行。” <i>(Some buttons didn't work properly when using Canvas on tablets.)</i> — Participant 8	Provide Device-Specific Guidance: “對於平板或不同設備的用戶，應該提供更詳細的操作指南。” <i>(More detailed instructions should be provided for users on tablets or other devices.)</i> — Participant 8
Question 9: “The educational activities encouraged engagement with course materials/content.”	
1. Lengthy Videos: “有些視頻內容偏長，容易讓人失去專注力。” <i>(Some video content was too long, making it hard to stay focused.)</i> — Participant 1	1. Enhance Video Interactivity: “Video 可以加入更多的測試環節，幫助我們在學習中檢查自己的理解。” <i>(Videos should include more testing segments to help us check our understanding during learning.)</i> — Participant 1

2. Relevance to Practical Application: “活動的設置過於理論化，沒有提供實際應用的機會。” <i>(The activities were too theoretical and didn't offer opportunities for practical application.)</i> — Participant 9 3. Limited Feedback on Activities: “有些活動完成後，我並不知道自己是否理解正確。” <i>(After completing some activities, I wasn't sure if I had understood them correctly.)</i> — Participant 6 4. Time Constraints for Discussions: “Online discussion 進行速度太快，讓人很難跟上。” <i>(The pace of online discussions was too fast, making it hard to keep up.)</i> — Participant 8	“調整視頻長度，保持在 15 分鐘左右會更合適。” <i>(Adjust video length to around 15 minutes for better focus.)</i> — Participant 3 3. Provide Detailed Feedback on Activities: “希望能有更多即時 feedback 的選項，讓我們知道自己的表現如何。” <i>(It would be great to have more real-time feedback options to know how we're doing.)</i> — Participant 6 4. Allow More Time for Discussions: “可以給討論活動更多時間，讓我們能更深入地參與和分享。” <i>(Give more time to discussion activities to allow deeper participation and sharing.)</i> — Participant 3
Question 11: “There was a strong instructor presence/personal touch in the course.”	
1. Limited Real-Time Interaction: “雖然導師很積極，但我們缺少實時的互動機會。” <i>(Although the instructors were active, we lacked real-time interaction opportunities.)</i> — Participant 3 2. Generic Feedback: “反饋有時候過於籠統，缺乏針對性。” <i>(The feedback was sometimes too generic and lacked specificity.)</i> — Participant 1 3. Limited Opportunities for Personal Touch: “在線討論中，導師很少直接參與，這讓我覺得有些疏離。” <i>(The instructors rarely participated directly in online discussions, which felt a bit distant.)</i> — Participant 2	1. Increase Real-Time Interaction: “Face-to-face 討論環節會讓我們更感受到導師的存在感。” <i>(Real-time discussion sessions would enhance the sense of instructor presence.)</i> — Participant 8 2. Provide Personalized Feedback: “在作業的反饋中可以增加一些個人化建議。” <i>(Personalized suggestions could be added to feedback on assignments.)</i> — Participant 1 3. Strengthen Participation in Discussions: “導師可以引導討論的方向，讓我們更深入地探討問題。” <i>(Instructors could guide the discussions to help us explore issues more deeply.)</i> — Participant 6
Question 14: “The course effectively blended online and face-to-face elements.” (Omit if there was not a face-to-face element in the course).	
1. Absence of Face-to-Face Components: “如果有一些面對面的環節，可能會更容易消化內容。”	1. Introduce Hybrid Learning Models: “Online 學習同 face-to-face 討論的結合會讓課程更有效率。”

<i>(If there were some face-to-face sessions, it might have been easier to digest the content.)</i> — Participant 8 2. Engagement Issues with Online Format: “線上討論的進行速度太快，有時候難以跟上。” <i>(The pace of online discussions was too fast, making it difficult to keep up.)</i> — Participant 9 3. Missed Collaborative Opportunities: “我們在分組活動中很少有直接的交流，這讓合作變得困難。” <i>(We had little direct interaction in group activities, which made collaboration difficult.)</i> — Participant 3 4. Overloaded Online Sessions: “全日的在線課程讓人感到疲憊，專注力難以維持。” <i>(Full-day online sessions were exhausting, and it was hard to maintain focus.)</i> — Participant 6	<i>(Combining online learning with live discussions would make the course more effective.)</i> — Participant 8 2. Facilitate Group Collaboration: “小組活動可以有一個在線的引導員，確保每個人都參與。” <i>(Group activities could have an online facilitator to ensure everyone participates.)</i> — Participant 7 3. Adjust Online Session Schedules: “不要安排連續的在線課程，應該給我們更多的間隔來消化內容。” <i>(Don't schedule back-to-back online sessions; give us more breaks to absorb the content.)</i> — Participant 6
Question 16: “Assessments (e.g. tests and self-assessments) were appropriate for the course objectives, content, and activities.”	
1. Misalignment with Objectives: “測驗的題目有時候和課程的重點不完全匹配。” <i>(The test questions didn't always match the course's key focus areas.)</i> — Participant 2 2. Limited Feedback: “有些評估環節只告訴你對錯，但沒有解釋原因。” <i>(Some assessments only told us if we were right or wrong without explaining why.)</i> — Participant 6 3. Practical Relevance: “測驗大多是理論性的，沒有太多實際應用的情境。” <i>(The tests were mostly theoretical and didn't include many practical scenarios.)</i> — Participant 9 4. Timing and Structure:	1. Align Assessments with Objectives: “測驗應該更針對課程目標設計，避免偏離核心內容。” <i>(The tests should be more targeted toward the course objectives to avoid drifting from the core content.)</i> — Participant 2 2. Provide Detailed Feedback: “反饋應該包括正確答案的背景和應用場景。” <i>(Feedback should include the rationale behind the correct answers and their application.)</i> — Participant 6 3. Enhance Practical Relevance: “增加更多與我們專業相關的模擬情境測驗。” <i>(Add more simulation-based tests relevant to our professions.)</i> — Participant 3 5. Incorporate Interim Assessments:

“如果能增加更多階段性的評估，可能效果會更好。” <i>(More periodic assessments could improve the overall learning experience.)</i> — Participant 5	“應該加入更多中途的評估，幫助我們在學習過程中調整策略。” <i>(Introduce more interim assessments to help us adjust our strategies during the learning process.)</i> — Participant 5
Question 17: “I had sufficient opportunity to assess and reflect upon my learning progress.”	
1. Limited Reflection Opportunities Mid-Course: “反思活動主要集中在課程末期，感覺過程中缺少檢視的機會。” <i>(The reflection activities were mostly at the end, and I felt there were few opportunities to evaluate during the course.)</i> — Participant 8 2. Insufficient Time for Reflection: “課程安排太緊湊，無法充分評估自己的進展。” <i>(The schedule was too tight to fully evaluate my progress.)</i> — Participant 7 3. Limited Structured Reflection Activities: “缺少結構化的反思工具，比如問卷或日記，來幫助我們整理思路。” <i>(There were no structured reflection tools, like surveys or journals, to help us organize our thoughts.)</i> — Participant 3	1. Introduce Iterative Reflection Tasks: “應該設計一些簡單的中途評估活動，幫助我們在學習過程中調整。” <i>(Simple mid-course evaluation activities should be designed to help us adjust during learning.)</i> — Participant 5 2. Incorporate Peer Feedback Mechanisms: “Peer feedback 能提供更多視角來檢視我們的學習。” <i>(Peer feedback could provide additional perspectives to evaluate our learning.)</i> — Participant 7 3. Extend Reflection Time Between Modules: “每個 module 之間應該有更長的間隔時間，讓我們能充分反思學習內容。” <i>(There should be longer gaps between modules to allow us to fully reflect on the learning content.)</i> — Participant 2 4. Use Structured Reflection Tools: “反思活動應該包括具體的問題來引導我們思考學習進展。” <i>(Reflection activities should include specific questions to guide our thoughts about learning progress.)</i> — Participant 6
Question 19: “I had sufficient opportunity to evaluate/provide feedback on the course.”	
1. Timing of Feedback Opportunities: “反饋問卷是在課程結束後提供的，過程中缺乏反饋機會。” <i>(The feedback survey was provided at the end of the course, and there were no opportunities during the course.)</i> — Participant 8 2. Limited Use of Feedback Channels: “反饋機制應該更加多樣化，而不是只依賴問卷。”	1. Introduce Mid-Course Feedback Opportunities: “可以在課程中途設置一個反饋環節，幫助我們即時調整課程內容。” <i>(Introduce a mid-course feedback session to help us adjust the course content in real time.)</i> — Participant 4 2. Refine Survey Questions: “問卷應該設計得更具體，針對不同的課程部分設置問題。”

<i>(The feedback mechanisms should be more diverse rather than relying only on surveys.)</i> — Participant 5	<i>(The survey should be more specific, with questions targeting different parts of the course.)</i> — Participant 2 3. Enhance Feedback Mechanisms: “應該設置更多互動的反饋方式，比如小組討論或即時投票。” <i>(There should be more interactive feedback methods, such as group discussions or real-time polls.)</i> — Participant 5 4. Demonstrate Use of Feedback: “課程的後續改進應該能反映我們提供的意見。” <i>(Future course improvements should reflect the feedback we provided.)</i> — Participant 7
Question 20: “I received adequate support for any technical issues encountered during this course.”	
1. Delayed Support in Some Cases: “有一次我的技術問題花了很長時間才得到解決，感覺有些挫敗。” <i>(One time, my technical issue took a long time to resolve, which was frustrating.)</i> — Participant 9 2. Compatibility and Device-Specific Issues: “在平板設備上使用 Canvas 時，有些功能無法正常運行。” <i>(Some functions didn't work properly when using Canvas on tablets.)</i> — Participant 8 3. Complexity of Tool Integration: “當切換到外部工具時，有時候會遇到加載速度慢的問題。” <i>(When switching to external tools, there were occasional slow-loading issues.)</i> — Participant 3	1. Enhance Real-Time Support Channels: “應該設置一個即時技術支持熱線，幫助我們快速解決問題。” <i>(There should be a real-time tech support hotline to help us quickly resolve issues.)</i> — Participant 9 2. Provide Device-Specific Guidelines: “應該提供針對不同設備（例如平板和手機）的詳細使用指南。” <i>(Detailed usage guides for different devices, such as tablets and phones, should be provided.)</i> — Participant 8 3. Improve Integration of Tools: “像 Edpuzzle 這樣的工具應該與 Canvas 更緊密地集成，減少操作步驟。” <i>(Tools like Edpuzzle should be more tightly integrated with Canvas to reduce operational steps.)</i> — Participant 4

Table 6-4

Template Analysis of Instructor Experience & Satisfaction

Challenges	Recommendation
Question 1: “Instructions provided a good introduction to the course (e.g. how to get started, where to find various course components, how to obtain technical support if needed, etc.)”	
1. Limited Interactive Engagement in First Session: “很多時候有些人可能就都不夠時間給他做，或者他有問題的時候，都可能礙於那個上課時間太緊。” (<i>Participants needed more direct engagement to clarify expectations during the first session</i>) (Participant C). 2. Lack of Practice with Tools: “一些學員未有機會實際練習操作技術工具。” (<i>Participants lacked opportunities to practice navigating the LMS and tools during the introduction</i>) (Participant C). 3. Limited Q&A Opportunities: “沒有足夠時間讓學員在第一堂提出所有問題。” (<i>Insufficient time in the first session for participants to ask all their questions</i>) (Participant A). 4. Overwhelming Pre-Course Materials: “pre-course material 有時候太多，學員可能未必完全掌握重點。” (<i>The amount of pre-course material sometimes overwhelmed participants, making it hard to identify key points</i>) (Participant B). 5. Disconnect Between Instructions and LMS Navigation: “學員覺得課程指導與技術工具的操作沒有充分聯繫。” (<i>Participants felt the course instructions were not sufficiently linked to practical LMS navigation</i>) (Participant C). 6. Unclear Steps for Starting Group Work: “關於如何開始小組工作的指導不足。” (<i>Guidance on how to begin group work was insufficient</i>) (Participant C)	1. Redesign First Session for Interactivity: “重新設計第一堂，包括 live demonstrations 和更多互動討論。” (<i>Redesign the first session to include live demonstrations and more interactive discussions</i>) (Participant A). 2. Incorporate Guided Tool Practice: “在第一堂中加入實際操作技術工具的環節，讓學員熟悉流程。” (<i>Include hands-on tool practice during the first session to familiarize participants with the process</i>) (Participant C). 3. Simplify Pre-Course Materials: “減少 pre-course material 的數量，突出最重要的部分。” (<i>Reduce the volume of pre-course materials and emphasize key components</i>) (Participant B). 4. Allocate Time for Q&A: “在第一堂安排專門的問答環節，解答學員疑問。” (<i>Include a dedicated Q&A segment in the first session to address participant queries</i>) (Participant A). 5. Link Instructions to LMS Navigation: “在指導中清楚展示技術工具的使用步驟，並強調與課程內容的聯繫。” (<i>Clearly link instructions to LMS navigation and emphasize connections to course content</i>) (Participant C). 6. Provide Clear Steps for Starting Group Work: “提供明確的小組工作開始步驟，幫助學員迅速進入狀態。” (<i>Offer clear instructions on starting group work to help participants transition effectively</i>) (Participant C).

	7. Add a Practice Assignment: “設計一個簡單的練習作業，幫助學員熟悉課程平台的功能。” <i>(Include a simple practice assignment to help participants familiarize themselves with the LMS features)</i> (Participant B).
Question 3: “Navigation of the technology-based components of the course was logical, consistent, and efficient.”	
Integration of Multiple Tools: “怎樣將不同的 software integrate 是一個問題...由一個軟件跳到另一個軟件的困難.” <i>(Participants struggled with integrating multiple tools and switching between platforms)</i> (Participant C). 2. Varying Familiarity with Tools: “有些學員對技術不熟悉，導航過程中花了很多時間.” <i>(Some participants were unfamiliar with the tools, which made navigation time-consuming)</i> (Participant B). 4. Limited Guidance on Tool Usage: “學員覺得關於工具操作的教學指導不足.” <i>(Participants felt that the instructions on how to use the tools were insufficient)</i> (Participant B). 5. Occasional Platform Issues: “有時候平台會卡住或者出現技術問題，影響學員的流暢體驗.” <i>(Occasional technical issues with the LMS interrupted the smooth navigation experience)</i> (Participant A).	1. Streamline Tool Integration: “減少需要切換不同軟件的步驟，提供整合的平台.” <i>(Reduce the need to switch between tools by integrating them into a unified platform)</i> (Participant C). 2. Provide Interactive Tutorials: “設計互動式導航教程，幫助學員快速熟悉平台.” <i>(Create interactive navigation tutorials to help participants quickly learn to use the platform)</i> (Participant B). 3. Emphasize Key Components in Pre-Course Materials: “在 pre-course material 中明確標出與導航相關的核心內容.” <i>(Highlight navigation-related key content in the pre-course materials)</i> (Participant C). 4. Offer Real-Time Navigation Support: “在第一堂安排即時的導航指導，解決學員的技術問題.” <i>(Include live navigation support during the first session to address participant issues)</i> (Participant A). 5. Enhance LMS Stability: “確保平台穩定性，避免影響學員的使用體驗.” <i>(Ensure the LMS platform is stable to avoid interruptions in user experience)</i> (Participant A). 6. Simplify LMS Interface: “考慮簡化平台界面設計，提升導航效率.” <i>(Simplify the LMS interface design to improve navigation efficiency)</i> (Participant B).
Question 5: “This course did NOT require participants possess inappropriately high computer skills.”	
1. Misinterpretation of the Question:	1. Simplify Tool Requirements:

“我可能是會錯了這個題目，我正正就是不需要。” <i>(One instructor misunderstood the question, leading to a lower score despite not experiencing issues)</i> (Participant A). 2. Varying Levels of Technical Proficiency: “有些人對技術背景不熟悉，需要多些時間學習。” <i>(Participants with less technical proficiency required more time to learn)</i> (Participant C). 3. Complex Tool Integration: “怎樣將不同的 software integrate 是一個問題。” <i>(Integrating different software was challenging for participants and instructors)</i> (Participant C). 4. Limited Onboarding for Technology Tools: “雖然有影片，但有些人需要更多的即場練習來掌握工具。” <i>(Some participants needed more live practice to fully grasp the tools, despite pre-course videos)</i> (Participant B)	“使用簡單的工具和更直觀的界面，以減少對技術背景的要求。” <i>(Choose simpler tools with more intuitive interfaces to reduce reliance on technical skills)</i> (Participant C). 2. Enhance Pre-Course Support: “增加更詳細的指導影片，幫助技術能力不足的學員。” <i>(Provide more detailed instructional videos to assist participants with less technical proficiency)</i> (Participant C). 3. Incorporate Hands-On Training: “在課程開始前安排現場的技術培訓，幫助學員上手。” <i>(Schedule live technical training sessions before the course to help participants get comfortable)</i> (Participant B). 4. Streamline Tool Integration: “優化工具的整合，減少切換軟件的需求。” <i>(Optimize the integration of tools to minimize the need for switching between platforms)</i> (Participant C). 5. Regular Technical Check-Ins: “課程中加入技術檢查環節，確保學員順利使用工具。” <i>(Include periodic technical check-ins during the course to ensure smooth usage of tools)</i> (Participant A)
Question 8: “I was able to contribute a personal presence/personal touch in the course.”	
1. Lack of Physical Interaction: “Social presence 似乎是欠缺一點。” <i>(The online format reduced opportunities for meaningful instructor-student engagement)</i> (Participant C). 2. Limited Role of Instructors in Group Work: “原來他們開了另一個 WhatsApp group，在裡面做了很多討論。” <i>(Participants often formed independent WhatsApp groups, bypassing instructor interaction)</i> (Participant B). 3. Difficulty Balancing Guidance and Independence: “我們需要讓學員有更多的自主性，但也希望保持一定的指導。” <i>(Facilitators struggled to balance providing guidance with allowing participant autonomy)</i> (Participant C). 4. Limited Opportunities to Build Personal Connections:	1. Introduce Face-to-Face Components: “加入面對面的環節，增強導師和學員之間的互動。” <i>(Incorporate face-to-face sessions to strengthen instructor-participant interaction)</i> (Participant C). 2. Encourage Social Presence as a Skill: “在課程中設計專門的 Module 塊，訓練導師如何在網絡中表現 social presence.” <i>(Develop modules to train instructors in demonstrating social presence in online settings)</i> (Participant B). 3. Enhance Messaging Platform Usage: “在 WhatsApp 群組內安排固定的互動時間，讓導師和學員更頻繁交流。” <i>(Schedule fixed interaction times in WhatsApp groups to encourage more frequent instructor-participant engagement)</i> (Participant A). 4. Strengthen Facilitator Roles in Group Work:

“網絡課程難以建立起面對面的那種個人聯繫。” (<i>It was difficult to establish personal connections in an entirely online course</i>) (Participant A).	“鼓勵導師在小組工作中更加積極參與，增強他們的存在感。” (<i>Encourage facilitators to take a more active role in group projects to enhance their presence</i>) (Participant C). 5. Create Icebreakers and Interactive Activities: “設計破冰活動和互動環節，幫助建立更個人的聯繫。” (<i>Include icebreakers and interactive activities to foster more personal connections</i>) (Participant A). 6. Regular Check-Ins for Feedback and Engagement: “安排定期的檢查，確保學員和導師都能保持互動。” (<i>Conduct regular check-ins to ensure ongoing interaction between instructors and participants</i>) (Participant B).
Question 12: “Assessments (e.g. tests and self-assessments) were appropriate for the course objectives, content, and activities.”	
1. Delayed Feedback: “中間沒有一些 steps 讓他掌握，不知道中間的過程是怎樣，一去就要去到尾。” (<i>No steps for interim feedback; participants go straight to the final task without checkpoints</i>). (Participant A) 2. Uneven Group Contributions: “有些 participant，他真的在那些 WhatsApp group 裡面...不停說自己很忙。” (<i>Some participants contributed less to group projects, creating fairness issues in evaluations</i>). (Participant C) 3. Limited Use of Technology: “現在那些課程設計，很大部份都是在製作影片，做一些 MCQ.” (<i>Course design heavily relies on videos and MCQs, with limited diversity in assessment methods</i>.) (Participant A) “Canvas 的功能其實有很多未被完全使用。” (<i>Canvas features for tracking and assessment were underutilized</i>.) (Participant C) 5. Difficulty in Connecting Theory to Practice:	1. Introduce Interim Assessments: “中間加幾個 check point，就好過最後一次去追。” (<i>Add checkpoints during the course for iterative feedback and progress tracking</i>) (Participant A). 2. Facilitate Balanced Contributions in Group Work: “可以考慮分工明確，令每個人都知道自己要做什麼。” (<i>Clearly assign roles to ensure balanced contributions within groups</i>) (Participant C). 3. Enhance LMS Features for Assessment: “強化 Canvas 的功能使用，例如 tracking 功能和即時 feedback 功能。” (<i>Train instructors to fully utilize Canvas features such as tracking progress and real-time feedback</i>) (Participant C). 4. Blend Face-to-Face and Online Learning: “考慮在課程中加入更多面對面的實時互動。” (<i>Incorporate face-to-face components, particularly for final assessments, to enhance engagement</i>) (Participant C). 5. Offer Real-Time Feedback Mechanisms:

“擔心他們有時也有些困難，怎樣去將那些理論聯繫到他們的網上學習。” (<i>Participants sometimes struggled to connect theoretical concepts to their e-learning practice.</i>) (Participant C) 6. Lack of Interim Assessment Points: “其實應該在 project 進行期間多幾次檢查點。” (<i>The absence of interim assessment points reduced opportunities for timely feedback</i>) (Participant A)	“提供即時的 feedback，例如 group project 進行期間的評估。” (<i>Provide real-time feedback during the progression of group projects to support continuous improvement</i>) (Participant A). 6. Improve Connection Between Theory and Practice: “可加入示範和討論，幫助學員理解理論與實踐的關係。” (<i>Use demonstrations and discussions to better connect theoretical concepts with practical applications</i>) (Participant C). 7. Incorporate More Diverse Assessments: “加入更多樣化的評估形式，例如反思報告或小組討論。” (<i>Introduce diverse assessment forms, such as reflective reports or group discussions, to supplement videos and MCQs</i>) (Participant A). 8. Facilitate Social Presence During Assessment: “加強導師與學員之間的互動，提升社交參與感。” (<i>Strengthen instructor-student interactions to improve the social presence in assessments</i>) (Participant C)
Question 14: “I am able to keep track of learners’ progress and engagement easily.”	
1. Limited Use of LMS Analytics: “Canvas 的功能其實有很多未被完全使用。” (<i>Advanced tracking features in Canvas were not fully utilized to monitor progress</i>) (Participant C). 2. Instructors Lacked Awareness of Participant Progress: “未必有 invite 到那些 instructor 去 join...我們未必知道。” (<i>Instructors were often not invited to join participant discussions, leaving them unaware of progress</i>) (Participant C). 3. Overreliance on Participant Self-Motivation: “有些 participant，他們不在主要群組討論，導師未能掌握進度。” (<i>Some participants did not engage in main discussion groups, limiting instructors' ability to track progress</i>) (Participant C). 4. Uneven Engagement Among Participants:	1. Leverage LMS Analytics: “強化 Canvas 的功能使用，例如 tracking 功能和即時 feedback 功能。” (<i>Train instructors to fully utilize advanced tracking and feedback features in Canvas</i>) (Participant C). 2. Introduce Interim Checkpoints: “其實應該在 project 進行期間多幾次檢查點。” (<i>Introduce interim checkpoints to monitor and guide participant progress</i>) (Participant A). 3. Encourage Transparent Communication: “鼓勵學員在主要群組內討論，方便導師追蹤進度。” (<i>Encourage participants to discuss within main groups to help instructors track progress</i>) (Participant C). 4. Offer Real-Time Progress Updates:

“有些 participant，他真的在那些 WhatsApp group 裡面...不停說自己很忙。” <i>(Participants' varying levels of engagement created challenges in tracking group dynamics)</i> (Participant C).	“提供即時的 feedback，例如 group project 進行期間的評估。” <i>(Facilitate real-time feedback sessions during group projects to track engagement and address challenges early)</i> (Participant A). 5. Enhance Instructor Involvement in Group Work: “多些機會讓導師參與學員的群組討論。” <i>(Provide opportunities for instructors to join participant group discussions to monitor and support engagement)</i> (Participant C)
Question 19: “I did not have significant computer/technical problems while developing or delivering this course.”	
1. Time-Intensive Preparation for Instructors: “製作 video 都用了一些時間，我自己的課前資料都用多一些時間。” <i>(Video creation and pre-course material preparation required significant time and effort)</i> (Participant C). 2. Tool Integration Difficulties: “怎樣將不同的 software integrate 是一個問題。” <i>(Integrating different tools into the LMS was challenging)</i> (Participant C). 3. Dependence on External Support: “很多時候需要 Tony 或者 support team 解答技術問題。” <i>(Frequent reliance on the support team for troubleshooting technical issues)</i> (Participant C)	1. Use AI-Assisted Tools for Efficiency: “可以考慮用 AI 的工具，例如 text-to-speech 來簡化錄音步驟。” <i>(Use AI tools like text-to-speech for faster video production)</i> (Participant C). 2. Provide Comprehensive Training for Instructors: “可以安排專門的訓練課程，幫助導師學習工具的整合和操作。” <i>(Organize dedicated training sessions to help instructors learn tool integration and operation)</i> (Participant C). 3. Simplify Tool Integration Processes: “考慮優化工具整合過程，減少需要在不同軟件之間切換的步驟。” <i>(Optimize the integration process to minimize switching between tools)</i> (Participant C). 4. Develop a Centralized LMS Solution: “考慮使用一個更能整合多種功能的 LMS 平台。” <i>(Explore an LMS platform that better integrates multiple tools)</i> (Participant C)

Section 6B
College Secretaries & Administrators

Introduction

The successful implementation of an LMS requires not only technological readiness but also effective administrative support. College administrators play a crucial role in managing course enrolments, tracking trainee progress, handling assessment logistics, and ensuring the seamless operation of e-learning platforms. To assess the challenges, usability, and support needs of administrators in managing the LMS, a structured evaluation was conducted.

Given that existing LMS evaluation models primarily focus on faculty and learner experiences, a self-developed questionnaire was designed with reference to the ETELM questionnaires. This questionnaire was adapted to assess the administrative experience, focusing on key areas such as system usability, workload burden, training needs, and integration with existing College workflows.

In addition to the questionnaire, a focus group discussion was conducted with College administrators to gather qualitative insights into their challenges and experiences with the LMS. Thematic analysis was used to interpret the focus group data, identifying recurring themes that informed recommendations for improving administrative support in LMS implementation.

Methodology

Study Design

A mixed-methods approach was employed, combining a structured questionnaire with a qualitative focus group discussion to ensure a comprehensive understanding of administrator experiences with the LMS.

Participants

The evaluation targeted College administrators responsible for LMS management, including those involved in enrolment processing, assessment coordination, content management, and system troubleshooting.

Data Collection Methods

1. Self-Developed Questionnaire

The questionnaire was adapted from ETELM, ensuring that key factors relevant to the administrator experience were included.

Questions focused on system usability, administrative workload, technical challenges, training support, and system integration with College workflows.

Responses were collected through a structured online survey.

2. Focus Group Discussion

A single focus group session was conducted with College administrators to explore their experiences in greater depth.

Participants were asked about specific LMS-related administrative challenges, the adequacy of training and support, and recommendations for improving system usability.

The discussion was audio-recorded and transcribed verbatim for analysis.

Data Analysis

Quantitative Data Analysis

Responses from the questionnaire were aggregated and analysed descriptively to identify patterns in system usability ratings, workload burden, and perceived training adequacy.

Qualitative Data Analysis

Thematic analysis was used to analyse focus group transcripts, identifying key recurring themes such as workflow inefficiencies, LMS usability challenges, training gaps, and integration issues.

Results

Quantitative Data

The survey received 18 responses from administrators across the Academy and colleges. Participants were asked to evaluate their satisfaction using a Likert scale ranging from 1 to 7, where 1 indicated "strongly disagree" and 7 represented "strongly agree." (Table 6-5)

Table 6-5

Self-Developed Questionnaire for Satisfaction of Administrative Staff

How well do you agree with the following?	Mean (N=18)	CV %
The process for creating courses was straightforward and easy to do	4.22	29.91
Upload and managing course files was easy	4.33	29.62
Creating assignments was easy	4.33	29.62
Course enrolment, role assignment and participant management features are efficient and effective	4.39	26.08
The LMS provided sufficient tools and features for organizing course contents	4.56	32.14
The announcements tools was easy to use for communicating with students	4.17	23.64
Communication and interaction among administrators and participants can be done effectively within the LMS	3.89	23.15
Creating assessments (e.g. quizzes) was easy	4.22	25.11
Setting up of CME/CPD quizzes was easy	4.00	22.69
The Gradebook was easy to use for calculating and tracking grades	3.94	31.92
Monitoring student progress and engagement was straightforward	4.00	27.12
The report types were sufficient for getting the data of student performance and progress	4.11	29.95
Analytics features in the LMS are helpful for me to monitor course progress and performance.	4.22	25.11
The LMS interface was user-friendly for navigation	4.06	27.37
It was easy to do course administration in the LMS	4.17	25.04
Technical issues with the LMS were minimal throughout the course	4.00	28.44
Overall, I recommend this LMS for online course administration	4.22	34.04
The user guide was useful and sufficient for me to learn how to operate the LMS	4.61	25.92
The support staff were knowledgeable and responsive	4.69	21.64
The technical support was easily accessed	5.11	22.14
I am satisfied with the technical support provided for the LMS	5.06	25.81

Open-ended Question Responses

Q22. Based on your experience, what improvements or enhancements would you recommend for the LMS?

More demonstration video for practical usage

Don't use this software

Improved technical support

Really sorry, tools are not friendly to me who's not a tech savvy

Technical support

The assignments cannot be downloaded by course session. It gets complicated when the course becomes recurrent. Also the admin cannot assign student assignment to specific teacher for marking.

Q23. Are there any functions that you have difficulties with?

Creating multiple level assignment

Many

Interaction components

Choosing participants - unable to do so after all

Upload the course materials

The assignments cannot be downloaded by course session. It gets complicated when the course becomes recurrent. Also the admin cannot assign student assignment to specific teacher for marking.

Q24. Are there any specific features or functionalities that you would recommend adding to the system?

Template for creating different contents

Use another system instead

AI assisted content creation

More friendly to the less savvy people, rather than spending much time to understand the syntax of operation

To obtain a report of list of students showing their progresses / grades on a particular module (or quiz) for a particular period of time (say 1 - 31 July 2024)

Allowing specific student assignment to be assigned to specific teachers so they don't have to search through the assignments to find the ones they need to mark

Q25. Is there anything else you would like to share about your experience with the LMS?

Still exploring

Sorry that can't go beyond the stage of choosing participants, so can't test anything further

Use another system instead

Qualitative Data

Thematic analysis of the interview transcript from college administrators revealed several key challenges and support needs in implementing and managing the Learning Management System (LMS). These themes highlight issues related to administrative burden, user experience, training and onboarding, system integration, and data management.

Administrative Burden and Course Management Challenges

Administrators play a crucial role in managing e-learning content, monitoring trainee participation, and ensuring compliance with training requirements. The interview highlighted that manual processes remain a major burden, particularly in uploading new learning materials, tracking progress, and managing assessments. One administrator described the labour-intensive process of manually tracking which trainees completed specific e-learning modules. Although the LMS provides logs, the lack of automated tracking features means administrators must rely on email notifications and manual cross-checking, increasing workload inefficiencies.

“我一定要他們在 Edpuzzle 看完整條片，100% 看完，我不可以再加在 LMS 裡面的 Quiz，每個 Modules 我就會有 5 條 MCQ，他們要答到 4 條，我要看看他們是否答到 4 條，這兩樣東西我都要人為去做 Statistic，就是我講的困難了。”

(I require them to watch the full Edpuzzle video, 100%, and answer at least 4 out of 5 MCQs. However, I have to manually track all these statistics, which is very challenging.)
(Administrator 1)

User Experience and LMS Functionality Issues

The complexity of the LMS interface was identified as a barrier to efficient course management. Administrators reported difficulty navigating the system, particularly for grading, tracking trainee progress, and extracting useful reports. One major challenge involved generating trainee progress reports, as the LMS Gradebook was not intuitive and required additional manual processing to extract relevant data. The report format did not align with the College's trainee portfolio system, requiring administrators to manually edit and reformat reports before uploading them to trainee records. Additionally, administrators mentioned that communication features within the LMS were underutilized because trainees and trainers preferred email for announcements.

“其實我每個月會下載到 Excel。那些資料並不是 exactly 我想要的東西，但我要自己整理，自己去搜尋。”

(Every month, I download an Excel file, but the data is not exactly what I need. I have to manually organize and search for the relevant information.) (Administrator 2)

Training and Onboarding for New Staff

A recurring issue was the difficulty in onboarding new administrators, especially when staff turnover occurred. While some training was provided, new staff struggled to familiarize themselves with the LMS, as they had to learn multiple digital systems simultaneously.

Administrators suggested creating a quick-start guide or a more structured training program tailored for new administrative staff. They also noted that having a designated support contact (such as a liaison like Oliver) was helpful, but reliance on individual staff members for troubleshooting was not a sustainable long-term solution

“我們有些新同事，未必可以很快地 pick up 到你們的系統，即使我可能給了他們一些 login。”

(Some of our new colleagues may not be able to pick up the LMS quickly, even if I give them the login details.) (Administrator 3)

System Integration and Data Synchronization

The interview revealed difficulties in integrating the LMS with existing college systems, particularly for trainee records and assessment tracking. Each College has its own logbook system, and there is currently no seamless way to transfer LMS data into trainee portfolios. This manual duplication of work significantly increases administrative workload and highlights the need for system integration between the LMS and College trainee portfolios.

“其實這些 attendance 我又要去放到我們的 College 裡面自己 Trainee portfolio 裡面，所以我之前問過你們和我們自己的 IT 人可不可以將這些東西 synchronize? 答案是不可以的。”

(I have to manually enter attendance data into our College's trainee portfolio. I asked if this could be synchronized, but the answer was no.) (Administrator 4)

Technical Challenges with Edpuzzle and Interactive Assessments

Edpuzzle was identified as a commonly used tool for video-based learning and embedded quizzes. However, technical issues with Edpuzzle login and integration with the LMS were frequently reported. Some administrators and trainees could not access videos or track their progress, leading to inconsistent completion records. Administrators also noted that trainees rarely logged into the LMS to review feedback or discussion forums, suggesting a disconnect between the LMS and how trainees engage with e-learning. To address this, better integration of interactive learning tools with the LMS is needed, ensuring assessment tracking works seamlessly.

“其實他們都 incorporate 了 MCQ 入去，但 Edpuzzle 不可以幫我 count...結果只可以在影片中出現，不可以在 LMS 那裡。”

(MCQs are embedded in Edpuzzle, but the system doesn't count them properly... The results only appear in the video, not in the LMS.) (Administrator 5)

Enrolment and User Management

Managing trainee enrolment and role transitions (e.g., from trainee to fellow) presented some logistical challenges. The manual process of updating user status was seen as time-consuming, and inter-college transitions were particularly complex, requiring additional administrative coordination.

“我們一年會收四次生。我們一年會收四次 Exit 的...有些 Fellow 其實已經在另一個 College，有 Academy 的帳戶，但來我們這裡做 Trainee，就要額外處理 Enrolment。”

(We enrol new trainees four times a year and also have four exit batches... Some Fellows already have Academy accounts but return as trainees under a different College, which requires extra enrolment steps.) (Administrator 6)

Discussion

The results from this structured evaluation highlight several critical aspects impacting the effectiveness of administrative support in LMS implementation. Administrators rated various features of the LMS around the midpoint of the Likert scale, suggesting general adequacy but clear room for improvement, as reflected in the moderate to high coefficients of variation (CV). The generally high CV values (>20%) indicate significant variability among administrators' responses, possibly reflecting different levels of motivation, varying technical proficiency, differing experiences, or inconsistent expectations. For example, qualitative feedback and open-ended responses revealed some administrators felt overwhelmed or less comfortable with technology, leading to lower motivation and satisfaction, while others appeared more confident and thus rated their experiences positively.

Notably, higher satisfaction ratings in areas like technical support (mean 5.11, CV% 22.14) and responsiveness of support staff (mean 4.69, CV% 21.64) indicate administrators value and appreciate the available support, representing a significant strength of the LMS implementation. This aligns with open-ended responses emphasizing the importance of accessible and knowledgeable technical support, though the variability suggests that not all administrators utilized or were equally aware of the available support services.

LMS Usability and Functionalities

Quantitative data underscored moderate satisfaction with course creation, enrolment, and content management, yet qualitative feedback identified consistent frustrations with interface complexity, especially regarding the Gradebook and analytics tools. Administrators noted difficulty extracting and reformatting trainee performance reports, emphasizing a mismatch between LMS-generated data and College-specific portfolio requirements. This inefficiency, corroborated by qualitative insights, underscores the need for tailored reporting functions aligned with existing administrative workflows.

Administrative Workload

The qualitative findings clearly demonstrate that manual processes significantly contribute to administrative burdens. Administrators expressed challenges in tracking trainee progress, particularly with interactive tools like Edpuzzle, which are insufficiently integrated into the LMS. The resulting manual tracking and cross-verification tasks increase workload and create inefficiencies, highlighting an urgent need for streamlined workflows and administrative tools within the existing LMS.

Training and Onboarding

Technical support received notably positive feedback, highlighting its effectiveness and responsiveness. However, administrators consistently identified training gaps, particularly impacting new staff onboarding. Administrators emphasized the need for accessible, practical training resources such as quick-start guides or demonstration videos, reinforced by quantitative ratings indicating a strong preference for user-friendly guides (mean 4.61, CV% 25.92). Open-ended responses highlighted difficulties faced by administrators less comfortable with technology, further emphasizing the necessity for structured, sustainable training solutions.

System Integration

Significant challenges were noted concerning integration between the LMS and College-specific trainee portfolio systems. Manual duplication of tasks related to attendance and progress reporting adds to administrative burden, with qualitative data indicating a clear demand for improved synchronization capabilities. Addressing this integration gap within the constraints of the current LMS may involve exploring intermediate solutions such as standardized data export templates or automating data formatting processes externally.

Technical Issues and Interactive Tools

The frequent technical issues highlighted by administrators, especially concerning interactive tools like Edpuzzle, reflect deeper integration problems. Administrators' inability to reliably track embedded assessments within Edpuzzle further complicates trainee progress management. Improved technical integration between the LMS and interactive platforms would streamline user experience and facilitate more accurate assessment tracking.

Recommendations

Given the commercial nature and recent adoption of the LMS, altering the system significantly is neither feasible nor advisable at this stage. Instead, refined recommendations should focus on maximizing current system capabilities and enhancing support, including:

- Developing standardized report templates and data export formats to streamline integration with College portfolio systems.
- Implementing workflow automation tools external to the LMS, such as macros or scripts, to reduce manual processing burdens.
- Creating robust onboarding programs, user-friendly quick-start guides, and demonstration videos to support administrator training and ongoing development.
- Strengthening technical support awareness and accessibility through clearly communicated resources and proactive outreach, ensuring administrators fully utilize available assistance.

In summary, enhancing training resources, workflow optimization, and administrative support tools will significantly improve administrator experiences, reduce inefficiencies, and strengthen overall LMS implementation effectiveness.

Reference

1. Kirkpatrick DL, Kirkpatrick JD. **Evaluating Training Programs: The Four Levels**. 3rd ed. Berrett-Koehler Publishers; 2006.
2. Cook DA, Ellaway RH. Evaluating technology-enhanced learning: a comprehensive framework. *Med Teach*. 2015;37(10):961-970. doi:10.3109/0142159X.2015.1009024.
3. King N, Brooks JM. **Template analysis for business and management students**. Sage Publications; 2017.
4. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*. 2000;55(1):68-78. doi:10.1037/0003-066X.55.1.68.
5. Irby DM, O'Sullivan PS. Developing and rewarding teachers as educators and scholars: Progress and challenges. *Med Educ*. 2018;52(1):74-84. doi:10.1111/medu.13479.
6. Steinert Y. Faculty development in the age of competency-based medical education: Perspectives from the field. *Med Teach*. 2020;42(8):852-858. doi:10.1080/0142159X.2020.1746191.
7. Rees CE, Monrouxe LV. Who are you and who do you want to be? Key considerations in developing professional identities in medicine. *Med J Aust*. 2018;209(5):202-203. doi:10.5694/mja17.00787.
8. Harden RM. Learning outcomes as a tool to assess progression. *Med Teach*. 2007;29(7):678-682. doi:10.1080/01421590701729955.
9. Wiggins GP, McTighe J. **Understanding by design**. 2nd ed. ASCD; 2005.
10. Vygotsky LS. **Mind in society: The development of higher psychological processes**. Harvard University Press; 1978.
11. van Merriënboer JJ, Kirschner PA. **Ten steps to complex learning: A systematic approach to four-component instructional design**. 3rd ed. Routledge; 2018.
12. Garrison DR. **E-learning in the 21st century: A framework for research and practice**. 3rd ed. Routledge; 2017.
13. Cook DA, Levinson AJ, Garside S, Dupras DM, Erwin PJ, Montori VM. Internet-based learning in the health professions: A meta-analysis. *JAMA*. 2008;300(10):1181-1196. doi:10.1001/jama.300.10.1181.
14. Salmon G. **E-Moderating: The Key to Teaching and Learning Online**. 3rd ed. Routledge; 2011.
15. Zhao Y, Sullivan J, Mellenius I. Small group online discussions in a large class: Strategies for facilitation. *Internet High Educ*. 2014;23:18-24. doi:10.1016/j.iheduc.2014.05.001.
16. Kolb DA. **Experiential Learning: Experience as the Source of Learning and Development**. 2nd ed. Pearson Education; 2014.
17. Yardley S, Teunissen PW, Dornan T. Experiential learning: AMEE Guide No. 63. *Med Teach*. 2012;34(2):e102-e115. doi:10.3109/0142159X.2012.650741.
18. Cook DA, Bordage G, Schmidt HG. Description, justification and clarification: A framework for classifying the purposes of research in medical education. *Med Educ*. 2008;42(2):128-133. doi:10.1111/j.1365-2923.2007.02974.x.
19. Smith B, MacGregor J. What is collaborative learning? In: Goodsell AS, Maher MR, Tinto V, eds. *Collaborative Learning: A Sourcebook for Higher Education*. National Center on Postsecondary Teaching, Learning, and Assessment; 1992:10-30.
20. Slavin RE. Cooperative learning and academic achievement: Why does groupwork work? *Ann Rev Psychol*. 2014;65:41-73. doi:10.1146/annurev-psych-010213-115122.
21. Brindley JE, Walti C, Blaschke LM. Creating effective collaborative learning groups in an online environment. *Int Rev Res Open Dist Learn*. 2009;10(3):1-18. doi:10.19173/irrodl.v10i3.675.

22. Salas E, Reyes DL, McDaniel SH. The science of teamwork: Progress, reflections, and the road ahead. *Am Psychol.* 2018;73(4):593-600. doi:10.1037/amp0000334.
23. Martin F, Bolliger DU. Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learn.* 2018;22(1):205-222. doi:10.24059/olj.v22i1.1092.
24. Winkler R, Söllner M. Unleashing the potential of chatbots in education: A state-of-the-art analysis. *Int J Educ Technol High Educ.* 2021;18(1):54. doi:10.1186/s41239-021-00278-3.
25. Bailey D, Burchard J, Marzban R, et al. AI-powered chatbots in online learning: Opportunities and challenges. *Comput Educ Artif Intell.* 2023;4:100103. doi:10.1016/j.caeai.2023.100103.
26. Zawacki-Richter O, Marín VI, Bond M, Gouverneur F. Systematic review of research on artificial intelligence applications in higher education – where are the educators? *Int J Educ Technol High Educ.* 2019;16(1):39. doi:10.1186/s41239-019-0171-0.
27. Kizilcec RF, Pérez-Sanagustín M, Maldonado JJ. Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Comput Educ.* 2017;104:18-33. doi:10.1016/j.compedu.2016.10.001.
28. Wang S, Hsu H. The impact of a structured course roadmap on student engagement and learning outcomes in online courses. *J Educ Comput Res.* 2021;59(4):654-678. doi:10.1177/0735633120988803.
29. Means B, Toyama Y, Murphy R, Bakia M, Jones K. Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. U.S. Department of Education. 2009. Available from: <https://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf>
30. Mayer RE. Multimedia learning. 3rd ed. Cambridge University Press; 2021. doi:10.1017/9781316941353.
31. Sweller J, Ayres P, Kalyuga S. **Cognitive load theory.** 2nd ed. Springer; 2011.
32. Brame CJ. Effective educational videos: Principles and guidelines for maximizing student learning from video content. *CBE Life Sci Educ.* 2016;15(4):es6. doi:10.1187/cbe.16-03-0125.
33. Schneider M, Nebel S, Beege M, Rey GD. The autonomy-enhancing effect of choice on cognitive load and learning outcomes in digital learning environments. *Comput Hum Behav.* 2018;89:454-463. doi:10.1016/j.chb.2018.08.025.
34. Zhang D, Zhou L, Briggs RO, Nunamaker JF Jr. Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Inform Manage.* 2006;43(1):15-27. doi:10.1016/j.im.2005.01.004.
35. Downing SM. Twelve steps for effective test development. *Adv Health Sci Educ Theory Pract.* 2006;11(1):49-63. doi:10.1007/s10459-005-5497-0.
36. Case SM, Swanson DB. Constructing written test questions for the basic and clinical sciences. National Board of Medical Examiners; 2002.
37. Nicol DJ, Macfarlane-Dick D. Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Stud High Educ.* 2006;31(2):199-218. doi:10.1080/03075070600572090.
38. Sadler DR. Formative assessment and the design of instructional systems. *Instr Sci.* 1989;18(2):119-144. doi:10.1007/BF00117714.
39. Hattie J, Timperley H. The power of feedback. *Rev Educ Res.* 2007;77(1):81-112. doi:10.3102/003465430298487.
40. Brindley JE, Walti C, Blaschke LM. Creating effective collaborative learning groups in an online environment. *Int Rev Res Open Distrib Learn.* 2009;10(3):1-18. doi:10.19173/irrodl.v10i3.675.

41. Salmon G. **E-tivities: The key to active online learning**. Routledge; 2013.
42. Garrison DR, Kanuka H. Blended learning: Uncovering its transformative potential in higher education. *Internet High Educ.* 2004;7(2):95-105. doi:10.1016/j.iheduc.2004.02.001.
43. Garrison DR, Cleveland-Innes M. Facilitating cognitive presence in online learning: Interaction is not enough. *Am J Distance Educ.* 2005;19(3):133-148. doi:10.1207/s15389286ajde1903_2.
44. Swan K. Building learning communities in online courses: The importance of interaction. *Educ Commun Inf.* 2002;2(1):23-49. doi:10.1080/1463631022000005016.
45. Steinert Y, Snell LS. Interactive learning: Strategies for increasing participation in lectures. *Med Teach.* 1999;21(1):37-42. doi:10.1080/01421599980011.
46. Ellaway RH, Masters K. AMEE Guide 32: e-Learning in medical education Part 1: Learning, teaching, and assessment. *Med Teach.* 2008;30(5):455-473. doi:10.1080/01421590802108331.
47. Hmelo-Silver CE. Problem-based learning: What and how do students learn? *Educ Psychol Rev.* 2004;16(3):235-266. doi:10.1023/B:EDPR.0000034022.16470.f3.
48. Deepamala N, Shobha G. Effective approach in making capstone project a holistic learning experience to students of undergraduate computer science engineering program. *J Technol Sci Educ.* 2018;8(4):420-438. doi:10.3926/jotse.427
49. Williams DP, Hurkett CP, Symons SL, et al. A framework for student-instructor partnerships. *Int J Teach Learn High Educ.* 2020;32(3):454-462
50. Cho MH, Tobias S. Should instructors require discussion in online courses? Effects of online discussion on community of inquiry, learner time, satisfaction, and achievement. *Int Rev Res Open Distrib Learn.* 2016;17(2):123-140. doi:10.19173/irrodl.v17i2.2342

Chapter 7

Assessment of Learning Outcome

Section 7A
Acceptance and Use of Technology

Introduction

The Academy has been implementing e-learning to enhance postgraduate medical education and continuing professional development (CPD) across its Colleges. The needs analysis, detailed earlier in this report, identified three essential components for effective e-learning integration: (1) the provision of technology, including a Learning Management System (LMS) and associated educational tools, (2) a dedicated support team to provide technical and administrative assistance, and (3) faculty development initiatives to empower educators with the necessary pedagogical and technological skills for online teaching.

The Learning On-Line (LOL) Educator Course was developed to address the third pillar by equipping the Academy's educators with both the theoretical foundations and practical competencies required for e-learning implementation. The evaluation of this course aims to assess its effectiveness in promoting acceptance and adoption of e-learning among educators and its role in supporting the broader institutional transition towards technology-enhanced learning.

Theoretical Basis

The primary objective of the LOL Course was to facilitate the acceptance and use of e-learning among the Academy's educators. This evaluation sought to measure the extent to which participants integrated LMS-supported learning activities into their teaching practice. Actual changes in LMS usage and implementation of e-learning strategies were tracked, alongside self-reported perceptions of acceptance and readiness to use digital learning tools.

However, given the time lag between attitude shifts and behavioural change, tracking long-term adoption trends was equally important. To address this, the evaluation also examined participants' technology acceptance and intention to use LMS-based teaching methods, providing a more comprehensive assessment of the course's impact.

The **Unified Theory of Acceptance and Use of Technology (UTAUT)**, developed by Venkatesh et al., was applied as the theoretical framework for evaluating technology adoption.¹ UTAUT synthesizes research from social psychology, behavioural psychology, and information systems management to identify factors influencing technology acceptance and use behaviour. Its extended model, UTAUT-2, incorporates additional factors relevant to voluntary learning environments, making it particularly suited to studying e-learning adoption.^{2, 3}

The UTAUT-2 framework (Figure 7-1) highlights key determinants of technology adoption, several of which are particularly relevant to this evaluation:

- Performance Expectancy – Whether participants perceive that using the LMS will enhance their teaching effectiveness.
- Effort Expectancy – The perceived ease of use of the LMS and its associated tools.
- Social Influence – The role of peer and institutional expectations in encouraging educators to engage with e-learning.
- Facilitating Conditions – The availability of technical support, institutional policies, and infrastructure to support LMS adoption.
- Hedonic Motivation – Whether engagement with e-learning tools is enjoyable and meaningful, influencing sustained use.

- Habit Formation – Whether LMS usage becomes a routine aspect of educators’ teaching practice.

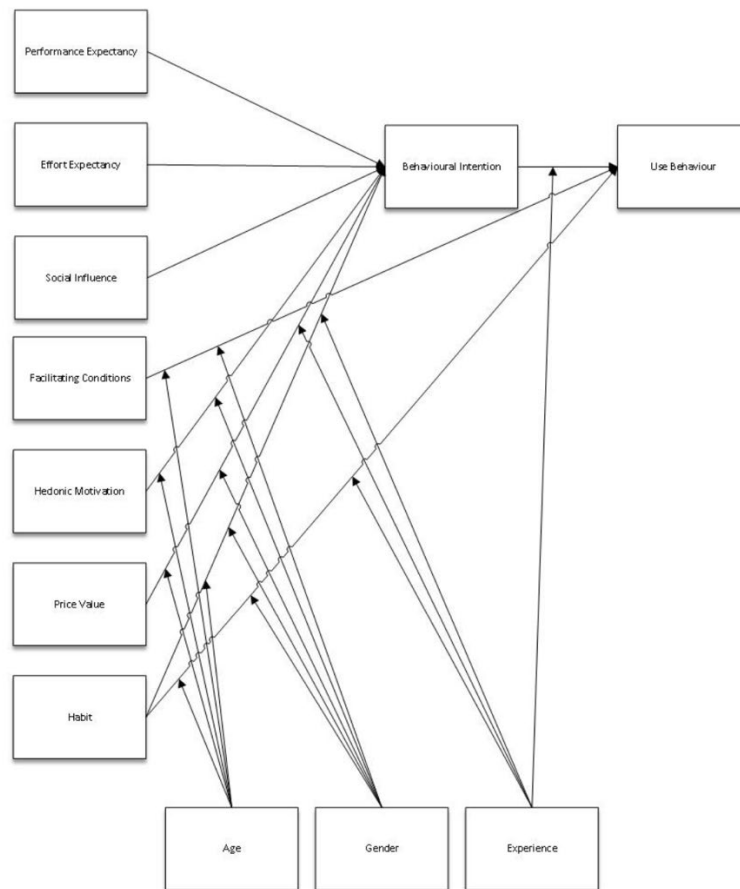


Figure 7-1 Unified Theory of Acceptance and Use of Technology-2 (UTAUT2)²

By applying UTAUT-2, this evaluation assessed not only immediate learner perceptions but also predictors of long-term adoption within the Academy’s Colleges. This framework provided insights into the effectiveness of the LOL Course in shaping attitudes and behaviours related to LMS use.

Methodology

This evaluation of the Learning On-Line (LOL) Educator Course employs a mixed-methods approach using a sequential explanatory design, integrating both quantitative and qualitative analyses to assess the acceptance, implementation, and effectiveness of e-learning in postgraduate medical education under the Academy.

Ethical Approval

Ethical approval for the study was obtained from the **Survey and Behavioural Research Ethics Committee of The Chinese University of Hong Kong**. Participants were informed about the purpose of the study, assured of confidentiality, and provided with the option to withdraw at any time. Data were anonymized and securely stored to protect participant privacy.

Quantitative Phase

A. Survey

Participant Recruitment

All learners from the 2nd to 7th LOL Courses were invited to participate in an online survey distributed via email and WhatsApp.

- For the 26 learners from the 2nd to 6th LOL Courses (which were already completed before this evaluation), only post-course data were collected.
- For all 13 participants of the 7th LOL Courses, pre- and post-course surveys were administered to assess changes in their perceptions and acceptance of e-learning.

Survey Instrument

A survey tool based on the Unified Theory of Acceptance and Use of Technology (UTAUT2)^{2, 4, 5} was used to measure participants' intentions to use e-learning in their teaching practices.

The questionnaire is designed to assess:

- **Performance expectancy** (perceived usefulness of the LMS)
- **Effort expectancy** (ease of use)
- **Social influence** (perceived institutional and peer support)
- **Facilitating conditions** (availability of resources and support)
- **Hedonic motivation** (enjoyment in using the LMS)
- **Habit formation** (degree of routine use)
- **Price/value** (perceived cost-benefit analysis)

Data Analysis

1. Pre- and post-course scores (total and individual construct scores) from the 7th LOL Courses (LOL-7) was analysed using repeated measures paired t-test to determine significant changes in participants' attitudes toward e-learning.
2. Independent t-test was conducted to compare the post-course scores of participants from the 2nd to 7th LOL Courses, identifying differences across course iterations.
3. Post-intervention scores of LOL 7 course participants was compared with those of 2nd-6th LOL (LOL 2-6) using independent t-test.

B. Other Data Sources

B-1. Reported Use of the eHKAM LMS

Information will be solicited from all colleges and the HKJC ILCM through their representatives in the eHKAM LMS Taskforce, documenting:

- E-learning activities using the eHKAM LMS that have already been implemented.
- Future e-learning initiatives planned for integration within college curricula.

B-2. Utilization Data of the eHKAM LMS

LMS usage statistics will be extracted and analyzed for trends, focusing on:

- Number of published courses on the LMS.
- User engagement, including the number of views, active participation, and resource access.
- Trends in LMS adoption, with a particular focus on postgraduate training and Continuing Professional Development (CPD).

These quantitative data sources will provide objective evidence on the uptake of e-learning in the Academy-accredited programs.

Qualitative Phase

A. Interviewing LOL Course Participants

Participant Recruitment

To gain deeper insights into areas for improvement, interviews were conducted with nine learners and three instructors who participated in the interventions evaluated in Part 5. These interviews aimed to provide explanations for the quantitative findings.

Data Collection

- Semi-structured interviews were conducted using an interview guide (Appendix 6-1).
- All interviews were audio recorded, transcribed verbatim using PLAUD note, and anonymized while retaining course iteration identifiers.

Data Analysis

- Template analysis, as described by King & Brooks⁶, was used to systematically categorize themes related to:
 - Perceived benefits and challenges of the course
 - Barriers to adopting e-learning
 - Technical usability of the LMS
 - Support required for sustainable e-learning implementation
- Findings will be used to inform course refinements and provide feedback to the LMS vendor where necessary.

B. Interview of College Lead in E-Learning

There are multiple barriers to implementation of e-learning⁷. In addition to trainers who use e-learning to teach, and learners who learn through e-learning systems, organization factors have to be addressed as well.⁸ Therefore, another component of this evaluation is to interview College leads to study the situation of management support, resources, and culture which have been identified to be significant factors affecting effective implementation of e-learning.^{8,9}

Participant Recruitment: College leads in e-learning from all 15 colleges and ILCM were identified by their representatives in the eHKAM LMS Taskforce and invited to participate in interviews, and 13 of them completed the interview.

Data Collection: Semi-structured interviews using the interview guide (Appendix 6-2) will be conducted.

All interviews were audio recorded and transcribed verbatim using PLAUD note. The transcripts were anonymized.

Analysis: Template analysis as described by King & Brooke⁶ was used for analysis.

Results

Quantitative Data

The Learning On-Line (LOL) Educator Course was designed to facilitate the adoption of e-learning among educators within the Academy. This evaluation employed the Acceptance and Use of Technology Survey based on the Unified Theory of Acceptance and Use of Technology (UTAUT2) to assess how participants integrated e-learning into their teaching.

1. Pre- and Post-Intervention Changes in LOL7 Participants (N=13) (Table 7-1)
2. Comparison of LOL7 Post-Intervention Results with LOL2–6 Combined (N=38) (Table 7-2)
3. Comparison Between LOL7 (N=13) and LOL2–6 (N=25) Post-Intervention Scores (Table 7-3)

Findings from these comparisons highlight improvements in LMS adoption, differences in course impact over time, and the role of iterative refinements in shaping course effectiveness.

Item	Pre-Intervention (Mean±SD)	Post-Intervention (Mean, SD)	P value	Cohen's d	% of Maximum Score Achieved after Intervention	Coefficient of Variation
Behavioural Intention (BI)	17.5+3.43	19.2+1.63	0.069	-0.602	91.2	7.41%
Performance Expectancy (PE)	35.3+6.40	39.5+3.48	0.027	-0.792	80.5	6.36%
Effort Expectancy (EE)	24.3+4.71	25.5+4.39	0.262	-0.253	72.7	6.74%
Social Influence (SI)	15.8+3.11	16.3+2.06	0.304	-0.204	77.7	10.52%
Facilitation Conditions (FC)	19.2+5.25	21.8+3.85	0.086	-0.551	77.7	14.03%
Hedonic Motivation (HM)	15.3+3.01	16.4+2.50	0.166	-0.389	78.0	12.50%
Price Value (PV)	22.8+2.49	24.0+2.24	0.099	-0.520	85.7	6.41%
Habit (HT)	14.2+4.67	17.2+3.09	0.030	-0.777	82.1	14.63%
Total	164.5+27.17	179.8+14.10	0.042	-0.707	80.3	6.41%

Table 7-1 Acceptance and Use of Technology Survey for LOL7

Item	Pre-Intervention (Mean+SD) (N=13)	Post-Intervention (Mean±SD) (N=38)	P value	Cohen's d	% of Maximum Score Achieved after Intervention	Coefficient of Variation
Behavioural Intention (BI)	17.5+3.43	17.4+2.94	0.558	0.047	78.5	14.2
Performance Expectancy (PE)	35.4+6.4	35.4+6.68	0.503	0.002	67.8	16.3
Effort Expectancy (EE)	24.3+4.71	23.9+5.86	0.590	0.074	65.9	23.9
Social Influence (SI)	15.8+3.11	15.1+3.08	0.738	0.206	69.1	17.2
Facilitation Conditions (FC)	19.2+5.25	20.3+3.92	0.223	-0.247	69.7	15.9
Hedonic Motivation (HM)	15.3+3.01	14.7+15.0	0.693	0.163	65.7	25.7
Price Value (PV)	22.8+2.49	21.8+3.39	0.828	0.306	73.7	11.9
Habit (HT)	14.2+4.67	14.1+4.45	0.513	0.011	59.4	27.4
Total	164.5+27.17	162.7+28.74	0.578	0.064	68.6	15.3

Table 7-2 Acceptance and Use of Technology Survey for LOL2-7

Item	LOL 7 (Mean±SD) (N=13)	LOL 2-6 (Mean±SD) (N=25)	P value
Behavioural Intention (BI)	19.2±1.63	17.0±3.07	0.006
Performance Expectancy (PE)	40.0±3.48	34.0±7.00	0.005
Effort Expectancy (EE)	27.0±4.39	25.0±6.43	0.240
Social Influence (SI)	16.3±2.06	15.0±3.37	0.089
Facilitation Conditions (FC)	21.8±3.85	19.5±3.81	0.094
Hedonic Motivation (HM)	16.4±2.50	13.8±4.45	0.061
Price Value (PV)	24.0±2.24	20.6±3.35	0.003
Habit (HT)	17.2±3.09	12.5±4.21	<0.001
Total	179.8±14.10	153.8±30.54	0.006

Table 7-3 Comparison of Post-Intervention **Acceptance and Use of Technology Survey** for **LOL7 vs LOL2-6**

A within-group comparison of LOL7 participants revealed significant improvements:

Enhanced Perception of LMS Effectiveness

Performance Expectancy (PE) increased from 35.3 ± 6.40 to 39.5 ± 3.48 ($p = 0.027$, Cohen's $d = -0.792$), indicating a stronger belief that the LMS enhances teaching.

Greater Integration of LMS Use into Routine Teaching

Habit Formation (HT) rose from 14.2 ± 4.67 to 17.2 ± 3.09 ($p = 0.030$, Cohen's $d = -0.777$), suggesting that LMS use became a more routine practice.

Overall Increase in E-learning Adoption

The total score improved significantly from 164.5 ± 27.17 to 179.8 ± 14.10 ($p = 0.042$, Cohen's $d = -0.707$), reflecting a broader positive shift in attitudes toward e-learning.

Non-Significant Positive Trends

Behavioural Intention (BI), Facilitating Conditions (FC), Hedonic Motivation (HM), and Price Value (PV) showed improvements but did not reach statistical significance.

Effort Expectancy (EE) and Social Influence (SI) remained relatively unchanged, indicating that ease of use and peer/institutional support did not shift substantially.

These findings indicate that the LOL7 course effectively enhanced perceptions of LMS effectiveness (Performance Expectancy) and reinforced habitual use (Habit Formation), contributing to greater overall acceptance of e-learning. However, Effort Expectancy (perceived ease of use) and Social Influence (peer and institutional support) remain areas for further improvement to optimize LMS adoption.

The second analysis compared LOL7 ($N=13$) against all LOL2–6 participants combined ($N=38$) revealed the following key findings:

No Significant Differences in Most Constructs

Across Behavioural Intention (BI), Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Hedonic Motivation (HM), Price Value (PV), and Habit Formation (HT), no statistically significant differences were observed ($p > 0.05$ for all).

The total mean scores were similar: 162.7 ± 28.74 (LOL2–6) vs. 164.5 ± 27.17 (LOL7), $p = 0.578$.

Higher Variation in LOL2–6

The coefficient of variation was higher in LOL2–6 for most constructs, particularly in Effort Expectancy (23.9%), Hedonic Motivation (25.7%), and Habit (27.4%), suggesting more variability in experiences and perceptions compared to LOL7.

At first glance, the absence of significant differences may suggest that LOL7 was not markedly different from prior iterations. However, the higher variability in LOL2–6 suggests that course impact fluctuated across different cohorts. This variability likely diluted the significance of any differences when all participants were analysed together.

A direct post-intervention comparison between LOL7 ($N=13$) and LOL2–6 ($N=25$) showed more substantial differences:

Higher Acceptance and Intent to Use LMS in LOL7

Behavioural Intention (BI): 19.2 ± 1.63 vs. 17.0 ± 3.07 ($p = 0.006$), indicating a stronger intent to use e-learning in LOL7.

Performance Expectancy (PE): 40.0 ± 3.48 vs. 34.0 ± 7.00 ($p = 0.005$), suggesting LOL7 participants found LMS use more beneficial for teaching.

Habit (HT): 17.2 ± 3.09 vs. 12.5 ± 4.21 ($p < 0.001$), reflecting a greater integration of LMS use into routine teaching.

Greater Perceived Value of E-learning in LOL7

Price Value (PV): 24.0 ± 2.24 vs. 20.6 ± 3.35 ($p = 0.003$), indicating a stronger perception that e-learning is worth the investment.

Moderate but Non-Significant Trends in Other Constructs

Social Influence (SI), Facilitating Conditions (FC), and Hedonic Motivation (HM) showed moderate increases but did not reach statistical significance.

Overall Stronger LMS Adoption in LOL7

The total score was 179.8 ± 14.10 in LOL7 compared to 153.8 ± 30.54 in LOL2–6 ($p = 0.006$), confirming that LOL7 participants had a significantly better post-course perception of LMS use.

These data support that the LOL7 cohort demonstrated significantly stronger post-course outcomes compared to LOL2–6, particularly in Behavioural Intention, Performance Expectancy, Habit Formation, and Price Value. This suggests that refinements made in LOL7—such as enhancements in course structure, delivery, or support mechanisms—contributed to greater acceptance and integration of e-learning.

Given these findings, the higher variability observed in LOL2–6 likely reflects differences in course design, participant backgrounds, and institutional readiness across iterations.

Course Refinements Over Time

Changes in instructional design, LMS tools, and teaching approaches may have led to inconsistencies in participant experiences.

Differences in faculty support and institutional messaging could have influenced engagement levels.

Evolving Institutional Readiness

Earlier cohorts may have faced greater scepticism toward e-learning, whereas later cohorts (LOL6–7) benefited from a more established LMS culture.

Technical and administrative support may have improved over time, affecting Facilitating Conditions (FC) and Performance Expectancy (PE).

Variations in Participant Experience with LMS

Participants in later cohorts may have entered with greater exposure to LMS-supported teaching, whereas earlier participants were less familiar with digital learning tools.

LOL2–6's variability suggests that course effectiveness evolved over time, with earlier iterations likely facing greater challenges in adoption. LOL7's significantly higher scores indicate that refinements made to the course were successful in addressing prior limitations.

Quantitative Data

A. Interview of Learning On-Line Educator Course Participants

The interviews with nine learners were analysed using template analysis, guided by the survey questions outlined above. The findings are summarized below.

Social Influence (SI) (Mixed peer engagement and inconsistent institutional support)

What Worked Well:

Colleague recommendations encouraged participation.

Many participants joined because of positive peer experiences, showing that word-of-mouth influence played a key role in LMS adoption. Seeing colleagues benefit from the course motivated them to enroll, even if they were initially unfamiliar with e-learning.

“同事說這個課程很好，所以我決定試試看，覺得學習新工具總是有幫助的。” (*My colleagues said this course was great, so I decided to give it a try. Learning new tools is always helpful.*) – (P1)

What Needed Improvement:

Lack of active engagement in forums.

Participants expected more peer interaction in discussion forums but found responses to be delayed or absent, leading to disengagement. Without real-time feedback, discussions felt one-directional rather than collaborative, and many participants stopped contributing over time.

“Forum 沒有人回應我，我分享了，但好像沒有人回應我，令我更加不想分享。” (*I posted on the forum, but no one responded. It discouraged me from sharing more.*) – (P7)

Mixed influence from colleagues

While some participants enrolled based on peer recommendations, their expectations were not always met, leading to mixed perceptions of the course's impact on professional practice.

“參加之前，我的同事說這個課程很有用，但到最後我覺得沒有想像中那麼大幫助。” (*My colleagues told me this course was useful, but in the end, I didn't find it as helpful as expected.*) – (P3)

Institutional support for LMS use was weak post-course.

Despite learning new tools, participants felt there was no structured plan to encourage LMS use beyond the course. Without follow-up support or guidance, many did not know how to integrate LMS into their daily practice, limiting long-term adoption.

“完成課程之後，沒有人真的問過我們怎樣繼續用 LMS，我覺得這方面可以做得更好。” (*After the course, no one asked how we would continue using LMS. I think this could be improved.*) – (P9)

Effort Expectancy (EE) (Technical challenges affected usability)

What Worked Well:

Step-by-step guidance was helpful.

The course's structured approach made it easier for participants to understand and apply new tools. Clear, sequential instructions allowed even those unfamiliar with LMS to gradually build confidence in using digital platforms.

“有清晰的步驟教學，所以不會太難跟上，讓我們慢慢適應新工具。” (*The course provided clear step-by-step instructions, so it wasn't too difficult to follow and adapt to new tools.*) – (P3)

What Needed Improvement:

Mobile accessibility issues.

Some LMS features did not function well on mobile devices, making it difficult for participants to access materials flexibly. Formatting inconsistencies between desktop and mobile disrupted the learning experience.

“用 desktop 去看，同用電話看是有分別的，不知是否格式的問題。” (*There's a difference between viewing on desktop and mobile, possibly due to formatting issues.*) – (P2)

Lack of video playback speed control.

Participants wanted more control over video playback speed to adjust for pacing and efficiency. Slow delivery in some lectures made it difficult to stay focused.

“影片不能調速，講者說話速度很慢，影響專注力。” (*The videos could not be sped up, and some speakers spoke too slowly, making it difficult to stay focused.*) – (P6)

Navigation and task completion were sometimes unclear.

Certain LMS tasks took longer than expected, requiring participants to repeatedly refer to instructions. This slowed progress and reduced efficiency.

“有時候我要 insert 一些內容，我會 insert 很久，還是 insert 得到的，不過我還是要看 introduction。” (*It took me a long time to insert content, even though I eventually figured it out. I had to keep referring to the introduction instructions.*) – (P5)

Performance Expectancy (PE) (High perceived usefulness, but some limitations in application)

What Worked Well:

Flexibility and self-paced learning were major benefits.

Participants valued the ability to learn at their own pace, making LMS a practical choice for busy professionals. The ability to revisit materials at any time helped reinforce learning and fit into unpredictable work schedules.

“這個課程最大的優點，就是它是一個 online 形式，可以用我空餘的時間去上課，慢慢地去看那些紀錄。” (*The greatest advantage of this course is that it is online, allowing me to take classes in my spare time and review recordings at my own pace.*) – (P1)

Introduced useful e-learning tools.

Many participants found tools like Mentimeter and Miro valuable for enhancing engagement in their own teaching. These interactive tools helped create a more dynamic learning environment.

“我學會了 Mentimeter，這個工具很容易用，課堂互動會更好。” (*I learned how to use Mentimeter—it's easy to use and improves class interaction.*) – (P4)

What Needed Improvement:

Some tools were not practical for clinical teaching.

While LMS tools worked well for theoretical content, they were less effective for hands-on skills training. Participants struggled to translate online learning into practical, real-world procedures..

“如果你要做一些手作，或者學一個 procedure，坦白說，我覺得 e-learning 是很困難的。” (*If you're learning a hands-on procedure, e-learning is very difficult.*) – (P6)

Lack of customization for different learning needs.

The course did not differentiate between beginner and advanced learners, making it less effective for experienced educators. Some participants suggested adaptive learning pathways to cater to different levels of expertise.

“如果有些 preparatory course，大學生那些不用 join，不用分組。例如，群組 A 全部是大學生，群組 B 是小學生。” (*If there were preparatory courses, advanced learners could skip them while beginners could get additional help. This would mirror real workplace environments better.*) – (P8)

Hedonic Motivation (HM) (Limited engagement and low enjoyment in learning activities)

What Worked Well:

Live discussions in Zoom sessions were engaging.

Participants found live Zoom sessions more engaging than discussion forums due to immediate interaction, real-time clarification, and a stronger sense of connection with peers and instructors. However, many felt the sessions were too short, limiting deeper discussion and participation. Breakout rooms were helpful but needed better facilitation to ensure equal contribution.

“最後 Zoom 的那天，我覺得那裡也挺好，反而我覺得時間不是最足夠。” (*The final Zoom session was great, but I think there wasn't enough time.*) – (P5)

What Needed Improvement:

Passive engagement in discussion forums.

Discussion forums were designed to encourage peer learning and interaction, but many participants found them ineffective due to low engagement. Several participants reported that their posts were often ignored, which discouraged them from further participation. Unlike real-time discussions, where immediate responses could drive engagement, the asynchronous nature of forums led to delayed or absent feedback, making interactions feel one-directional rather than dynamic.

“Forum 沒有人回應我，我分享了，但好像沒有人回應我，令我更加不想分享。” (*I posted on the forum, but no one responded. It discouraged me from sharing more.*) – (P7)

Group work felt transactional rather than collaborative.

Many participants found group work frustrating due to uneven participation and coordination issues in the asynchronous course. Some contributed early, while others delayed until the last minute, doing the bare minimum to complete tasks. Without clear accountability, proactive learners felt they were carrying the workload, making collaboration transactional rather than meaningful.

“有些人去到最後的一分鐘，你真的不逼他，他真的不做。” (*Some people wouldn't contribute until the last minute unless forced.*) – (P3)

Assessments and Feedback Lacked Personalization

Some participants wanted more customized feedback on their progress rather than generic LMS auto-grading.

“我交了功課，但 feedback 只是系統自動的 comments，沒有真正的反饋。” (*I submitted my assignment, but the feedback was just auto-generated by the system, not real feedback.*) – (P6)

Habit Formation (HT) (Limited long-term adoption of LMS due to post-course challenges)

What Worked:

Structured exposure to LMS tools helped build initial habit formation.

Many participants reported that being required to use the LMS during the course made them more comfortable with the platform. Even those who were initially unfamiliar with e-learning gained confidence through repeated exposure.

“之前沒有用過 LMS，但這個課程讓我習慣了上載內容和使用一些互動工具，現在覺得比之前順手很多。” (*I hadn't used LMS before, but this course got me used to uploading content and using interactive tools. Now, it feels much easier.*) – (P2)

What Needed Improvement:

No Institutional Follow-Up on LMS Adoption

After the course, there was no structured plan for continued LMS use, leading to low long-term adoption.

“完成課程之後，沒有人真的問過我們怎樣繼續用 LMS，我覺得這方面可以做得更好。” (*After the course, no one asked how we would continue using LMS. I think this could be improved.*) – (P9)

Lack of Incentives to Continue Using LMS

Participants did not see direct career benefits from adopting LMS, reducing motivation for long-term use.

“如果 LMS 的使用和我們的考評有關，或者和升遷有關，可能我們會更有動力用。” (*If LMS usage were linked to assessment or career progression, we might be more motivated to use it.*) – (P2)

B. Interview of College Education Leads

While the LOL Educator course is expected to influence the acceptance of e-learning in postgraduate and continuing medical education, training alone is not the sole determining factor. To explore perceived facilitators and barriers, we interviewed ten college leads, and the themes are outlined below.

1. Administrative and Institutional Support

E-learning implementation requires strong institutional commitment, efficient administrative processes, and adequate financial and manpower support. Some colleges benefit from secretarial teams that assist in platform management, troubleshooting, and content uploading, but not all colleges are able to provide such support. Where support is available, secretarial staff often take on a significant role in facilitating e-learning implementation. However, challenges persist, such as the significant manual workload required for LMS administration, which increases faculty and administrative staff burden. The absence of a dedicated leadership team overseeing e-learning results in inconsistent progress across colleges.

Subthemes:

Secretarial Support

Some colleges rely on their secretariat staff to assist with technical and logistical aspects of e-learning. While this provides some relief for faculty, dependence on administrative staff for IT-related tasks can slow down the implementation process, and some colleges lack secretarial support altogether.

“很多時候都是 secretariat 提供的 support, 我們 Web and Computer Committee 亦有 Secretary 負責這方面的工作。”

(*Most of the time, the secretariat provides support. Our Web and Computer Committee also has a secretary responsible for this work.*) (Participant 1)

Manual Administrative Burden

Many LMS platforms require significant manual effort for uploading content, tracking learner progress, and managing access. This increases inefficiencies and extra workload for faculty, making e-learning adoption less appealing.

“我們的 board 的人手，主要都是得我負責放 tutorial 上去... 變成我也不是有時間去 check 那些學生去看那個 video 的記錄。”

(*Our board lacks manpower, and I am the only one responsible for uploading tutorials... This means I don't even have time to check whether students have watched the videos.*) (Participant 3)

Need for Administrative Leadership in E-Learning

Colleges that lack administrative leadership struggle with coordination and support for e-learning processes, leading to inefficiencies and inconsistent implementation.

“我們沒有一個專門管理 e-learning 的行政團隊，每個學院的做法都不一樣，這讓我們很難統一進度。”

(We don't have a dedicated administrative team managing e-learning, and each college adopts a different approach, making it difficult to standardize progress.) (Participant 4)

Scalability and Standardization

E-learning provides an opportunity to scale training across a wider audience and ensure consistency in content delivery across different institutions.

“通過 E-learning，我們可以一次過 roll 晒比所有 members，這個是 efficient 的。” *(With e-learning, we can roll out training to all members at once, which is very efficient.)* (Participant 1)

2. Technology and IT Support

While some colleges have IT personnel supporting e-learning platforms, others struggle with limited technical expertise and manpower. Faculty and administrative staff often find LMS interfaces complex, leading to a steep learning curve that discourages engagement. Limited training opportunities on LMS usage and the absence of automation for tasks such as assignment grading and student progress tracking further hinder adoption. Colleges without dedicated IT teams experience delays in troubleshooting and system updates, affecting the smooth functioning of online learning.

Subthemes:

Complexity of LMS Interfaces

Some users, particularly admin staff and senior fellows, find LMS platforms difficult to navigate. The user-friendliness of a system significantly impacts its adoption.

“對於電腦有少少認識，我自己覺得還可以，但在 Secretariat 的層面，對他們來說很困難，因為太過 powerful，Canvas 的界面有時候也挺難用的。”

(For those with some computer knowledge, it is manageable, but for the secretariat staff, it is quite difficult because the system is too powerful. The Canvas interface can sometimes be quite difficult to use.) (Participant 1)

Lack of IT Support

Limited technical expertise and personnel make troubleshooting and maintenance difficult. This results in longer downtimes and delays in system improvements.

“我們需要 IT 人手來處理日常問題，但目前我們的資源有限，沒辦法即時解決技術問題。”

(We need IT personnel to handle routine problems, but currently, we have limited resources, so issues cannot be resolved immediately.) (Participant 2)

Need for Training on LMS Usage

Faculty and administrators require structured training to effectively utilize LMS features. Without this, some potential functionalities of the system remain underutilized.

“Trainer 們不懂得用 Canvas，他們有很多不知道怎麼 upload 東西，或者上載了之後，也不知道怎麼去 check 學員有沒有去看。”

(Trainers don't know how to use Canvas. Many don't know how to upload content, and even after uploading, they don't know how to check whether learners have accessed it.)

(Participant 2)

Absence of Automation

Many LMS platforms do not automate key administrative tasks, such as grading and progress tracking, leading to inefficient workflows and additional burdens on educators.

“我們的系統很多東西都需要手動操作，例如成績計算和學生進度追蹤，如果可以自動化，會減少我們很多工作量。”

(Our system requires a lot of manual work, such as grading calculations and student progress tracking. If these tasks could be automated, it would significantly reduce our workload.)

(Participant 5)

Potential for Efficiency Gains

With the right implementation, LMS automation and digital tools can reduce administrative burden and enhance efficiency.

“如果是 College 角度，我認為其中一個因素是，它有自動計分的方法，這也能幫助我們同事的 workload。”

(From the college's perspective, I think one of the factors is that it has an automated grading system, which can help reduce our colleagues' workload.)

(Participant 1)

3. Faculty and Learner Engagement

Faculty and learner engagement is critical for the successful implementation of e-learning. While some educators embrace online teaching, others struggle with motivation or technical challenges. Similarly, trainees demonstrate varied levels of participation, with some engaging actively while others complete online learning only when required.

Subthemes:

Faculty Buy-in and Motivation

Some educators see the value of e-learning and are eager to contribute, while others remain sceptical about its effectiveness compared to traditional teaching.

“有些老師比較願意嘗試新技術，但有些老師覺得 e-learning 沒有面對面學習有效。”

(Some teachers are more willing to try new technologies, but others feel that e-learning is not as effective as face-to-face learning.)

(Participant 4)

Recognition and Incentives for E-Learning Development

Some institutions provide incentives such as CME/CPD credits or formal recognition for trainers who contribute to e-learning content development.

“如果我們的 faculty 投入時間製作 e-learning 內容，我們應該考慮給他們一些認可，例如 CME credits 或者教學獎項。”

(If our faculty invest time in creating e-learning content, we should consider recognizing their efforts, such as awarding CME credits or teaching awards.)

(Participant 10)

Challenges for Senior Fellows

Older faculty members often struggle with digital platforms and require additional support, creating disparities in engagement levels.

“一些年長的導師對於使用 LMS 不太熟悉，有時候需要額外的支援，甚至有些人因為技術問題而放棄使用。”

(Some senior instructors are not very familiar with using LMS. Sometimes they need extra support, and some even give up due to technical difficulties.) (Participant 5)

Need for Faculty Development

Many educators require training on digital pedagogy to effectively design and deliver online courses.

“我們的導師雖然有豐富的臨床經驗，但對於如何在網上教學還是很陌生，需要一些專門的工作坊來提升他們的能力。”

(Our instructors have rich clinical experience, but they are still unfamiliar with online teaching methods. Some specialized workshops would help enhance their skills.)

(Participant 3)

Learner Engagement and Accountability

Many trainees engage with e-learning only when participation is mandatory or assessed, affecting its overall impact.

“我們發覺有八成的學員都不會做這個 pre-reading 的。如果我們實施一些強制的 pre-reading，他們大部分都是上課前那一天才會去 pre-read 的。”

(We found that 80% of trainees do not complete the pre-reading. If we make pre-reading mandatory, most of them only do it the day before the class.) (Participant 2)

Flexibility and Accessibility

E-learning allows trainees to access learning anytime, anywhere, improving engagement and making training more adaptable.

“我們希望這個 platform 可以讓他們更容易拿 CME 分。也希望他們可以通過這個平台不限時間和地點，隨時隨地學習，就算深夜也可以。”

(We hope this platform can make it easier for them to earn CME points. We also hope that they can use this platform to learn anytime and anywhere, even late at night.)

(Participant 2)

4. E-Learning Pedagogy and Content Development

The development of effective digital learning materials is critical to e-learning success. While multimedia and interactive tools can enhance engagement, some educators struggle with adapting content for online formats. Concerns also exist regarding the effectiveness of e-learning for skill-based training.

Subthemes:

Use of Interactive Learning Tools

Some colleges implement tools such as EdPuzzle to maintain learner engagement.

“我們發現 EdPuzzle 可以幫助學生保持專注，因為他們不能快轉，還需要回答問題。”
(*We found that EdPuzzle helps students stay focused because they cannot fast-forward and are required to answer questions.*) (Participant 5)

Challenges in Digitizing Traditional Content

Some faculty find it difficult to convert lecture materials into engaging online formats.

“有些導師只是把 PPT 放上去，但這樣的方式很難吸引學生，我們需要更有創意的方
法。”

(*Some instructors just upload their PowerPoint slides, but this approach fails to engage students. We need more creative methods.*) (Participant 3)

Concerns About Practical Skill Training

Some skills require hands-on practice that is difficult to replicate through e-learning.

“我們的課程需要實際操作，例如插管和手術技巧，單靠影片教學效果有限。” (*Our courses require hands-on practice, such as intubation and surgical skills. Video-based teaching alone is not sufficient.*) (Participant 4)

AI-Powered Learning and Feedback

AI-enhanced tools, such as intelligent tutoring systems and automated feedback generators, offer personalized learning experiences and reduce faculty workload.

“AI 如果可以幫我們自動生成個人化的學習建議，或者根據學生的回答來提供反饋，
這樣會大大提升學習體驗。”

(*If AI can automatically generate personalized learning recommendations or provide feedback based on students' responses, it would greatly enhance the learning experience.*)

(Participant 5)

“我們對 AI 生成的反饋很好奇，但還不確定它能不能真正理解學員的需求。” (*We are curious about AI-generated feedback, but we are not yet sure if it truly understands learners' needs.*) (Participant 3)

Potential for E-Learning to Enhance Inter-College Collaboration

Developing shared online modules across different specialties can increase efficiency and foster interdisciplinary learning.

“一些共通的課題，例如醫學教育或遺傳學，可以考慮不同學院共同開發 e-learning 課
程。”

(*Common subjects, such as medical education or genetics, could be developed as joint e-learning courses across different colleges.*) (Participant 8)

5. Policy, Leadership, and Sustainability

A structured policy framework is necessary to support e-learning sustainability. Some colleges actively explore transitioning towards asynchronous learning, recognizing its potential to offer greater flexibility. However, the lack of clear governance, long-term funding, and leadership oversight limits scalability. Without a centralized strategy, e-learning initiatives remain fragmented, leading to varying levels of adoption across different colleges. Sustainable leadership structures and funding mechanisms are critical for long-term success.

Subthemes:

Transition to Asynchronous Learning

Some colleges recognize the need to offer flexible, self-paced learning, but implementation remains slow.

“我們現在積極研究如何運用 online platform 令到之後同事在學習上除了親身上課或實時間 zoom 之外，課程可不可以轉為 asynchronous learning。”

(We are actively exploring how to use an online platform so that colleagues can transition from in-person classes or real-time Zoom sessions to asynchronous learning.)

(Participant 1)

Absence of Centralized Governance

A lack of overarching policy leads to inconsistent e-learning adoption across different colleges.

“我們需要一個長期負責 e-learning 的團隊，而不是每次只有一兩個人來推動，這樣不夠可持續。”

(We need a dedicated team responsible for e-learning in the long term, rather than relying on just one or two people each time, as this is not sustainable.) (Participant 3)

Leadership and Strategic Oversight

The absence of a structured leadership team overseeing e-learning results in fragmented implementation, with some colleges advancing rapidly while others lag behind.

“我們學院沒有一個專門的 e-learning 負責人，所以很多時候都是個別導師自發去做，這樣影響了整體的發展。”

(Our college does not have a designated person in charge of e-learning, so most of the time, it is individual instructors taking the initiative. This affects the overall development.)

(Participant 4)

Funding and Resource Allocation

Long-term investment is necessary to sustain e-learning initiatives, but financial support remains inconsistent.

“現在的資源大多是一次性的，如果要長遠發展 e-learning，需要有穩定的資助和專門的團隊。”

(Currently, most resources are one-off. For the long-term development of e-learning, stable funding and a dedicated team are needed.) (Participant 7)

Discussion

The Learning On-Line (LOL) Educator Course has played a crucial role in fostering LMS adoption among the Academy educators as part of its broader faculty development initiatives. Findings from the Acceptance and Use of Technology Survey (UTAUT2) indicate significant improvements in Performance Expectancy (PE), Habit Formation (HT), and Behavioural Intention (BI), particularly in the LOL7 cohort. These findings suggest that faculty members recognize the value of LMS in enhancing teaching, are incorporating it into their routine practice, and have a stronger intent to continue using LMS in their teaching.

The observed variability in post-intervention results across LOL2–6 suggests that changes in course design have influenced LMS acceptance and integration. The stronger results in LOL7 compared to previous cohorts highlight the potential of course refinements to enhance engagement, learning effectiveness, and technology adoption. If course design had no impact, similar post-course results would have been expected across all cohorts. Instead, the significant improvements in LOL7 suggest that enhancements in instructional delivery, support mechanisms, and engagement strategies played a pivotal role in shaping participant perceptions. Many of these changes, already detailed in Part 5, focused on clarifying the role of LMS in teaching, increasing structured learning activities, and reinforcing participant engagement through interactive components. The stronger Habit Formation (HT) scores in LOL7 indicate that these modifications helped participants integrate LMS more effectively into their teaching practices.

As a faculty development initiative, the LOL Educator Course has provided a structured platform for educators to engage with e-learning tools. However, while these findings affirm the course's effectiveness, areas for improvement remain. The lack of significant progress in Effort Expectancy (EE) and Social Influence (SI) highlights persistent challenges in LMS usability and peer engagement. This suggests that although faculty members acknowledge the benefits of LMS, further enhancements in accessibility, user experience, and peer-driven support structures are necessary to ensure widespread and sustained adoption. Addressing these issues requires a two-pronged approach: refining the LOL Educator Course to better support participants and implementing broader institutional changes that reinforce a culture of e-learning within the Academy.

Refining the LOL Educator Course

The qualitative findings in this part identified issues related to the LOL Educator Course, most of which have already been addressed in Part 5 of the evaluation. These include the need for enhanced interactivity, clearer integration guidance, and fostering post-course engagement. While these refinements will further optimize the course, they alone are not sufficient to sustain LMS adoption across postgraduate medical education.

Since the LOL Educator Course is a core faculty development initiative, its refinement is essential to improving faculty engagement with LMS and strengthening their confidence in e-learning pedagogy. However, ensuring lasting impact requires a broader institutional commitment that extends beyond course design. Faculty development must be reinforced through systematic support structures, policies, and leadership initiatives that facilitate adoption of e-learning at multiple levels.

A comprehensive approach must address not only individual faculty development but also the institutional structures that influence e-learning adoption.¹⁰ Strengthening faculty engagement,

technical support, policy alignment, and inter-college collaboration will provide the necessary ecosystem for e-learning integration. The following sections outline these broader institutional factors that need to be addressed to complement course-level improvements.

Faculty Engagement and Training

Faculty development extends beyond a single training program and requires continuous engagement, reinforcement, and institutional support.^{11, 12} The LOL Educator Course has improved faculty perceptions of e-learning effectiveness, reinforcing the importance of structured training. However, engagement remains inconsistent, and technical difficulties continue to hinder LMS use. Some colleges reported strong engagement where faculty development efforts were more structured, while others noted that engagement was low due to competing clinical responsibilities and limited incentives.

To address these challenges, the Academy should expand faculty development initiatives. Offering blended faculty training that combines online and in-person support can cater to varying levels of digital literacy.¹⁰ Establishing a peer mentorship program can facilitate knowledge sharing and help faculty members navigate e-learning tools more effectively.¹³ Providing structured training in instructional design will also support faculty in integrating e-learning more effectively into their teaching, particularly by aligning e-learning with curriculum needs.¹⁴ Research indicates that successful integration of e-learning into curricula requires a pedagogically sound approach, such as blended learning or flipped classroom models, which facilitate interactive and collaborative learning experiences¹⁰. Training faculty in instructional design will enable them to adopt these strategies effectively, ensuring that e-learning use is not just a technological addition but a meaningful enhancement to postgraduate medical education. Recognizing faculty contributions to e-learning through CME credits and teaching awards can serve as an incentive to engage more actively with digital education initiatives. Research suggests that faculty self-efficacy plays a critical role in e-learning adoption, and structured training programs significantly enhance digital competence¹⁴.

Technical and Administrative Support

The effectiveness of e-learning implementation is contingent upon robust technical and administrative support. Some colleges have dedicated e-learning support teams, which have led to higher e-learning adoption rates, while others lack adequate support, leaving faculty members to navigate technical challenges on their own. The evaluation revealed that faculty members frequently encountered usability issues, requiring structured guidance and technical assistance.

More than just providing post-course troubleshooting, there is a need for a structured, institutionalized support system that proactively addresses faculty concerns, improves e-learning usability, and encourages sustained engagement. The Academy should consider enhancing technical support by establishing a centralized e-learning helpdesk and assigning e-learning coordinators to each specialty college. Conducting usability assessments can help identify specific pain points and improve LMS functionality.¹⁴ Providing microlearning modules for troubleshooting common issues can also facilitate faculty members' ability to navigate the platform. Research highlights that technical barriers are a major deterrent to e-learning adoption and that real-time support significantly enhances faculty engagement.¹⁰

Institutional Policy and Leadership Commitment

Institutional leadership plays a pivotal role in shaping the culture and direction of e-learning adoption. Colleges with strong leadership support for e-learning use have seen higher levels of faculty engagement, whereas the lack of a unified e-learning strategy across Academy colleges has resulted in inconsistencies in adoption. Without clear institutional expectations, some faculty members remain hesitant to invest time in digital education initiatives.

To ensure sustained e-learning adoption, the Academy should work with college leaders to develop an institution-wide e-learning policy that integrates LMS use into accreditation and training requirements. Establishing clear institutional expectations for faculty engagement in digital education will reinforce its importance within postgraduate training. Conducting periodic audits to assess LMS adoption across colleges can provide valuable insights into areas for further improvement. Strategic alignment of digital education with institutional priorities has been shown to lead to sustained adoption.¹⁰ Moreover, leadership commitment should extend beyond policy creation to include resource allocation, monitoring, and evaluation mechanisms that ensure continuous improvement in e-learning implementation.¹³

Inter-College Collaboration

Some colleges have successfully implemented LMS-based learning, demonstrating best practices that can be shared across the Academy. However, the lack of structured inter-college collaboration has resulted in redundant content development and inefficiencies. Colleges operate independently in their e-learning initiatives, leading to missed opportunities for knowledge sharing and co-development of resources.

The Academy should facilitate inter-college collaboration by establishing a cross-disciplinary task force to develop shared e-learning resources. Encouraging colleges to co-develop online modules on common topics can prevent duplication of effort and enhance efficiency. Promoting best practice sharing through the Academy-wide faculty forums will allow educators to learn from one another and implement effective strategies within their respective institutions. Research suggests that collaborative development of e-learning resources enhances engagement and reduces workload duplication.¹⁵ Additionally, fostering a culture of shared responsibility between colleges, rather than isolated development efforts, will create more sustainable and scalable e-learning practices.^{10, 16}

Integration of Emerging Technologies

Advancements in artificial intelligence (AI), adaptive learning, and virtual reality (VR) present opportunities to enhance LMS capabilities for postgraduate medical education. AI-driven learning analytics can help provide personalized learning pathways, while VR-based procedural training can offer immersive learning experiences. However, faculty members remain unfamiliar with these technologies, and integration remains fragmented across colleges. To bridge this gap, the Academy should explore emerging technologies by piloting AI-driven learning analytics to personalize learning experiences. Implementing VR-based procedural training can be particularly beneficial for skill-based specialties where hands-on learning is critical. Conducting faculty workshops on integrating adaptive learning tools can build capacity among educators and foster a culture of innovation. Research supports the effectiveness of VR simulations in medical training and suggests that AI-based personalization can improve learner engagement and retention.¹⁴ However, the integration of these technologies must align with

faculty needs and institutional priorities, ensuring that they are not just novel additions but valuable tools that enhance postgraduate medical education in a meaningful way.

Limitations

While this evaluation provides valuable insights into the effectiveness of the LOL Educator Course and the broader adoption of LMS within the Hong Kong Academy of Medicine, several limitations should be acknowledged.

First, the study relied on self-reported survey data, which may be subject to response bias. Participants may have provided socially desirable responses or overestimated their engagement with e-learning tools. Future evaluations could incorporate objective LMS usage analytics to triangulate findings.

Second, the study focused on short-term outcomes, primarily assessing faculty perceptions and initial adoption trends. Longitudinal research is needed to determine whether the improvements observed in this evaluation translate into sustained changes in teaching practices and learning outcomes over time.

Third, while the study included qualitative interviews, the sample was limited to faculty members who had participated in the LOL Educator Course. Broader engagement with non-participants and trainees would provide a more comprehensive understanding of barriers and facilitators to e-learning adoption.

Lastly, institutional variations in LMS implementation across different Academy colleges were not fully explored. Given the decentralized nature of postgraduate medical education, further research is needed to assess how structural and cultural differences influence LMS adoption.

Conclusion

The LOL Educator Course has been effective in fostering e-learning adoption, but sustained success requires a broader institutional strategy. The Academy must move beyond course-level interventions and address faculty engagement, technical support, leadership commitment, inter-college collaboration, and emerging technologies. Addressing these elements will ensure that e-learning adoption becomes an integral and sustainable part of postgraduate medical education, rather than an isolated initiative. By implementing the strategic roadmap, the Academy can position the Academy as a leader in technology-enhanced postgraduate medical education, ensuring long-term faculty adoption and meaningful LMS integration.

Reference

1. Venkatesh V, Morris MG, Davis GB & Davis FD. User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly* 2003; 27(3):425-478

2. Venkatesh V, Thong JYL, Xu X. Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly* 2012; 36(1): 156-78
3. Lahash HAE, Elmansori MM, Salama M. Prior Research on the Adoption of E-Learning and UTAUT2 Model: A Critical Analysis. *i-Manager's Journal of Educational Technology* 2021; 18(1):47-56
4. Goh CF, Hii PK, Tan OK, & Rasli A. Why do University Teachers use E-Learning System. *Int Review Res Open & Distributed Learning* 2020; 21(2):136-155
5. Farooq MS, Salam M, Faafar N, et.al. Acceptance and use of lecture capture system (LCS) in executive business studies. Extending UTAUT2. *Interactive Technology and Smart Education* 2017; 14(4):329-348
6. King, N., & Brooks, J. M. Thematic analysis in organisational research. In C. Cassell, A. L. Cunliffe & G. Grandy (Eds.), **The SAGE handbook of qualitative business management research methods: Methods and challenges**. London: Sage. 2018:pp.219-236
7. Ain N, Kaur K & Waheed M. The influence of learning value on learning management system use: An extension of UTAUT2. *Information Development* 2016; 32(5):1306-1321
8. Doherty D, Dromey M, Loughheed J, Hannigan A, Last J, McGrath D. Barriers and solutions to online learning in medical education - an integrative review. *BMC Med Educ* 2018;18(1):130.
9. de Leeuw RA, Logger DN, Westerman M, et.al. Influencing factors in the implementation of postgraduate medical e-learning: a thematic analysis. *BMC Med Educ* 2019; 19: 300
10. Regmi K, Jones L. A systematic review of the factors – enablers and barriers – affecting e-learning in health sciences education. *BMC Med Educ*. 2020;20(1):91. doi:10.1186/s12909-020-02007-6.
11. Steinert Y, Mann K, Centeno A, et al. A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education: BEME Guide No. 8. *Med Teach*. 2006;28(6):497-526. doi:10.1080/01421590600902976.
12. Steinert Y, Mann K, Anderson B, Barnett BM, Centeno A, Naismith L, et al. A systematic review of faculty development initiatives designed to enhance teaching effectiveness: A 10-year update: BEME Guide No. 40. *Med Teach*. 2016;38(8):769-86. doi:10.1080/0142159X.2016.1181851.
13. Tolegenova AA, Smailova G, Zhussupova R, et al. Exploring the impact of faculty development programs on digital pedagogy: A mixed-methods study. *Int J Educ Technol High Educ*. 2024;21(1):23. doi:10.1186/s41239-024-00399-9.
14. Kaqinari T, Minsch D, Schättin A, et al. Faculty development for digital teaching: Findings from a scoping review. *Med Teach*. 2023;45(1):13-24. doi:10.1080/0142159X.2022.2147439.
15. Khamees D, Brown CA, Hsu ES, Shehata AH. Remote learning developments in postgraduate medical education in response to the COVID-19 pandemic: A BEME systematic review. *Med Teach*. 2022;44(3):211-23 doi:10.1080/0142159X.2021.2016216.
16. Tonheim S, Tolsby H. Facilitators and barriers to online group work in higher education: A systematic review. *Educ Sci*. 2024;14(1):45. doi:10.3390/educsci14010045.

Section 7B
Utilization Data

Courses Making Use of the eHKAM LMS

Courses by Colleges

In July 2024, the LMS project team conducted a survey to assess the usage patterns among the colleges. This was done by inquiring about the number of courses that had been uploaded and were planned for upload. The survey was carried out via email, which was sent to the college representatives of the eHKAM LMS Task Force. They were asked to provide details on the courses uploaded to the LMS, the frequency with which these courses had been conducted, the estimated duration of the learning sessions, and the average number of participants per course.

The survey responses revealed that a total of 36 courses have been uploaded to the LMS by the colleges. Some of these courses have been conducted two to three times, with the potential for repetition in the coming years.

Most courses have a duration of approximately 2 to 4 hours. However, a few courses extend beyond 20 hours due to their extensive content.

On average, each course enrolls around 20 participants, although a select number of courses have seen participation exceed 200 individuals.

According to the colleges' responses, a total of six courses are planned for upload in the near future.

Common types of materials found in the colleges' courses include reading materials (such as PowerPoint presentations and PDFs), videos, Edpuzzle video quizzes, online quizzes, and pre- and post-course questionnaires. Additionally, some courses have incorporated ActivePresenter and H5P formats to enhance interactivity for learners.

Courses by HKJC ILCM/JCIMED

The LMS sub-account for HKJC ILCM/JCIMED currently hosts approximately 23 courses. These primarily support professional development programs for medical practitioners, focusing on specialist training and simulation skills development. Several key courses, including the **Learning On-Line Educator Course**, **Comprehensive Simulation Educator Course**, and **Workplace-based Assessment Course**, have consistently utilized the LMS for content delivery for multiple times.

HKJC ILCM utilized the LMS for multiple instructional purposes, including:

- Pre-course preparation materials
- Supplemental readings and reference resources
- Assessment quizzes and evaluations
- Pre- and post-course questionnaires
- Facilitated online discussions

In addition, Grades and Reports are also the tools frequently used by the ILCM course organizers and trainers to review the participant's learning progress and difficulties encountered during their learning.

In 2021, ILCM collaborated with The Hong Kong College of Anaesthesiologists to develop Basics in Procedural Sedation Safety, a comprehensive online course. This interactive course incorporates multimedia elements including audio recordings, instructional videos, animations, interactive diagrams, quizzes, and progress tracking features to enhance learning effectiveness. Following its completion in 2023, the course has served as preparatory training for participants of The Hong Kong College of Anaesthesiologists' sedation training, equipping them with essential knowledge prior to in-person training sessions.

With ILCM's transition to the Jockey Club Institute for Medical Education and Development (JCIMED) in November 2024, the LMS continues to deliver online medical education to medical and health care practitioners across various specialties.

Courses by the Academy

The Academy actively utilizes the LMS to deliver diverse online learning resources. Key offerings include:

HKAM Events Course

This serves as a digital repository allowing users to access and review archived events through video recordings.

Hong Kong Medical Journal Portal

Provides Academy fellows with current medical journal articles and associated CMECPD quizzes for CMECPD points.

HKAM Training Course for Expert Witness

Launched in 2022 alongside the LMS platform, this fully online course employs instructional videos and knowledge checks to train participants in best practices for serving as professional medical expert witnesses. The LMS's automated progression feature sequentially advances participants through modules upon completion of all requirements.

LMS Training Resources

The **Introduction to eHKAM LMS (for Trainers)** course features step-by-step video tutorials and self-assessment tools, enabling educators to develop proficiency in creating various online learning activities. This self-paced online course allows users to efficiently acquire LMS operational skills according to their individual learning preferences and schedules.

Advancing e-Learning Initiatives

College course organizers and trainers have significantly increased their adoption of the LMS for training programs as they grow more proficient in platform operations and recognize the advantages of online teaching. Cross-institutional collaboration in LMS course development between Colleges and JCIMED has also become more widespread compared to the early implementation phase, enabling Colleges to further strengthen their administrative expertise.

A key milestone was achieved in Q4 2024 with the Hong Kong College of Emergency Medicine's successful launch of the first phase of LMS-based online tutorials for trainees, featuring integration with their e-Portfolio system. This allows trainees and supervisors to monitor topic completion status seamlessly. The second phase, slated for completion in Q2 2025, will deliver a full suite of online tutorials aligned with curriculum requirements, including opportunities to earn mandatory training points.

Building on this progress, broader LMS adoption across additional Colleges is anticipated in the coming years, driven by rising demand for self-paced learning and personalized educational pathways—cornerstones of competency-based medical education.

With JCIMED's establishment, further initiatives and training programs will be introduced to enhance specialist training and professional development. The LMS will continue serving as a centralized learning hub, offering scalable resources and progress-tracking tools to support efficient, interdisciplinary training and continuous skill development.

Utilization Data of the eHKAM LMS

In the following analysis, the usage data is categorized into three implementation phases: the pilot run, Year 1, and Year 2.

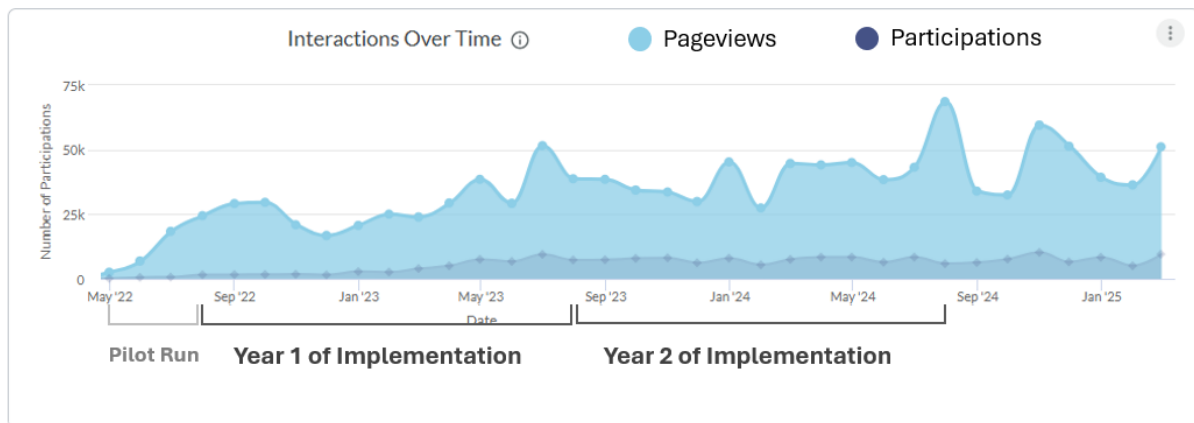
The **pilot run** commenced in May 2022, immediately following the contract signing with Instructure. During this phase, pilot users from various colleges began exploring and testing the system. Additionally, the ILCM started utilizing the LMS to distribute training course materials to participants. Online courses and sandbox courses were also introduced to help users familiarize themselves with the system's functionalities.

Year 1 of implementation began in August 2022, marking the start of the subscription period. Similarly, **Year 2 of implementation** started from August 2023 to July 2024, coinciding with the renewal of the subscription.

This section of LMS utilization focuses on the data of following aspects:

1. User interactions over time
2. Content and activities usage
3. Content components usage
4. Activities components usage
5. Numbers of logged-in users
6. Numbers of active users

1. User Interactions Over Time



Source: LMS Admin Analytics

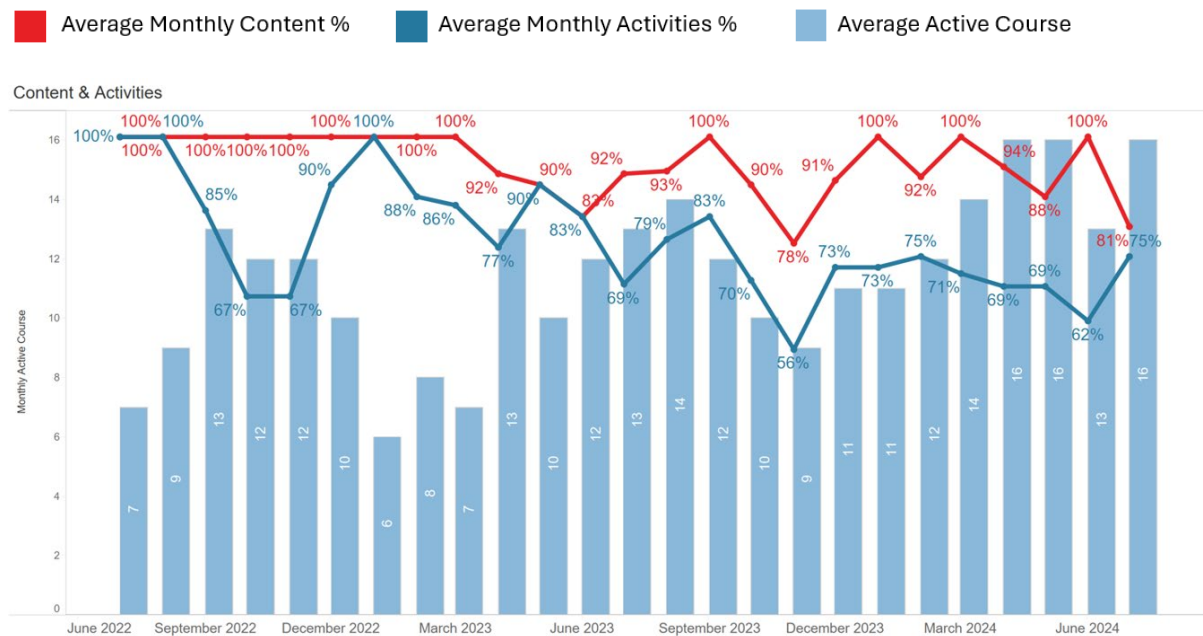
Metrics

- **Pageviews (light blue region):** A "page view" is counted when user opens a page in a course. Page views can indicate how users have been accessing course resources such as Pages, Assignments and Grades etc.
- **Participations (dark blue region):** Actions taken by a user in a course. Submitting assignments, posting or replying to discussions, and submitting quizzes are some of the examples of participations.

Analysis

- **Consistent Pageviews to Participations ratios:** Throughout all implementation phases, pageviews (light blue) substantially outnumber actual participations (dark blue), typically by a 3:1 or 4:1 ratio.
- **Overall Growth:** Overall interaction volumes increased progressively from the Pilot Run through Year 2, with both metrics showing upward momentum across the implementation timeline.
- **Year 2 Achievements:** The second implementation year reached the highest engagement levels, with pageview peaks exceeding 70,000 interactions during peak periods, significantly higher than Year 1's maximum of approximately 50,000.

2. Content and Activities Usage (August 2022 – August 2024)



Source: Canvas Executive Business Review 2024

Metrics

- Active Course (light blue bars): Defined as a course with at least four distinct users (students or instructors) accessing it.
- Average Monthly Content Engagement % (red line): The percentage of active courses where an enrolled user viewed a page, file, or module.
- Average Monthly Activity Engagement % (blue line): The percentage of active courses where an enrolled user interacted with an assignment, quiz, or discussion.

Analysis

Active Course Growth

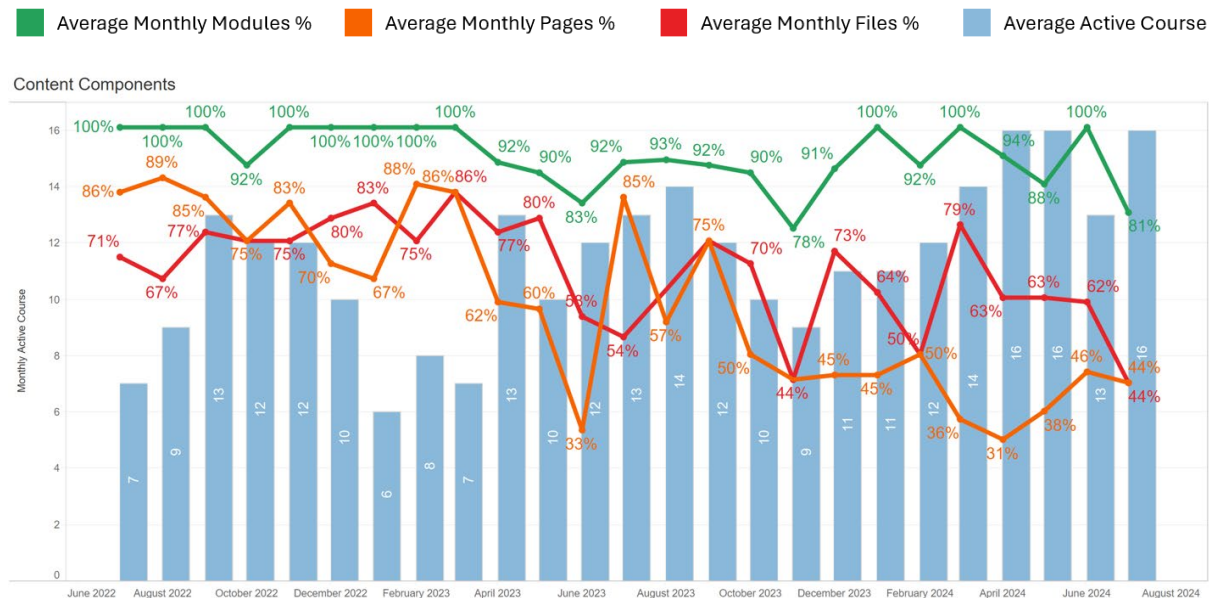
- Year-over-Year Increase: Implementation Year 2 saw a 25–30% growth in average monthly active courses compared to Year 1.
- Consistency & Peaks:
 - Year 2 maintained more stable activity, with no months falling below 9 active courses (vs. occasional dips in Year 1).
 - Peak activity rose to 16 courses in Year 2, surpassing Year 1's maximum of 13.

- The upward trend in Year 2's final months suggests increasing platform adoption.

Content vs. Activity Engagement

- Content Engagement (Red Line):
 - Consistently higher (75–100%), with minimal fluctuations.
 - Likely driven by Canvas' default course structure, where modules (frequently viewed) serve as the primary landing page.
- Activity Engagement (Blue Line):
 - More variable (56–100%), with sharper peaks and valleys.
 - Lower average engagement may reflect fewer activity-type resources (assignments/quizzes) in training courses compared to content.

3. Content Components Usage



Source: Canvas Executive Business Review 2024

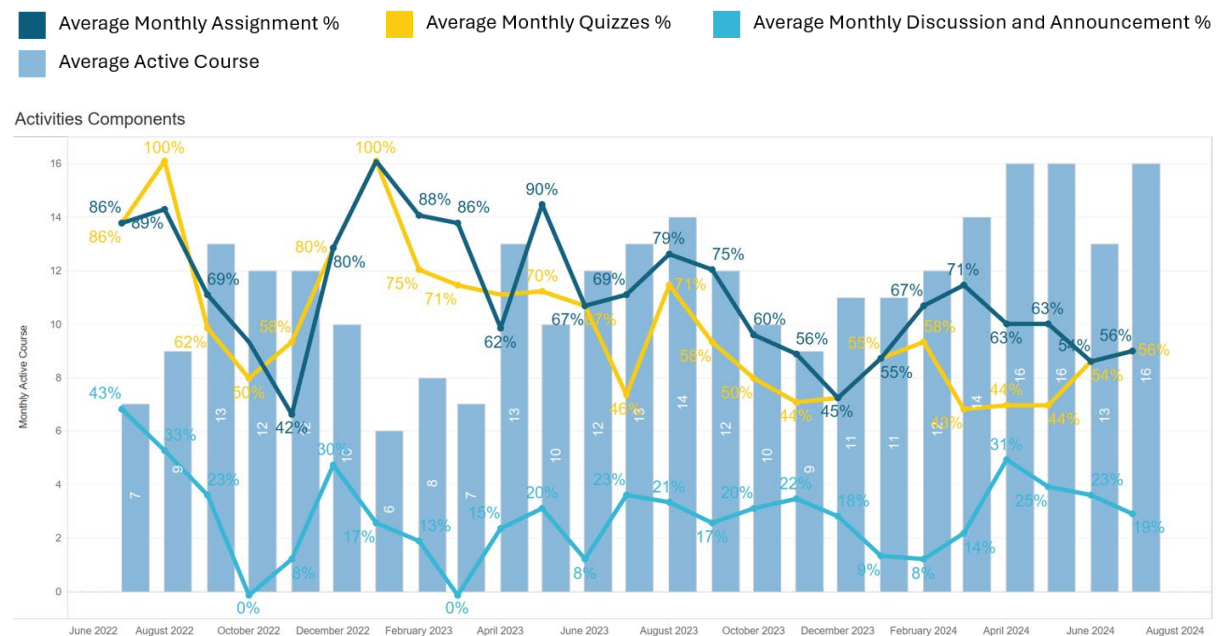
Metrics

- **Average monthly modules % (green line)** represents the percentage of active courses where an enrolled user viewed a module.
- **Average monthly pages % (orange line)** represents the percentage of active courses where an enrolled user viewed a page.
- **Average monthly files % (red line)** represents the percentage of active courses where an enrolled user viewed a file.

Analysis

- **Modules** maintained the highest usage rates throughout the entire period, ranging from 81-100%. It shows the most consistent pattern with minimal fluctuation compared to other components. This may be because the module serves as the default course homepage, where course materials are organized to help participants better understand the course structure and locate resources more efficiently.
- **Pages** exhibit the most significant decline in usage over time, suggesting they were utilized far less in Year 2.
- **Files** show moderate but consistent usage as they serve primarily for distributing course materials, particularly study resources in PDF, Word, and PowerPoint formats.

4. Activities Components Usage



Source: Canvas Executive Business Review 2024

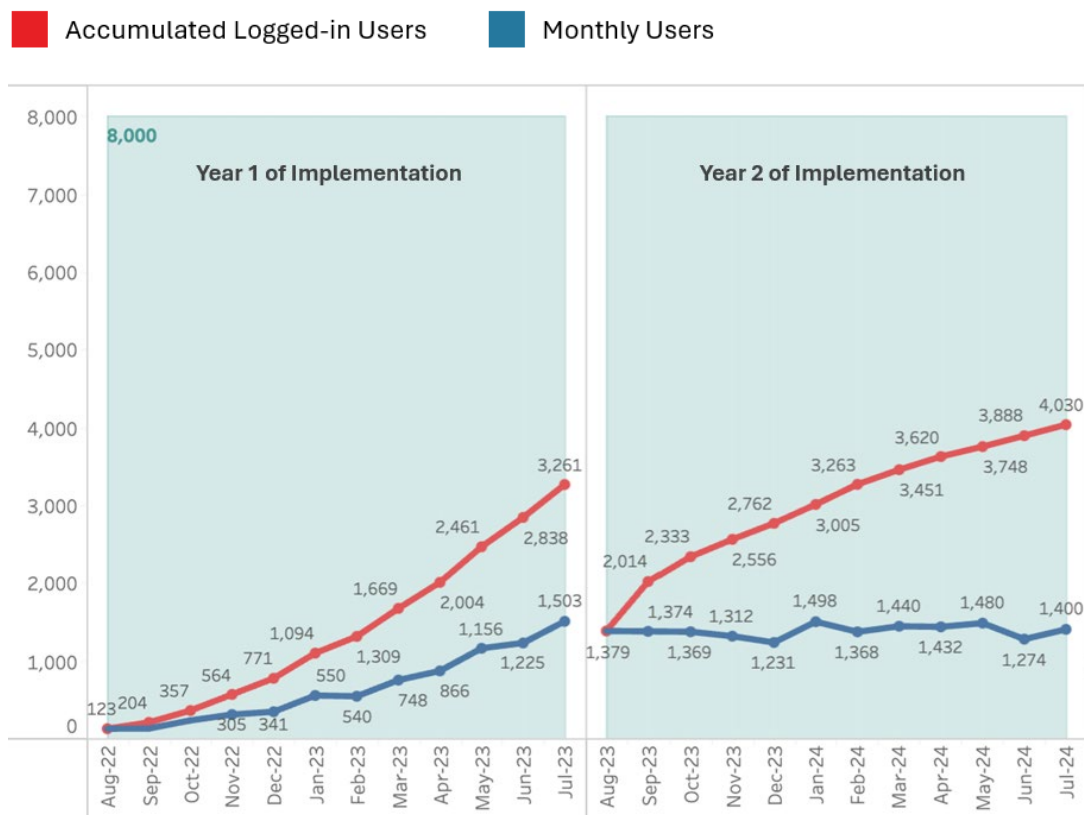
Metrics

- **Average monthly assignments %** (dark blue line) represents the percentage of active courses where an enrolled user viewed an assignment. In the LMS, assignments include built-in assignments (e.g., text submission, upload a file etc.) and assignments created by using external tools such as Edpuzzle and H5P.
- **Average monthly quizzes %** (yellow line) represents the percentage of active courses where an enrolled user viewed a quiz. In the LMS, quizzes are used for grading and online survey.
- **Average monthly discussion and announcement %** (light blue line) represents the percentage of active courses where an enrolled user viewed a discussion or course announcement.

Analysis

- **Assignments** generally maintained higher usage percentages (56%-100%) compared to quizzes (40%-100%) throughout both implementation years.
- **The preference for assignments over quizzes** likely stems from instructors' ability to incorporate interactive and multimedia elements using external integration tools (such as Edpuzzle and H5P) within assignment. These third-party applications provide enhanced engagement opportunities and interactive content creation capabilities that aren't natively available within Canvas's standard quiz functionality.
- The usage of **discussions and course announcements** remains consistently low, likely because these activities are often conducted through other channels or platforms, such as email and instant messaging apps.

5. Logged-in Users



Source: LMS utilization graph

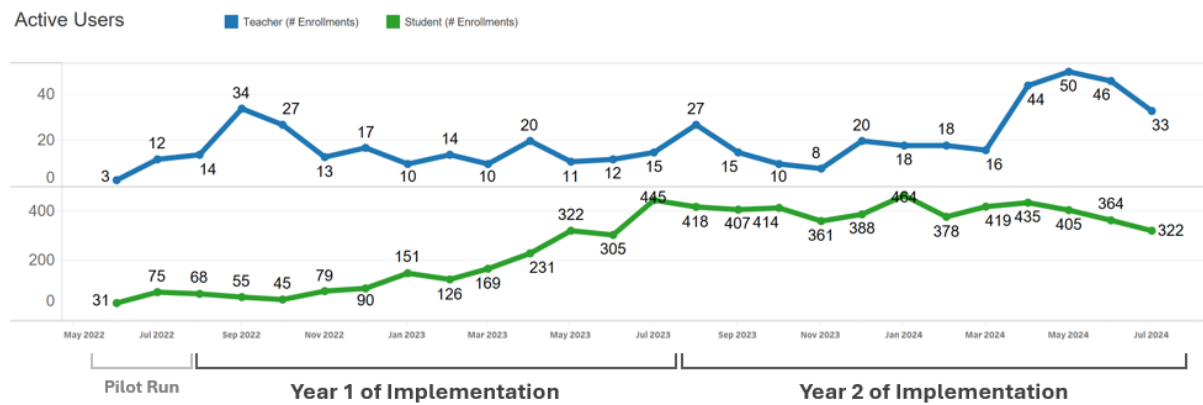
Metrics

- **Accumulated numbers of logged-in users** (red line) – the cumulative number of unique users who logged in during the period.
- **Monthly numbers of logged-in users** (blue line) – the number of unique users who logged in within a month.

Analysis

- The first year of implementation shows strong growth in monthly users, while the second year shows overall stable monthly usage with little fluctuations.
- The growth of accumulated number of unique logged in users for Year 2 are comparatively stable than Year 1.
- During Year 2, there were roughly 220 new users logging in each month on average.
- The total number of accumulated logged-in users in Year 2 shows a 24% increase over Year 1, suggesting a broader adoption of the LMS during the second year.

6. Monthly Active Teacher and Student Users



Source: Canvas Executive Business Review 2024

Metrics

- **Monthly Active Teacher** (blue line) – teachers that have more than 5 sessions/logins in a month.
- **Monthly Active Student** (green line) – students that have more than 5 sessions/logins in a month.

Analysis

- **Student participation grew approximately 10x** from pilot to Year 2 peak (31 to 464 students).
- **Year 2 Stability:** While Year 1 showed steady growth, Year 2 demonstrated more stable engagement patterns with higher baseline participation.
- **Teacher engagement** showed marked increment in Year 2, with both increased frequency and consistency. This heightened participation likely resulted from course materials preparation and learner progress monitoring.

Key Takeaways from eHKAM LMS Usage (2022-2024)

1. People Are Using It More

- Both viewing content and doing activities increased every year
- 2nd year saw highest usage: 70,000 pageviews at peak (vs 50,000 in 1st year)
- 24% more users logged in during 2nd year (about 220 new users each month)

2. What People Do Most Often

- Viewing content is 3-4 times more common than doing activities
- Course "modules" (main pages) are most popular (used in 81-100% of courses)
- PDFs/PPTs stay steady, while regular "pages" became less used over time
- Assignments are more popular than quizzes (likely because they allow videos/interactive content)

3. What People Do Less Often

- Quizzes are used but not as much as assignments
- Discussions and announcements are rarely used (people may prefer email/chat apps)

4. What This Tells Us

- The system is being adopted by more users each year
- People naturally look at content more than they participate
- How courses are set up affects what people use (modules get more attention)
- Some features might need improvement or better promotion

Suggestions:

- Make quizzes more engaging (like assignments are)
- Check why "pages" are being used less
- Consider how to get more discussion happening in the LMS
- Keep training teachers to maintain their good participation

Chapter 8

Estimation of Cost, Reusability & Sustainability

Evaluation of Return on Investment (ROI) of e-Learning Programme - Quantitative Approach

Objective

This report presents a comprehensive return on investment (ROI) evaluation comparing the financial costs and benefits of two training courses delivered in different formats: online and face-to-face.

To provide a holistic view of the implications of implementing a Learning Management System (LMS) for online training, this report also includes an appendix detailing the set-up and operating costs associated with the LMS used for the online training approach. By consolidating these costs and benefits, this report aims to provide the data necessary to evaluate the monetary value and impact of two training approaches on the Academy.

Calculation of ROI:

$$\frac{\text{Total Benefits (course income + saved costs)} - \text{Total Costs}}{\text{Total Costs}} \times 100$$

Course income: course/registration fees collected from the course participants.

Saved costs: the costs saved by changing the teaching mode from traditional to online mode. They are typically the costs incurred by conducting training in classroom setting.

Total costs: the costs due to the development of online training.

Positive ROI: indicates the financial benefits of the training program exceed its costs.

Negative ROI: indicates the costs of the training program exceed the financial benefits gained.

Course A: Expert Witness Training Course

Evaluation Period

October 2022 – July 2024

Course Income

\$500 (course registration fee) x 280 registrants (as of 31/7/2024) = \$140,000

Estimated Cost Saved from Face-to-Face Training Mode

Assumption:

- All 7 modules are conducted in two full days:
 - Day 1: core modules 1 – 4 (8 hours)
 - Day 2: elective modules 5 – 7 (6 hours)
- Face-to-face training hours: 2 hours x 7 modules = 14 hours

- All 280 registrants (as of 31/7/2024) are treated as the participants of this face-to-face training.
- Total 39 speakers would need to come to the Academy to deliver their lectures.
- 5 speakers are from overseas.

Expenses of face-to-face training mode	Estimated Costs
Venue rentals Run Run Shaw Hall: \$20,540 (4-hour session) Day 1: Core module 1 – 4 (2 sessions: am, pm) Day 2: Elective module 5, 6, 7 (2 sessions: am, pm) \$20,540 x 2 sessions x 2 days = \$82,160 (Source: https://www.hkam.org.hk/en/venue-hire)	\$82,160
Equipment rental fee (per day) • Laptop computer: \$640 • Presenter: \$160 • Projector: \$850 • Microphone: \$340 • Whiteboard: \$120 Sub-total: \$2,110 per day \$2,110 x 2 days = \$4,220 (Source: https://www.hkam.org.hk/en/venue-hire)	\$4,220
Training preparation and course administration Average administrative salary: \$23,295 per month or \$667.5 per day Course material/handouts preparation: 5 days Venue set-up: 1 day Course day support: 2 days Post-course administration: 1 day \$667.5 x 9 days x 2 staffs = \$12,015	\$12,015
Additional administrative staff \$1,800 x 2 staffs x 2 days = \$7,200	\$7,200
Technician standby \$1,970 (4-hour) \$1,970 x 2 sessions x 2 days = \$7,880 (Source: https://www.hkam.org.hk/en/venue-hire)	\$7,880
Accommodation of overseas speakers	\$430,000

Expenses of face-to-face training mode	Estimated Costs
Total 5 overseas speakers conducted in 2 modules respectively. Flight ticket (from Europe): \$80,000 per person Hotel: \$2,000 per night $\\$80,000 \times 5 + \\$2,000 \times 5 \times 3 \text{ nights} = \\$430,000$	
Printing of handouts \$0.4 per page, color copy 241 pages x 280 copies $\\$0.4 \times 241 \times 280 = \\$26,992$ Printing of completion and attendance certificates \$5 x 650 (attendance certificates based on number of completed participants) = \$3,250 \$5 x 100 (course completion participants) = \$500 $\\$26,992 + \\$3,250 + \\$500 = \\$30,742$ (Reference: Handout color copy: https://rainbowprint.hk/ Certificate: https://colorprintmax.com/zhengshu.html)	\$30,742
Stationery Paper, pen, Blu-tack etc.	\$300
Catering Lunch: \$86 per person Refreshment: \$30 per person $\\$116 \times 2 \text{ days} \times (39 \text{ speakers} + 280 \text{ participants}) = \\$74,008$	\$74,008
Total Costs	\$648,525

Cost of Developing and Administering Online Training Mode

Expenses due to the course development, administration and user support (Year 1 – 2) done for the Expert Witness training course.

Calculation period

- Course development: September 2021 – September 2022 (13 months)
- Course administration and user support: October 2022 – July 2024 (22 months)

Assumption:

- Administrative cost: \$23,295 (monthly salary) / 30 = \$776.5 per day or \$97 per hour

Expenses of Online Training Mode	Estimated Costs
eHKAM IDs (Single sign-on account) \$60 per user account x 280 Fellow/CSR registrants	\$16,800
LMS subscription fee (prorated) Subscription fee (8000 users): Year 1: \$854,776.92 Year 2: \$805,196.10 Prorated for 280 users (course registrants): (\$1,659,973.0 / 8000) x 280 = \$58,099	\$58,099
Course materials production Average production time: 3 days per sub-module (including videos, reading material and quizzes) Total production time: 3 days x 34 sub-modules = 102 days plus other set-up including registration form, certificates and promotion etc. = 5 months approximately \$23,295 x 5 months = \$116,475	\$116,475
Room rentals for video recording: Room rentals: \$630 (4 hours) A total of 10 sub-topic videos were recorded in the recording room. \$630 x 10 = \$6,300 (Source: https://www.hkam.org.hk/en/venue-hire)	\$6,300
Staff administration supports Supports include: • Participants enrolment • Course completion record update • Answer user enquiries Average workload: 1 hour per week Total 94 weeks from the launch of the course to 31- 7-2024. Administrative cost: \$97 (per hour) x 94 = \$9,118	\$9,118
Software MS Office: (\$1,620 / 12) x 35 months Graphic and video editing: • \$3,190 (material development and promotion) x 1 year Edpuzzle (year 1 & 2 subscription): \$20,384 Envato stock media (material development and promotion): \$1,574	\$29,873

Expenses of Online Training Mode	Estimated Costs
Software cost: \$4,725 + 3,190 + \$20,384 + 1,574 = \$29,873	
Hardware Computers and data storage: \$49,470 Rental costs of video recording equipment for the in-house recording of 10 video lectures: • Video camera: \$275 per lecture • Microphone: \$170 per lecture • Laptop computer: \$320 per lecture Subtotal of hardware and rental costs of recording equipment: \$49,470 + (\$275 + 170 + 320) x 10 = \$57,120	\$57,120
Total Costs	\$293,785.0

ROI of Expert Witness training course (online mode):

Total Benefits = Course Income + Saved Costs

Total Benefits (\$140,000 + \$648,525) – Total Costs \$293,785

$$\frac{\text{Total Benefits} - \text{Total Costs}}{\text{Total Costs}} \times 100 = 168\%$$

Analysis:

A positive ROI (145%) indicates the online training mode of Expert Witness training course brings financial benefits more than double the costs.

In contrast to face-to-face training, online training can support a larger number of students without incurring significant additional costs. Therefore, the ROI could become higher when more users are registered for the course.

In the mode of online training, a large amount of budget could be saved by eliminating the needs such as training venue, overseas speaker accommodation, printing of documents and catering etc.

Apart from ROI, there are intangible benefits of online training. Flexibility of learning is one of these benefits. This self-paced online course allows the users to learn flexibly in their own time without conflicting with their work schedules, resulting in greater productivity and a greater willing to learn.

Course B: Learning On-Line Educator Course

Calculation of ROI:

$$\frac{\text{Total Benefits (course income + saved costs)} - \text{Total Costs}}{\text{Total Costs}} \times 100$$

Assumptions

- The calculation is based on the average class size of 22 learners and 9 faculty members.
- Assumed 11 learners pay 50% (College discount) of tuition fee while the remaining 11 learners pay 80% (HA discount) of tuition fee. The total tuition fee earned would be:
 $11 \times \$22,000 \times 0.5 + 11 \times \$22,000 \times 0.8 = \$314,600$
- The three live sessions (Module 1, 5 and 7) are combined as two 1-day sessions.
- Cost figures are rounded to eliminate decimal places

Cost Saved from Face-to-Face Teaching Mode

Expenses of face-to-face training mode	Estimated Costs
Venue rentals ILCM whole center: \$11,130 (1 full day) Sub-total: \$11,130 x 2 days = \$22,260 (Source: https://hkjcilcm.hk/en/venue-booking)	\$22,260
Equipment rental fee Rental fee (per day) • Laptop computer: \$640 x 34 = \$21,760 • Presenter: \$160 • Projector: \$850 • Microphone: \$340 • Whiteboard: \$120 Sub-Total: \$23,230 x 2 days = \$46,460 (Source: https://www.hkam.org.hk/en/venue-hire)	\$46,460
Course preparation and administration Average administrative salary: \$23,295 per month or \$667.5 per day Pre-course material set-up: 5 days	\$24,030

Expenses of face-to-face training mode	Estimated Costs
Venue set-up: 4 days Course day support: 2 days Post-course administration: 1 day $\$667.5 \times 12 \text{ days} \times 3 \text{ staffs} = \$24,030$	
Additional administrative staff \$1,800 (per day) $\$1,800 \times 2 \text{ days} = \$3,600$	\$3,600
Technician standby $\$3,250 \text{ (4-hour, weekend)} \times 2 \times 2 \text{ days} = \$13,000$ (Source: https://www.hkam.org.hk/en/venue-hire)	\$13,000
Printing of handouts \$0.4 per page (color copy) $\$0.4 \times 505 \text{ pages} \times 22 \text{ copies} = \$4,444$ (Reference: https://rainbowprint.hk/)	\$4,444
Stationery Paper, pen, Blu-tack etc.	\$300
Catering Lunch: \$86 per person Refreshment: \$30 per person $\$116 \times 2 \text{ days} \times 31 \text{ participants} = \$7,192$	\$7,192
Total Cost	\$121,286.0

Total Cost of Online Training Mode

Expenses of online training mode	Costs
Venue rentals (Mainly for administering the online training) ILCM venue (half-center): \$8,900 (1 full day) Sub-total: \$8,900 x 2 days (Source: https://hkjcilcm.hk/en/venue-booking)	\$17,800
Equipment rentals Laptop computers rentals: \$640 x 8 x 2 days = \$10,240	\$10,240

Expenses of online training mode	Costs
(Source: https://www.hkam.org.hk/en/venue-hire)	
Course preparation and administration Average administrative salary: \$23,295 per month or \$667.5 per day Pre-course material set-up: 5 days Venue set-up: 4 days Course day support: 2 days Post-course administration: 4 days \$667.5 x 15 days x 3 staffs = \$30,038	\$30,038
Additional administrative staff Admin helper: \$1,200 (per day) \$1,200 x 5 x 2 days = \$12,000 (Source: https://hkjcilm.hk/en/venue-booking)	\$12,000
Faculty honorarium \$10,000 x 9 = \$90,000	\$90,000
eHKAM IDs (Single sign-on account) \$60 per user account x 31 participants = \$1,860	\$1,860
LMS subscription fee (prorated from year 1 and 2): (\$1,659,973 / 8000) x 31 = \$6,432	\$6,432
Zoom Software License \$780 (per year)	\$780
Software licenses (per course) Edpuzzle: \$9,800/year Mentimeter: \$43,302/year Miro: \$45,431/year Prorated: (\$9,800 + \$43,302 + \$45,431) / 3 = \$32,844 Remark: the above licenses were used for 3 LOL courses during the subscription period.	\$32,844
Total Cost	\$201,994

ROI of Learning On-Line Educator course (online training mode):

Total Benefits = Course Income + Saved Costs

Total Benefits (\$314,600 + \$121,286) – Total Costs \$201,994

$$\frac{\text{Total Benefits (\$314,600 + \$121,286) – Total Costs \$201,994}}{\text{Total Costs: \$201,994}} \times 100 = 115\%$$

Analysis:

A positive ROI (115%) indicates the online training mode of the Learning On-Line Educator course brings financial benefits more than double the costs.

It also implies that this training course is cost effective and the investment can be justified. When the course is conducted online, a large amount of budget has been saved by not needing the training venue, classroom equipment, printing and catering etc.

In fact, when the course is conducted multiple times using the same or nearly identical set of course materials, the costs of preparation and course administration are reduced. Therefore, the ROI for the courses conducted later will be higher.

Besides, there are some non-monetary benefits of online training that are not included in the ROI calculation. One of them is the transportation costs and time saved due to conducting the training online. This saving would also help enhance the job and teaching quality and learning efficiency.

Conclusion

This comprehensive formative evaluation of the e-learning initiative at the Academy systematically addressed key objectives, including assessing LMS effectiveness in achieving postgraduate medical education (PGME) goals, ensuring accountability in implementation processes, evaluating educational impact, and exemplifying quality assurance practices. The implementation of the eHKAM Learning Management System (LMS), complemented by the Learning On-Line (LOL) Educator Course, dedicated administrative and IT support, and strategic faculty development initiatives, represents a significant advancement toward modernizing PGME in line with the Academy Position Paper on PGME 2023.

The LOL Educator Course significantly enhanced faculty engagement and adoption of the LMS. Findings from the Acceptance and Use of Technology Survey (UTAUT2) indicated marked improvements in Performance Expectancy, Habit Formation, and Behavioural Intention, particularly pronounced in the most recent cohort (LOL7). These improvements underline the effectiveness of targeted course refinements such as structured learning activities, enhanced interactivity, and explicit guidance on integrating LMS into teaching practices.

However, variability observed across earlier cohorts (LOL2–6) revealed persistent challenges, especially related to Effort Expectancy and Social Influence. These issues highlight ongoing difficulties in LMS usability, accessibility, and peer collaboration, emphasizing the need for sustained institutional strategies alongside course-level interventions.

Effective administrative and technical support emerged as crucial factors influencing LMS adoption. Colleges benefiting from robust e-learning support teams reported higher levels of satisfaction and user engagement compared to those without consistent support structures. Establishing a centralized e-learning helpdesk and dedicated e-learning coordinators within each specialty college is recommended to proactively address technical challenges and ensure consistent, high-quality user experiences.

Faculty development must extend beyond initial training to include ongoing support mechanisms. Blended training approaches, peer mentorship programs, structured instructional design workshops, and recognition of faculty contributions through incentives such as CME credits and teaching awards are essential for long-term adoption and effective integration of e-learning into educational practices.

Institutional policy and leadership commitment play pivotal roles in cultivating a sustainable e-learning culture. Developing unified, institution-wide policies that explicitly integrate LMS usage into accreditation standards and training requirements will set clear expectations and reinforce LMS integration. Regular audits, continuous monitoring, and resource allocation will further ensure accountability and sustained institutional engagement.

Promoting inter-college collaboration represents an additional opportunity to enhance efficiency and consistency across the Academy colleges. Establishing cross-disciplinary task forces to develop shared resources, facilitating best-practice exchanges, and encouraging collaborative e-learning projects can reduce duplication of efforts and foster a cohesive, institution-wide approach.

Integrating emerging technologies, such as AI-driven analytics, adaptive learning platforms, and virtual reality (VR) simulations, offers significant potential to enrich educational experiences further. Conducting targeted faculty workshops and pilot initiatives will

familiarize educators with these innovative tools, demonstrating tangible educational benefits and encouraging broader adoption.

The cost-effectiveness of the e-learning initiative has also been a critical consideration. Preliminary assessments suggest that investing in LMS infrastructure, faculty development, and dedicated technical support can yield substantial long-term cost savings through improved resource allocation, reduced redundancies, and enhanced teaching efficiencies. Continued cost-effectiveness analyses are recommended to ensure optimal resource utilization and validate financial sustainability.

Future evaluations should address existing methodological limitations, including reliance on self-reported data, short-term outcome assessments, limited qualitative insights, and institutional variability. Implementing longitudinal studies with objective LMS usage data will provide more robust insights into long-term impacts and validate ongoing improvement efforts.

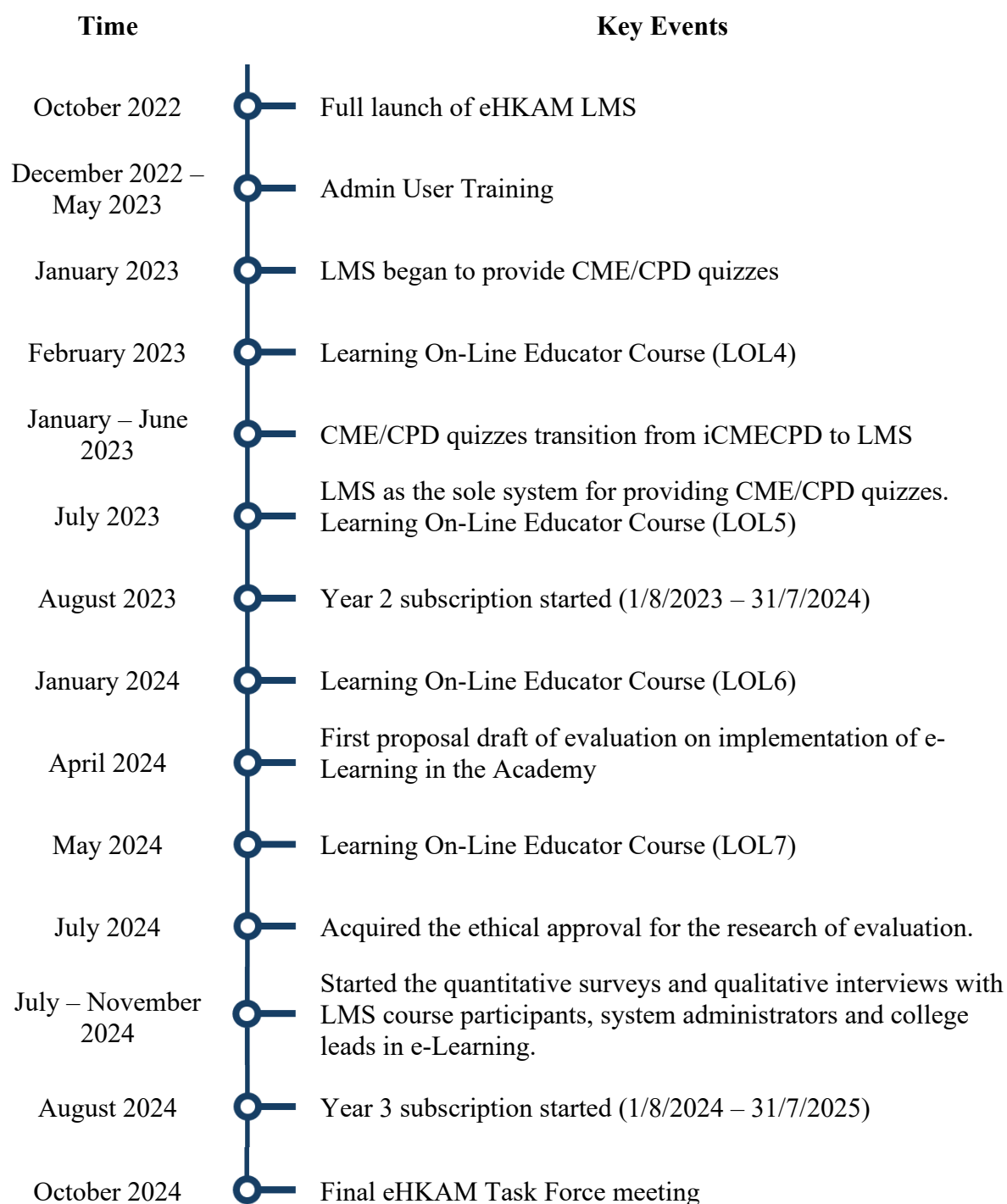
By strategically addressing these identified areas for enhancement and systematically implementing recommended actions, the Academy will strengthen its position as a leader in technology-enhanced medical education. A comprehensive, multi-dimensional approach will ensure sustainable digital transformation, significantly improving educational outcomes, faculty satisfaction, and cost efficiency in postgraduate medical education.

Appendices

Appendix 1-1

Timeline of Implementation of E-Learning Program in the Hong Kong Academy of Medicine

Time	Key Events
November 2020	Applied funding from the Government
January 2021	A 3-year funding was approved by the Food and Health Bureau
April – May 2021	Onboarding of LMS project team
June 2021	Formation of eHKAM LMS Task Force and the first task force meeting
July – August, 2021	LMS products demonstration
August – November, 2021	LMS Needs Analysis
December 2021	Consolidation of User Requirements
December 2021	Learning On-Line Educator Course (LOL1)
January 2022	LMS product demonstration after functions vetting
February 2022	Evaluation of Canvas and Moodle
February – April, 2022	Tendering
April 2022	Council approved appointment recommendation
May, 2022	Contract signed with Instructure
June – July 2022	Pilot and User Training
July 2022	Learning On-Line Educator Course (LOL2)
August 2022	Year 1 subscription started (1/8/2022 – 31/7/2023)
September 2022	Learning On-Line Educator Course (LOL3)



Appendix 2-1

Interview Guide for Needs Analysis

Questions for Course Directors/Organizers (ILCM, Colleges)

Set 1 (users without LMS experience)

Course-related:

1. How do you usually distribute course materials to trainees?
2. How do you usually deliver a training?
3. Can e-Learning help you to present your training contents and why?
4. Can LMS help you to deliver your courses to the learners and why?

Assessment-related:

1. How do you usually conduct training assessment? Any kind of tools do you use?
2. How do you record the training results and give feedback to the trainees?
3. Is there any place or workflow for improvement?
4. Any other functions you think are important but are not included in the existing system?

Others:

1. In your opinion, what would be the opportunities/challenges of using e-learning technology in medical education?

Set 2 (users with LMS experience)

Course-related:

1. How do you usually distribute course materials to trainees by using LMS?
2. Is there any place or workflow for improvement?
3. Do you know what your trainees feel about the existing system and why?
4. From your perspective of teaching, what kinds of function should a LMS provide?

Assessment-related:

1. How do you conduct training assessment with the LMS?
2. How do you record the training results and give feedback to the trainees?
3. Could you describe your user experience to us? Does the system serve your purpose? Why?
4. Are there any suggestions for improvement of the current practice?

Others:

1. Could you describe your general user experience of the LMS to us? Any suggestions for places to be improved?
2. Any functions you think are important but not accessible in the current LMS? Why?
3. In your opinion, what would be the opportunities/challenges of using e-learning technology in medical education?
4. Do you use other LMS as well? If yes, what do you do on that LMS?

Questions for Learners

Set 1 (users without LMS experience)

Course-related:

1. How do you usually attend training courses?
2. Given the availability of e-learning, if you can choose either physical or online courses to attend, which one will be your priority? Why?
3. We realized that college may have its own e-learning resources, e.g. Medscape, Pedseducation, eNeonatal Reviews etc.,
 - do they support your learning purposes well?
 - can you describe your user experience with these e-learning resources?

Assessment-related:

1. How do you usually conduct and submit your training assignments?
2. How do you upload your results and have feedback returned from the trainers?
3. As we know, college has a self-developed system(iCMECPD) for training record storage. Could you describe your user experience to us? Any suggestions for improvement?
4. Any other functions you think are important but are not included in the existing system?

Others:

1. In your opinion, what would be the opportunities/challenges of using e-learning technology in medical education?

Set 2 (users with LMS experience) - ILCM

Course-related:

1. How do you usually take training courses with existing LMS?
2. Can you describe how these functions will be involved and help in the whole learning process?
3. Do these functions serve your purposes? Why?

Assessment-related:

1. How do you usually conduct and submit your training assignments with the LMS?
2. How do you upload the training results and have feedback returned from the trainers?
3. Are there any suggestions for improvement of the current practice?

Others:

1. Could you describe your general user experience of the LMS to us? Any suggestions for places to be improved?
2. Any functions you think are important but not accessible in the current LMS platform? Why?
3. Do you use other LMS as well? If yes, what do you do on that LMS?
4. In your opinion, what would be the opportunities/challenges of using e-learning technology in medical education?

Questions for System Administrators

Set 1 (College administrators, secretariats & ICT staff)

1. What is your role?
2. For the whole training process, which part would you be involved in? And how?

3. Questions for e-Portfolio users:
 - How do you manage the e-Portfolio data? Can you describe the process?
 - Any difficulties met or any improvements you may suggest for the existing system?
4. Questions for users of e-Learning platforms e.g., Medscape, Pedseducation, eNeonatal Reviews:
 - How do you manage the record for this? Can you describe the process?
 - Any places on these systems needed to be improved?
5. In your opinion, what kind of functions should an LMS include? Why?

Set 2 (Academy secretariats, administration and ICT Staff)

1. What do you usually use the iCMECPD for?
2. Please describe the procedures/workflow of your tasks on the iCMECPD.
3. Does it serve your working purposes?
4. Does it provide the information you need?
5. Where do you get support on the system?
6. Any suggestions for places to be improved and why?
7. Any functions you expect to be included in the LMS and why?

Set 3 (ILCM administrators)

1. What do you usually use the LMS for?
2. Please describe the procedures/workflow of your tasks on the LMS.
3. Does it serve your working purposes?
4. Does it provide the information you need?
5. Where do you get support on the system?
6. Any suggestions for places to be improved and why?
7. Any functions you expect to be included in the LMS and why?

Learning On-Line Educator Course Program Outline

- 1. Pre-Course Period (7 days):** Asynchronous learning using 8 interactive videos
 - 1.1 Cognitive Theory of Multimedia Learning (and Assignment 1)
 - 1.2 Introduction to E-Learning
 - 1.3 Introduction to Community of Inquiry Model
 - 1.4 Social Presence
 - 1.5 Cognitive Presence
 - 1.6 Teaching Presence
 - 1.7 Assessment and the CoI Model
 - 1.8 Information Security and Copyright
- 2. Synchronous Virtual Meeting (8 hours)**
 - 2.1 Introduction and Course Overview (0830-0920)
 - 2.2 Experiential Learning (0920-1050)
 - 2.3 Introduction to CoI Framework & Social Presence (1105-1150)
 - 2.4 Introduction to e-Learning Technology (1150-1220)
 - 2.5 Cognitive Presence (1300-1345)
 - 2.6 Teaching Presence 1: Design and Organization (1345-1415)
 - 2.7 Teaching Presence 2: Facilitating Disclosure (1415-1445)
 - 2.8 Teaching Presence 3: Direct Instruction (1500-1530)
 - 2.9 Assessment and CoI Framework (1530-1600)
 - 2.10 Technology: Security and Copyright (1600-1615)
 - 2.11 Introduction to Course Work (Final Assignment)
 - 2.12 Wrap Up (1630-1700)
- 3. Design of Online Learning Course (6 days)**
- 4. Implementation of Online Learning Course (4 days)**
- 5. Synchronous Virtual Meeting (2.25 hours)**
 - 5.1 Welcome and Recap (1900-1915)
 - 5.2 Debriefing 1 (1915-2000)
 - 2 simultaneous sessions in 2 breakout rooms
 - 5.3 Debriefing 2 (2000-2045)
 - 2 simultaneous sessions in 2 breakout rooms
 - 5.4 Wrap Up (2045-2115)

Program Outline of 2nd Learning On-Line Educator Course (LOL2)

Module 1: Introduction (July 9, 2022)

Objectives:

- Introduce faculty and participants
- Provide an overview of the course
- Familiarize participants with key e-learning technologies

Format: Synchronous Zoom session

Activities:

- Introduction of Faculty and Learners (1700-1745) – Icebreaker activity and faculty introductions
- Course Overview (1745-1800) – Explanation of course structure and expectations
- Introduction to E-Learning Technology (1800-1830) – Overview of Canvas, Slack, and Miro

Module 2: Initial Assignment (July 9 – July 22, 2022, 2 weeks)

Objectives:

- Understand the fundamentals of e-learning and blended learning
- Explore the Cognitive Theory of Multimedia Learning (CTML)
- Complete the initial assignment

Format: Asynchronous learning (Videos + Assignments)

Content:

- Introduction to E-Learning and Blended Learning (*Speaker: HY So*)
- Instruction to Initial Assignment (*Speaker: Albert Chan*)
- Cognitive Theory of Multimedia Learning (CTML) (*Speaker: HY So*)
- Use of Google Slides (*Speaker: Tony Fung*)
- Discussion and feedback via Slack

Module 3: Community of Inquiry (CoI) Framework and Technology I

(July 23 – August 5, 2022, 2 weeks)

Objectives:

- Understand the CoI framework and its application in online learning
- Explore Social and Cognitive Presence in e-learning
- Learn and apply educational technology tools

Format: Asynchronous learning (Videos + Assignments)

Content:

- Introduction to the CoI Framework (*Speaker: George Wong*)
- Social Presence (*Speaker: George Wong*)
- Cognitive Presence (*Speaker: HY So*)
- Technology I: Introduction to Edpuzzle and Mentimeter (*Speaker: Tony Fung*)

Module 4: Community of Inquiry (CoI) Framework and Technology II

(August 6 – August 21, 2022, 2 weeks)

Objectives:

- Understand Teaching Presence and its components
- Explore assessment strategies for online learning
- Address data security and copyright concerns

Format: Asynchronous learning (Videos + Assignments)

Content:

- Teaching Presence 1: Design and Organization (*Speaker: Abraham Wai*)
- Teaching Presence 2: Facilitating Discourse (*Speaker: Phoon Ping Chan*)
- Teaching Presence 3: Direct Instruction (*Speaker: Abraham Wai*)
- Assessment and the CoI Framework (*Speaker: Tanya Yau*)
- Data Security and Copyright (*Speaker: Kenny Chan*)

Module 5: Synchronous Virtual Meeting (August 21, 2022, 1 day)

Objectives:

- Provide an interactive space for faculty to discuss and reflect on the learning experience
- Review key concepts and facilitate structured debriefing sessions

Format: Synchronous Zoom session

Activities:

- Course Overview (0830-0850) (*Speaker: HY So*)
- Experiential Learning (0850-1020) (*Speaker: Albert Chan*) – Participants engage in structured presentations and discussions
- Introduction to CoI Framework & Social Presence (1030-1100) (*Speaker: George Wong*)
- Introduction to E-Learning Technology I (1105-1135) (*Speaker: Tony Fung*)
- Cognitive Presence (1140-1210) (*Speaker: HY So*)
- Teaching Presence: Design and Organization (1325-1355) (*Speaker: Abraham Wai*)
- Teaching Presence: Facilitating Discourse (1400-1430) (*Speaker: Phoon Ping Chan*)
- Teaching Presence: Direct Instruction (1440-1510) (*Speaker: Abraham Wai*)
- Assessment and CoI Framework (1515-1545) (*Speaker: Tanya Yau*)
- Technology: Security and Copyright (1550-1620) (*Speaker: Kenny Chan*)
- Introduction to Final Assignment (1620-1635) (*Speaker: Ralph Cheung*)
- Wrap-up (1635-1700) (*Speaker: HY So*)

Module 6: Final Assignment (August 21 – October 3, 2022, 6 weeks)

Objectives:

- Design, develop, and implement a short online course using CoI principles and technology tools
- Apply the instructional design and assessment strategies learned throughout the course

Format: Self-paced course development

Deliverable:

- Participants design an online course module and submit it for peer and faculty feedback

Module 7: Reflection (October 3, 2022, 1 day)

Objectives:

- Reflect on the experience of designing and implementing an online course
- Discuss challenges, successes, and areas for improvement
- Evaluate teaching activities using the CoI framework

Format: Synchronous Zoom session

Activities:

- Reflection 1 (1830-1940) – Small group discussions on reactions and reflection based on CoI framework
- Reflection 2 (1945-2045) – Swap groups and repeat
- Course Wrap-up (2045-2100) – Summary of key takeaways and future steps

Appendix 6-1

Interview Guide for Assessment of Participant/Instructor Experience & Satisfaction

1. Introduction
 - a. Introduce yourself
 - b. Thank interviewee for participation, ensure interviewee has seen the introductory document and provided consent to the interview and recording
 - c. Reiterate purpose of the research
 - d. Establish ground rules for interview, including mutual respect, assure that the interviews are confidential, and the identities of the interviewee will not be revealed throughout the research process
2. Opening Question
 - a. In which course(s) did you experienced e-learning using the eHKAM LMS?
3. Transition Question
 - a. What do you understand as the purpose/advantages of e-learning?
4. Key Questions
 - a. In the questionnaire, you mentioned that some aspects of the course you attended could be improved, (for each item scored 4 or below in the ELELM questionnaire) could you tell me the issue on...
 - b. In your opinion, how could that be improved?
 - c. Repeat a and b until all items scored 4 or below for that participants has been completed
5. Closing Question
 - a. Anything else you want to tell me?
 - b. Thanks interviewee for participation

Interview Guide for Assessment of Acceptance & Use of e-Learning System for Learners

1. Introduction
 - a. Introduce yourself
 - b. Thank interviewee for participation, ensure interviewee has seen the introductory document and provided consent to the interview and recording
 - c. Reiterate purpose of the research
 - d. Establish ground rules for interview, including mutual respect, assure that the interviews are confidential, and the identities of the interviewee will not be revealed throughout the research process
2. Opening Question
 - a. Can you tell us the reason you participated in the Learning On-Line Course?
3. Transition Question
 - a. What do you understand as the purpose/advantages of e-learning?
4. Key Questions
 - a. In the questionnaire, you mentioned that some aspects of the course you attended could be improved, (for each item scored 4 or below in the Acceptance and Use of Technology questionnaire) could you tell me the issue on...
 - b. In your opinion, how could that be improved?
 - c. Repeat a and b until all items scored 4 or below for that participants has been completed
5. Closing Question
 - a. Anything else you want to tell me?
 - b. Thanks interviewee for participation

Interview Guide for College Leads in E-Learning

1. Introduction
 - a. Introduce yourself
 - b. Thank interviewee for participation, ensure interviewee has seen the introductory document and provided consent to the interview and recording
 - c. Reiterate purpose of the research
 - d. Establish ground rules for interview, including mutual respect, assure that the interviews are confidential, and the identities of the interviewee will not be revealed throughout the research process
2. Opening Question
 - a. Can you tell us something about your current position and how the implementation of the Academy LMS influenced postgraduate medical education in your college?
3. Transition Question
 - a. How would you define as successful implementation of e-learning in your college?
4. Key Questions
 - a. What form of management support does your college provided to facilitate implementation of e-learning (planning, project leaders, commitment from council...)?
 - b. What financial and non-financial resources are provided to facilitate implementation
 - c. Would you described the culture in your college is supportive of implementation of e-learning? Can you elaborate?
 - d. Would there be a need to change to teaching method to rip the most from e-learning? Can you elaborate
 - e. What are the important barriers your college is facing in implementation of e-learning?
5. Closing Question
 - a. Anything else you want to tell me?
 - b. Thanks interviewee for participation

End of Report