Original Paper

Usability and Implementation Readiness of an In-House Curriculum Management System in Undergraduate Medical Education: Convergent Mixed Methods Pilot Study

Afaf Sulaiman Alblooshi[1], MD, PhD; Falah Mohammed Almarzooqi[2], MBChB, CCFP; Marwa Gaffar Alameen[1], MD, MScHPE; Mohammed G Alameen[1], BSc; Hiba Alblooshi[3], PhD; Taleb M Almansoori[4], MBBS, FRCPC; Azhar T Rahma[5], PhD; Anmol Punn[1], MD, MPH

[1]Department of Medical Education, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, Abu Dhabi, United Arab Emirates

[2]Department of Family Medicine, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, Abu Dhabi, United Arab Emirates

[3]Department of Genetics and Genomics, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, Abu Dhabi, United Arab Emirates

[4]Department of Radiology, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, Abu Dhabi, United Arab Emirates

[5]Institute of Public Health, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, Abu Dhabi, United Arab Emirates

Corresponding Author:

Falah Mohammed Almarzooqi, MBChB, CCFP
Department of Family Medicine
College of Medicine and Health Sciences, United Arab Emirates University
PO Box 15551
Al Ain, Abu Dhabi
United Arab Emirates
Phone: 971 506433582
Email: almarzooqi.doc@uaeu.ac.ae

Abstract

Background: Digital curriculum management systems (CMSs) can support curriculum oversight and mapping, but successful implementation also depends on usability and alignment with institutional workflows and organizational requirements.

Objective: This pilot study compared perceived usability of the existing curriculum management system (CMS1) with a newly developed in-house system (newly developed curriculum management system [CMS2]) and explored users' perceptions of functionality, perceived workflow impact, and implementation readiness before wider institutional rollout.

Methods: In this convergent mixed methods pilot, faculty and administrative staff rated CMS1 based on their prior routine experience and rated CMS2 after orientation and a 2- to 3-week pilot period. Paired System Usability Scale (SUS) scores were compared using paired *t* tests, 95% CIs, and effect sizes. Fifteen participants also contributed to 14 semistructured interview sessions. Interview data were analyzed using reflexive thematic analysis informed by the Technology Acceptance Model, and quantitative and qualitative findings were integrated using a joint display.

Results: Fifteen participants (12 faculty and 3 administrative staff) completed paired assessments. Mean SUS scores increased from 55.00 (SD 23.72) for CMS1 to 73.83 (SD 8.65) for CMS2 (mean difference 18.83, 95% CI 3.86-33.81; P=.02; Cohen d_z=0.70). Among faculty, mean scores increased from 51.46 (SD 23.68) to 75.63 (SD 7.40). The mean difference was 24.17 (95% CI 7.53-40.80; P=.008; Cohen d_z=0.92). Among administrative staff (n=3), mean SUS scores changed from 69.17 (SD 21.84) for CMS1 to 66.67 (SD 11.27) for CMS2 (mean difference –2.50 points); this subgroup was summarized descriptively because of the very small sample. Qualitative findings indicated perceived gains in curriculum visibility, task completion, and competency mapping, alongside constraints related to reporting, role-based access, interoperability, governance, and role-tailored training.

Conclusions: CMS2 was associated with higher perceived usability overall and among faculty, while no descriptive improvement was observed among the small administrative staff subgroup. Qualitative and integrated findings indicated that implementation readiness depended not only on interface usability but also on reporting capability, role-aligned permissions, interoperability, governance safeguards, and role-tailored training.

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Keywords: curriculum management system; medical education; undergraduate medical education; curriculum mapping; usability testing; System Usability Scale; Technology Acceptance Model; implementation readiness; workflow; medical education informatics; mixed methods

Introduction

Curriculum is the backbone of any educational program and a key indicator of program quality and effectiveness [1,2]. Achieving intended teaching and learning outcomes depends not only on curriculum design but also on how effectively the curriculum is implemented, monitored, and continuously managed. Systematic oversight is therefore essential to ensure the curriculum is delivered as intended and learner outcomes are consistently met [3,4].

In higher education, curriculum management is recognized as a central component of instructional leadership and a prerequisite for maintaining high-quality teaching processes [5]. It also represents an important strategic function within educational systems, supporting alignment with institutional goals, national priorities, and global educational developments [6]. Effective curriculum management encompasses a wide range of interconnected activities, including planning, delivery, monitoring, evaluation, and ongoing refinement [1]. With increasing complexity in academic programs, many institutions are adopting digital platforms to enhance curriculum transparency, facilitate alignment of learning outcomes, and support data-driven decision-making across all levels of curriculum delivery [7-9].

Within medical education, the demands on curriculum management are even greater. Medical programs must demonstrate clear alignment between learning outcomes, teaching strategies, and assessment methods while ensuring compliance with accreditation standards and regulatory expectations [10]. Consequently, curriculum mapping supported by digital curriculum management systems (CMSs) has emerged as an important approach to ensuring coherence across programs, facilitating faculty coordination, and enabling administrators to monitor program delivery and identify gaps or redundancies within the curriculum [7,9,11].

Despite their importance, many curriculum management platforms in health professions education have documented limitations. Reported limitations include usability challenges, incomplete reporting and data extraction functions (eg, teaching-load or key performance indicator [KPI] reports), role-based access constraints, and limited interoperability with learning management systems and institutional calendars (eg, Blackboard and Outlook), leading to duplicated work and fragmented workflows [10,12]. Such challenges may hinder efficient curriculum delivery, disrupt workflow, and limit stakeholders' ability to make informed decisions regarding curriculum improvement.

Despite the strategic importance of CMSs, empirical evidence remains limited on how such systems are experienced by different user groups in medical schools, particularly in relation to usability, perceived workflow impact, role-based access, reporting functions, interoperability, and governance. Evidence from Gulf-region medical schools is especially scarce. Because curriculum oversight and reporting contribute to program coherence and quality assurance processes, evaluating both usability and operational fit is important before system scale-up. To address this gap, the College of Medicine and Health Sciences (CMHS) at United Arab Emirates University (UAEU) developed a newly developed curriculum management system (CMS2) to improve curriculum oversight, mapping, and operational workflows. We therefore conceptualized implementation readiness as broader than perceived usability alone, encompassing the fit between the system and users' role-specific workflows, reporting needs, access structures, interoperability with existing platforms, governance requirements, and implementation support. Accordingly, this study aimed to compare the perceived usability of the existing curriculum management system (CMS1) with the newly developed in-house system (CMS2) and to explore faculty and administrative staff perceptions of CMS2 functionality, perceived workflow impact, and implementation readiness before wider institutional rollout. Specifically, the study addressed three research questions: (1) Does CMS2 improve perceived usability compared with CMS1? (2) How do faculty and administrative staff perceive CMS2's usefulness, ease of use, and perceived workflow impact? (3) What implementation barriers and refinements are needed before wider institutional rollout?

Methods

Study Design and Setting

We conducted a convergent mixed methods pilot evaluation at the CMHS at UAEU to compare perceived usability of the legacy CMS1 and a newly developed system (CMS2) and to explore user experiences of CMS2 in relation to functionality and perceived workflow impact. The pilot was designed to assess short-term perceived usability and implementation readiness rather than long-term adoption, educational outcomes, or accreditation impact. In this study, implementation readiness referred to perceived preparedness for wider institutional rollout, considered in relation to usability, workflow fit, reporting capability, role-based access, interoperability, governance, and implementation support. Quantitative usability assessment and qualitative interviews were collected in the same study phase and integrated during interpretation.

Ethical Considerations

Ethical approval was obtained from the UAE University Social Sciences Ethics Committee (approval number ERSC_2025_7004). Participation was voluntary, and written informed consent was obtained from all participants prior to data collection.

CMS2 and Comparator (CMS1)

CMS2 was developed to support curriculum planning, coordination, and management within CMHS. Core functions available during the pilot included calendar views, competency mapping, role-based permissions, notifications, selected reporting functions, and selected data export capabilities. Some reporting/export functions and LMS/Outlook integration features remained under development during the pilot phase. Access to CMS2 was governed through role-based permissions aligned with participants' institutional responsibilities.

The pilot used real curricular materials (eg, course syllabi, schedules, and session resources) uploaded to CMS2 as part of routine curriculum management activities. Any access to student or staff information occurred only within UAEU institutional systems through role-based permissions; no student- or staff-identifiable data were exported, downloaded, or transmitted outside UAEU secure servers for the purposes of this study.

Participants

Participants included faculty members and administrative staff involved in curriculum leadership and management within CMHS. A purposeful sampling approach with stratification by role was used to ensure representation of faculty and administrative staff involved in curriculum planning, coordination, and administration. Eligibility criteria included employment within CMHS, active involvement in curriculum management or coordination, and completion of both CMS1 (baseline) and CMS2 (posttrial) quantitative assessments.

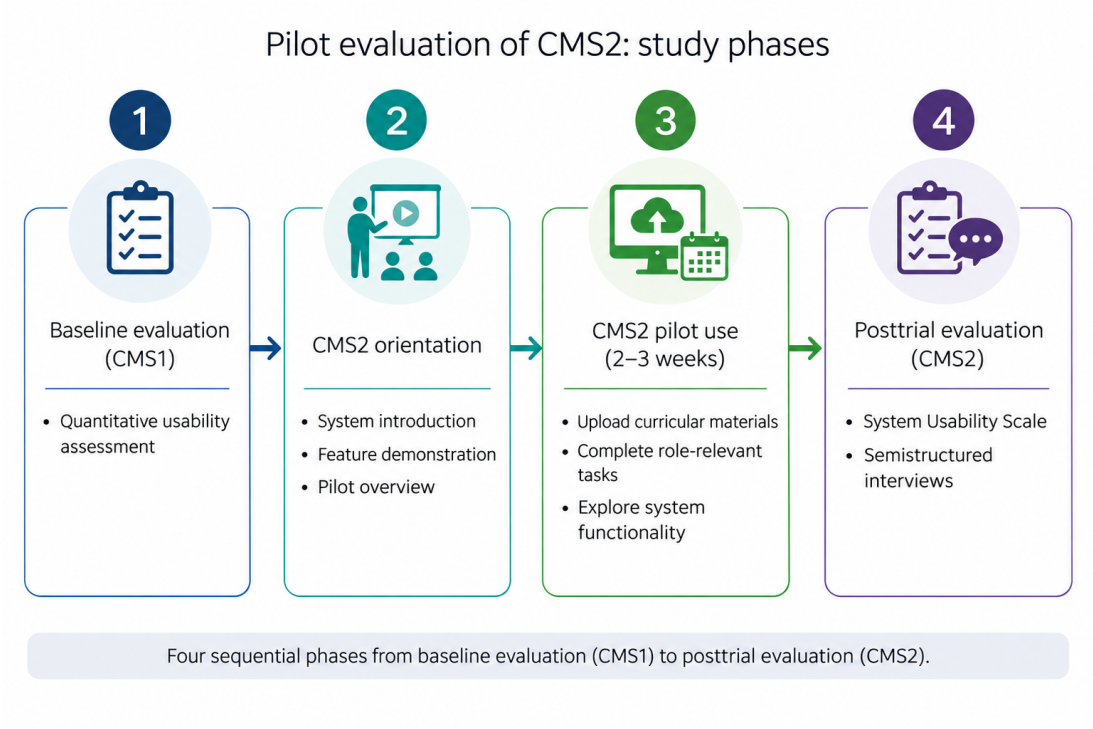
A total of 23 participants (18 faculty members and 5 administrative staff) completed the CMS1 (baseline) assessment. Only participants who completed both the pre- and CMS2 (posttrial) phases were included in the paired quantitative analysis, resulting in a final analytic sample of 15 participants (12 faculty members and 3 administrative staff). Eight of the 23 (35%) baseline participants did not complete the posttrial assessment. Baseline System Usability Scale (SUS) scores were similar among participants who completed both assessments (mean 55.00, SD 23.72) and those who did not complete the posttrial assessment (mean 54.38, SD 25.56). Noncompletion of the posttrial survey was primarily due to competing workload and limited time during the pilot period. Because the final paired sample was small, especially among administrative staff, role-stratified findings were interpreted cautiously and treated as exploratory.

Semistructured interviews were conducted following completion of the CMS2 trial. Thematic saturation was considered to have been reached after 12 interview sessions, after which 2 additional individual interviews and 1 dyadic interview were conducted to confirm the stability of the developing thematic structure, resulting in 14 interview sessions involving 15 participants. Participant identifiers used in quotations are nonsequential, as they correspond to the broader needs-assessment dataset. Individual participant characteristics are provided in Multimedia Appendix 1.

Study Procedures

The pilot evaluation of CMS2 was conducted in 4 sequential phases (Figure 1). First, participants completed a baseline usability assessment of CMS1 based on their prior routine experience with the legacy system; no study-specific CMS1 orientation or standardized exposure period was provided. The duration and frequency of participants' prior CMS1 use were not systematically measured. Second, participants attended an orientation session introducing CMS2, including system features, pilot objectives, and expected participant activities. Third, participants accessed CMS2 for approximately 2 to 3 weeks to explore system functionality using real curricular materials. Participants were instructed to complete a minimum set of role-relevant tasks, including session management, competency mapping, report generation, and calendar review activities. Task completion and frequency of CMS2 use were not independently verified through system logs. These tasks were selected to reflect common curriculum management workflows for faculty and administrative users. Completion was not intended to simulate full institutional implementation but to provide sufficient exposure for short-term usability and acceptability assessment. Fourth, participants completed a posttrial CMS2 evaluation consisting of the SUS and semistructured in-depth interviews exploring user experiences with CMS2.

Figure 1. Overview of the 4 sequential phases of the CMS2 pilot evaluation, including baseline usability assessment of CMS1, CMS2 orientation, pilot system use, and posttrial evaluation using the System Usability Scale and semistructured interviews. CMS1: existing curriculum management system; CMS2: newly developed curriculum management system.



Data Collection

Quantitative Measures

Quantitative data were collected using a structured survey consisting of two components (Multimedia Appendix 2): (1) demographic questionnaire and (2) SUS questionnaire. Usability was assessed using the 10-item SUS, scored on a 5-point Likert scale and converted to a 0 to 100 usability score using the standard scoring method [13]. SUS provides a global measure of perceived usability across a range of technologies, including hardware, software, mobile apps, and web-based platforms. The scale captures 3 key dimensions of usability: effectiveness, efficiency, and user satisfaction [14]. The survey data were administered using REDCap (Vanderbilt University), a secure web-based electronic data capture platform hosted at CMHS, UAEU [15,16]. Data were stored on secure university servers and were accessible only to authorized members of the research team.

Qualitative Interviews

Qualitative data were collected through semistructured in-depth interviews guided by an interview schedule designed to explore participants' experiences with both CMS1 and CMS2. The interview guide (Multimedia Appendix 3) covered predefined domains, including general impressions, usability and design, system functionality, collaboration and communication, training and support, integration with other systems, and perceived impact on workflow. Interviews were conducted either online or face-to-face, depending on participant availability and digital access. One interview included 2 participants due to scheduling constraints, and 2 interviews were conducted in person because of limited digital access. All interviews were audio-recorded and transcribed verbatim for analysis.

Data Analysis

Quantitative Analysis

Quantitative data were analyzed using Stata (version 19.5; StataCorp LLC). SUS scores were calculated according to the standard scoring method described by Brooke [13]. Descriptive statistics were generated for all variables. Prior to inferential analysis, the normality of the paired SUS difference scores was assessed for all participants (n=15) and for faculty participants alone (n=12). Normality of the paired SUS difference scores was evaluated using the Shapiro-Wilk test along with visual inspection of data distributions [17] (Multimedia Appendices 4 and 5). Given the small sample size, inferential results were interpreted alongside effect sizes, confidence intervals, and qualitative findings rather than *P* values alone. Visual inspection and the Shapiro-Wilk test did not indicate major departures from normality, supporting the use of paired *t* tests. Effect size was calculated for paired samples (eg, Cohen d_z), using the mean of paired differences divided by the standard deviation of the paired differences [18]. All statistical tests were 2-tailed, with a significance level of *P* value of <.05. Internal consistency of the SUS items was evaluated using Cronbach α, with a threshold of ≥0.70 indicating acceptable reliability [19]. Given the small number of administrative staff participants, their results were summarized descriptively rather than included in inferential comparisons, as statistical inference may be unreliable with very small sample sizes [20].

Qualitative Analysis

Qualitative data were analyzed using reflexive thematic analysis following the 6-phase approach described by Braun and Clarke [21,22], supported by NVivo (version 15; Lumivero). The analysis was theoretically informed by the Technology Acceptance Model (TAM) and aligned with the COREQ (Consolidated Criteria for Reporting Qualitative Research) to ensure transparency and rigor (Checklist 1).

All interviews were conducted by FMA, a faculty member and member of the research team who was not involved in CMS2 development. The interviewer had a professional relationship with participants through the institution but no direct supervisory or reporting relationship. Interviews were conducted either in person in a private office or online, with no other individuals present, and lasted approximately 15 to 30 minutes. Interview transcripts were reviewed repeatedly to achieve data familiarization. Initial coding was conducted iteratively to identify meaningful units of text related to participants' experiences with CMS2. NVivo software was used to organize transcripts, manage coding, and facilitate theme development.

Two complementary analytic approaches were undertaken to enhance methodological rigor. First, a researcher-led inductive thematic analysis was conducted. Three researchers (ATR, FMA, and M Gaffar Alameen) contributed to qualitative coding and theme development. Consistent with reflexive thematic analysis, differences in coding or interpretation were discussed within the research team rather than resolved through calculation of interrater agreement. Analytically important discrepancies were reviewed in consultation with an independent qualitative research expert. In this analysis, transcripts were coded directly from the data, allowing themes to emerge from participants' accounts of their experiences with CMS2. Although the analysis was primarily inductive, the interview guide domains served as sensitizing concepts to support the initial coding framework and organization of the data without restricting the emergence of new themes.

Following the initial researcher-led inductive analysis, a second structured, AI-assisted deductive analysis was conducted using ChatGPT to identify candidate codes and construct-aligned summaries relevant to the TAM. AI-assisted processing was undertaken only after all participant identifiers had been removed from the interview transcripts; no identifiable participant information was entered into the AI tool. The full deidentified transcripts were processed using a standardized custom prompt provided in Multimedia Appendix 6. AI outputs were treated solely as secondary analytic inputs and were critically examined against the original transcripts, the researchers' manually generated codes, and the study's interpretive framework. The AI did not determine final codes, themes, interpretations, or conclusions. Final coding and theme development remained the responsibility of the research team and were refined through repeated engagement with the full dataset, reflexive team discussion, examination of supporting and contradictory accounts, and review of analytically important discrepancies with an independent qualitative research expert. Representative anonymized excerpts were selected by the researchers to support the final interpretations.

Mixed Methods Integration

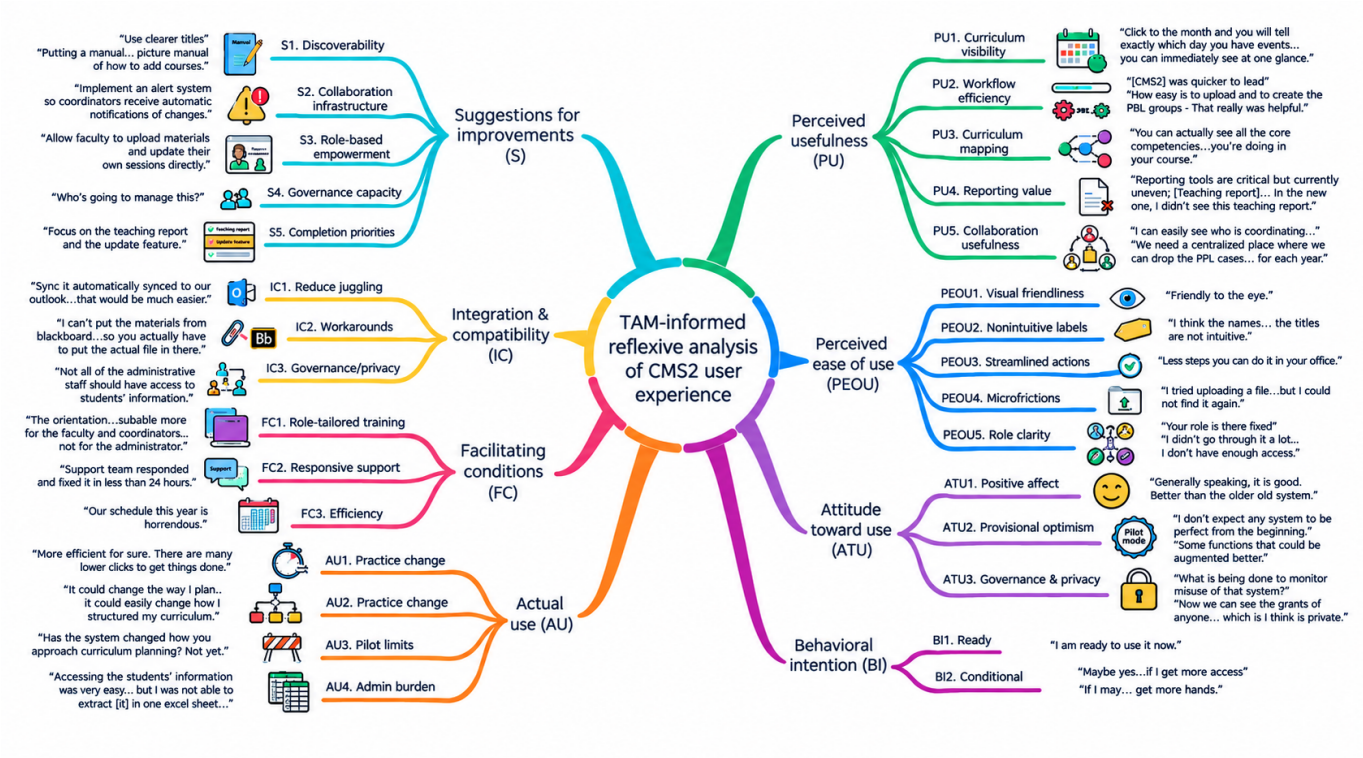
Quantitative and qualitative findings were analyzed separately and integrated after completion of the strand-specific analyses. Integration was conducted using a joint display approach that paired overall and role-stratified SUS findings with qualitative evidence relating to usability, workflow, and implementation conditions. Relationships between the 2 strands were classified as convergence when the findings supported a similar interpretation, divergence when they indicated different or contrasting patterns, and expansion when the qualitative findings provided contextual or explanatory information not captured by SUS scores. Integrated interpretations were developed through research team discussion and used to identify conditions affecting implementation readiness.

Reflexivity

Credibility and trustworthiness were enhanced through methodological triangulation, analyst triangulation, reflexive discussion, and independent expert review of the coding framework and thematic interpretation. Reflexive thematic analysis acknowledges the researchers' active role in interpreting and constructing themes. Throughout analysis, the team used reflexive discussion to examine assumptions and ensure that interpretations remained grounded in participants' accounts. An independent qualitative expert reviewed areas of discrepancy to support credibility and confirmability.

Findings were presented using theme tables (Multimedia Appendices 7-15) and mind-map style conceptual diagram (Figure 2) to illustrate relationships between constructs and emergent themes and subthemes. The conceptual thematic diagram was generated using NotebookLM (Google) based on researcher-developed mind-map outlines derived from the qualitative thematic analysis. Because CMS2 was developed and evaluated within the same institution, the analysis team explicitly considered how institutional familiarity, expectations regarding local innovation, and proximity to the system could influence interpretation. Because the interviewer was an institutional colleague of the participants, the research team remained attentive to the potential for professional familiarity and perceived institutional expectations to influence participant responses. Although a coauthor led the design and programming of CMS2, the developer was not involved in participant recruitment, interviewing, quantitative analysis, qualitative coding, or theme development. Separation of system development from evaluation was maintained, and analytically important discrepancies were reviewed with an independent qualitative research expert.

Figure 2. TAM-informed thematic map illustrating relationships among themes and subthemes identified in the qualitative analysis. The visual diagram was generated using NotebookLM (Google) based on researcher-developed mind-map outlines. TAM: Technology Acceptance Model.



Results

Overview of Findings

This mixed methods pilot study evaluated the usability, functionality, and perceived workflow impact of the newly developed CMS2 among faculty and administrative staff. Results are presented across three components: (1) participant demographics, (2) quantitative usability outcomes from paired pre- and postpilot SUS scores, and (3) qualitative themes from interviews conducted after a 2- to 3-week trial of CMS2. Integration of both datasets provides a comprehensive assessment of system performance and identifies priority areas for refinement prior to large-scale implementation.

Participant Characteristics

Fifteen participants completed paired CMS1 and CMS2 usability assessments and contributed qualitative data across 14 interview sessions following the CMS2 trial. Participants represented 7 departments within CMHS. The largest groups were from medical education (n=4) and microbiology and immunology (n=3). Others included internal medicine, pediatrics, surgery, the institute of public health, and physiology. Figure 3 shows the participant flow through the study phases.

Participants' characteristics are summarized in Table 1. Among faculty participants, assistant professors were the most common rank (n=5), followed by associate professors (n=3), instructors (n=3), and professors (n=1).

Participants also held relevant curriculum-related leadership roles including course coordinators (n=8), course co-coordinators (n=3), and year director (n=1). Three participants were administrative staff involved in curriculum administration.

Figure 3. Participant flow through the existing curriculum management system (CMS1) baseline survey, newly developed curriculum management system (CMS2) posttrial survey, and qualitative interviews.

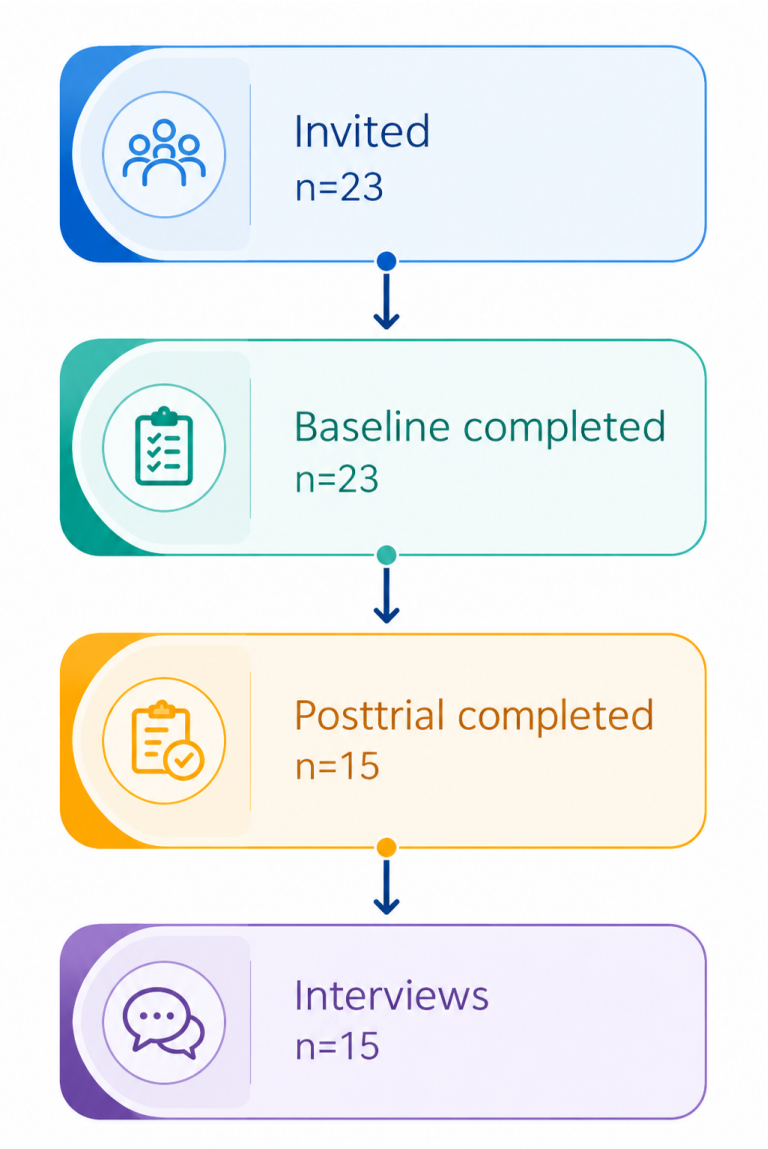


Table 1. Participants' characteristics.

Characteristics	Values
Participants, n (%)	
Final total number of participants	15 (100)
Faculty	12 (80)
Administrative staff	3 (20)
Department, n (%)	
Medical education	4 (27)
Microbiology and immunology	3 (20)
Internal medicine	2 (13)
Pediatrics	2 (13)
Surgery	2 (13)
Institute of public health	1 (7)
Physiology	1 (7)
Academic rank, n (%)	
Professor	1 (7)
Associate professor	3 (20)

Characteristics	Values
Assistant professor	5 (33)
Instructor	3 (20)
Curriculum leadership responsibilities, n (%)	
Year director	1 (7)
Course coordinator	8 (53)
Course co-coordinator	3 (20)
Administrative curriculum management role[a]	3 (20)

[a]Administrative curriculum management role refers to the participant's reported curriculum responsibility and is distinct from the participant-role classification of faculty versus administrative staff.

Quantitative Findings

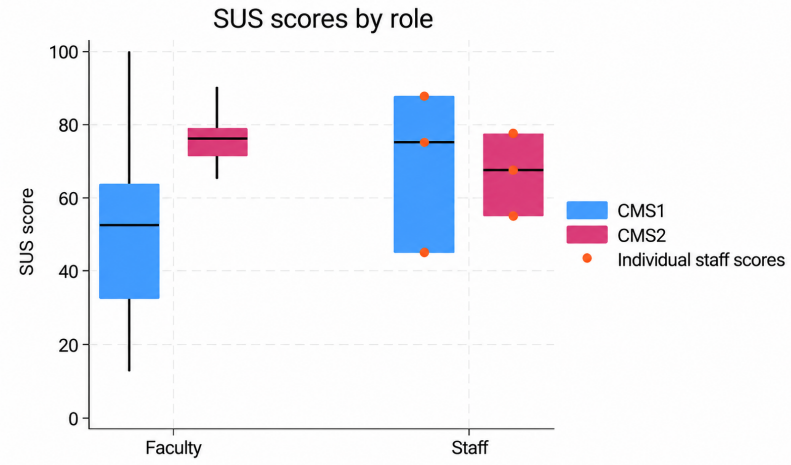
Table 2 presents the pre- and postpilot comparison of SUS scores for the overall sample and stratified by role. Given the pilot sample size, inferential analyses were considered exploratory and were interpreted primarily in relation to paired mean differences, 95% CIs, effect sizes, and the qualitative findings. The distribution of SUS scores before and after CMS2 implementation is illustrated in Figure 4.

Table 2. Comparison of SUS[a] scores overall and by role (baseline CMS1[b] vs posttrial CMS2[c]). For descriptive context, an SUS score of 68 is commonly used as an approximate benchmark for average usability; the benchmark was not treated as an inferential threshold.

Group	Values, n	CMS1, mean (SD)	CMS2, mean (SD)	Mean paired difference (95% CI)	*P* value	Cohen d_z
Overall	15	55.00 (23.72)	73.83 (8.65)	18.83 (3.86 to 33.81)	.02	0.70
Faculty	12	51.46 (23.68)	75.63 (7.40)	24.17 (7.53 to 40.80)	.008	0.92
Staff[d]	3	69.17 (21.84)	66.67 (11.27)	−2.50 (−57.70 to 52.70)	Descriptive	—[e]

[a]SUS: System Usability Scale.
[b]CMS1: existing curriculum management system.
[c]CMS2: newly developed curriculum management system.
[d]Administrative staff results are presented descriptively because of the small subgroup size (n=3); no inferential statistical test or effect size was estimated.
[e]Not available.

Figure 4. System Usability Scale scores for CMS1 and CMS2, stratified by participant role (faculty, n=12; administrative staff, n=3). Boxes represent interquartile ranges, horizontal lines indicate medians, and whiskers indicate the range of observed scores. Individual administrative staff scores are overlaid to show the distribution within the small subgroup. Staff findings are descriptive and hypothesis-generating. CMS1: existing curriculum management system; CMS2: newly developed curriculum management system; SUS: System Usability Scale.



Across overall sample (n=15), the mean paired difference between CMS1 and CMS2 was 18.83 points (95% CI 3.86-33.81), with a moderate-to-large paired effect size (Cohen d_z=0.70). The exploratory 2-tailed paired *t* test yielded t_{14}=2.70, *P*=.02. Among faculty participants (n=12), the mean paired difference was 24.17 points (95% CI 7.53-40.80), with a large paired effect size (Cohen d_z=0.92). The exploratory 2-tailed paired *t* test yielded a t_{11} value of 3.20 (*P*=.008).

Among administrative staff (n=3), SUS scores changed from 69.17 (SD 21.84) for CMS1 to 66.67 (SD 11.27) for CMS2, corresponding to a mean paired difference of

–2.50 points (Table 2). Given the very small administrative subgroup (n=3), no inferential statistical testing was performed; this finding is descriptive and hypothesis-generating and should not be interpreted as evidence of a role-specific effect.

Qualitative Findings

Overview

Fourteen interview sessions involving 15 participants were analyzed using Braun and Clarke's [21,22] reflexive thematic analysis, theoretically informed by the TAM and extended by e-learning and workflow improvement literature. Qualitative data were analyzed using reflexive thematic analysis informed by the TAM and extended by workflow and implementation-readiness concepts. Themes were organized around perceived usefulness, perceived ease of use, attitude toward use, behavioral intention, actual use/perceived workflow impact, facilitating conditions, integration and compatibility, and suggested improvements. Overall, participants viewed CMS2 positively but conditionally: perceived value depended on support for role-specific workflows, reporting needs, appropriate access, interoperability, and governance. Figure 2 summarizes the TAM-informed thematic structure and its relationship to broader implementation conditions.

Perceived Usefulness

Participants perceived CMS2 as useful when it improved curriculum visibility, streamlined routine tasks, and supported competency mapping. Calendar-based oversight helped users view teaching activities at a glance, while mapping functions made competencies and course alignment more visible. However, perceived usefulness decreased when expected reports, KPI outputs, or communication functions were absent or difficult to locate. One participant described the value of calendar visibility:

> *Click to the month and you will tell exactly which day you have events...you can immediately see at one glance*. [P11, Male associate professor and course coordinator]

Another participant emphasized the usefulness of competency mapping:

> *You can actually see all the core competencies...you're doing in your course*. [P09, Male assistant professor and course coordinator]

These findings suggest that CMS2's implementation readiness depends on completing high-value functions that users associate with curriculum oversight, particularly calendar visibility, competency mapping, reporting, and communication support.

Perceived Ease of Use

Participants described CMS2 as easier to use than CMS1 when routine tasks required fewer steps and the interface appeared clearer. Ease of use was reduced by nonintuitive labels, difficulty locating functions, technical glitches, and access restrictions. Participants emphasized that usability was shaped not only by interface design but also by whether permissions matched their expected responsibilities. One participant highlighted reduced procedural burden:

> *Less steps, you can do it in your office*. [P16, Male associate professor and course coordinator]

Another participant noted that terminology affected navigation:

> *I think the names...the titles are not intuitive*. [P15, Female assistant professor and course co-coordinator]

For wider implementation, usability refinement should prioritize clearer terminology, improved discoverability of functions, and role-based access that allows users to complete their expected tasks.

Attitude Toward Use

Participants expressed a generally positive attitude toward CMS2, often describing it as an improvement over CMS1. This positive attitude was cautious rather than unconditional, because users recognized that CMS2 was still in a pilot phase and raised concerns about governance, monitoring, and data visibility. One participant summarized the overall positive comparison with CMS1:

> *Generally speaking, it is good, better than the old system*. [P13, Male instructor and course coordinator]

However, another participant raised concerns about monitoring and misuse:

> *What is being done to monitor misuse of that system?* [P03, Male associate professor and course coordinator]

These findings indicate that positive attitudes toward CMS2 will need to be supported by transparent governance, privacy safeguards, and clear communication about data access and monitoring.

Behavioral Intention to Use

Participants generally expressed willingness to use CMS2, but intention to use the system was conditional on adequate access, hands-on practice, and completion of key features. This suggests that acceptance during the pilot reflected provisional readiness rather than stable long-term adoption. One participant expressed immediate readiness:

I'm ready to use it now. [P13, Male instructor and course coordinator]

An administrative participant linked willingness to use CMS2 with greater system access:

Maybe yes...get more access...so we can really go through it. [P25, Female administrative staff]

Wider rollout should therefore ensure that users have sufficient access, role-specific training, and opportunities for supervised practice before CMS2 becomes part of routine curriculum management work.

Actual Use and Perceived Workflow Impact

Participants reported perceived workflow gains when CMS2 made routine curriculum management tasks easier, including session editing, uploading materials, and moving sessions. Some participants also described how improved visibility of competencies could support curriculum planning and review. However, workflow gains were uneven, particularly for administrative users who still required reporting and data extraction functions. One participant described the system as more efficient for routine tasks:

More efficient for sure. There are many fewer clicks to get things done. [P13, Male instructor and course coordinator]

In contrast, an administrative participant described a continuing data extraction limitation:

I was not able to extract the student's information in one Excel sheet. [P21, Female administrative staff]

These findings suggest that CMS2 may improve perceived workflow efficiency for faculty-facing tasks, but administrative workflow benefits will depend on reliable reporting, export, and data extraction functions.

Facilitating Conditions

Training, technical support, and workload shaped participants' ability to engage with CMS2 during the pilot. Participants valued responsive technical support, but administrative users reported that orientation was more aligned with faculty workflows than administrative tasks. Workload pressures also limited opportunities for repeated practice. One administrative participant described the need for role-specific orientation:

The orientation...suitable more for the faculty and coordinators...not for the administrator. [P21, Female administrative staff]

Another participant described timely technical support:

I was working on it after hours...and it wasn't less than 24 hours in which [the support team] responded and fixed it. [P08, Female instructor and course co-coordinator]

Implementation readiness will require role-specific training, protected time for practice, and a defined support pathway during scale-up.

Integration and Compatibility

Participants emphasized that CMS2 needed better integration with existing institutional systems, particularly Outlook and Blackboard. Limited interoperability created workarounds, including repeated uploading of materials and continued reliance on external platforms. Compatibility concerns also extended to governance, especially appropriate visibility of student, staff, and faculty-related information. One participant emphasized the value of calendar synchronization:

If there's a way to sync it automatically to our Outlook...that would be much easier. [P03, Male associate professor and course coordinator]

Another participant highlighted the need for learning management system integration:

If this can be linked with Blackboard... [P08, Female instructor and course co-coordinator]

These findings indicate that interoperability should be treated as a core implementation requirement rather than a later technical enhancement.

Suggestions for Improvement

Participants' suggestions focused on practical refinements rather than rejection of CMS2. Recommended improvements included clearer labels, visual user guides, automated notifications, improved reporting, better exports, and role-aligned permissions. These suggestions indicate user engagement with CMS2 and provide a clear road map for iterative refinement before wider rollout. One participant emphasized the need for clearer terminology:

The titles are not intuitive. [P15, Female assistant professor and course co-coordinator]

Another participant suggested automated notifications to improve coordination:

Coordinator and the Co-coordinator should receive notifications of changes made automatically to session. [P13, Male instructor and course coordinator]

Before scale-up, these suggestions should be translated into a phased improvement plan: short-term usability refinements, medium-term reporting and export functions, and longer-term interoperability and governance enhancements. Overall, the qualitative findings showed that CMS2 was perceived as more usable and potentially more supportive of curriculum management work than CMS1. However, adoption readiness remained conditional on

technical completeness, workflow alignment, role-specific access, interoperability, role-tailored training, and governance safeguards.

Integrated Findings

Mixed methods integration identified convergence, role-based divergence, and expansion across the 2 data strands. Convergence was observed between improved overall and faculty SUS scores and interview accounts of easier session editing, fewer procedural steps, improved curriculum visibility, and clearer competency mapping. Role-based divergence was evident between faculty and administrative staff: administrative staff showed no descriptive improvement in SUS scores, while their interviews highlighted limited permissions, incomplete reporting and data extraction functions, and continued manual workarounds. The qualitative findings expanded the quantitative results by identifying implementation conditions not captured by SUS, including interoperability, governance, role-based access, reporting capability, and role-tailored training. The integrated findings therefore suggest that implementation readiness was shaped by both perceived usability and broader organizational and technical conditions (Table 3).

Table 3. Joint display of quantitative and qualitative findings.

Serial number	Quantitative finding	Corresponding qualitative evidence	Integration	Integrated interpretation
1	Overall SUS[a] increased from 55.00 (SD 23.72) for CMS[b]1 to 73.83 (SD 8.65) for CMS2[c]; mean difference 18.83 points (95% CI 3.86-33.81), Cohen d_z=0.70	Participants described fewer procedural steps, clearer curriculum visibility, easier session management, and improved competency mapping.	Convergence	Higher overall perceived usability was consistent with participants' reports of easier completion of common curriculum management tasks.
2	Among faculty, SUS increased from 51.46 (SD 23.68) to 75.63 (SD 7.40); mean difference 24.17 points (95% CI 7.53-40.80), Cohen d_z=0.92	Faculty commonly described improved navigation, session editing, calendar visibility, and competency mapping.	Convergence	Usability gains were most evident where CMS2 supported faculty-facing workflows.
3	Among administrative staff (n=3), mean SUS changed from 69.17 (SD 21.84) to 66.67 (SD 11.27); mean difference –2.50 points	Administrative staff described limited permissions, incomplete reporting/export functions, and orientation that was more aligned with faculty workflows.	Divergence by role	The absence of descriptive usability improvement among staff was consistent with unresolved administrative workflow barriers; this subgroup finding is hypothesis-generating.
4	SUS measures perceived usability but does not directly assess interoperability, governance, reporting completeness, or role-specific training.	Interviews identified Outlook/Blackboard integration, data visibility, governance, reporting, permissions, and role-specific training as conditions affecting willingness and ability to use CMS2.	Expansion	Qualitative findings extended the usability results by showing that implementation readiness involved organizational and technical conditions beyond interface usability.

[a]SUS: System Usability Scale.
[b]CMS: curriculum management system.
[c]CMS2: newly developed curriculum management system.

Discussion

Principal Findings

This convergent mixed methods pilot found higher perceived usability for CMS2 than for CMS1 overall and among faculty participants, while no descriptive improvement was observed among the small administrative staff subgroup. Qualitative findings indicated perceived benefits in curriculum visibility, task completion, and competency mapping but also showed that implementation readiness depended on reporting capability, role-based permissions, interoperability, governance safeguards, and role-tailored training. Together, these findings suggest that usability alone is insufficient to determine readiness for wider implementation. The broader contribution of this pilot therefore lies not in the local CMS1-CMS2 comparison alone but in showing how perceived usability interacts with workflow fit and organizational conditions when assessing readiness for institutional implementation.

Interpretation of Quantitative Findings

In this exploratory pilot, CMS2 was associated with higher perceived usability scores than CMS1 overall and among faculty participants. The magnitude of the paired differences and corresponding effect sizes suggests a potentially meaningful usability signal; however, these estimates should be interpreted cautiously given the small sample, short exposure period, and asymmetric familiarization conditions. Because CMS2 was introduced after an orientation and a trial period, improvements may partially reflect training and novelty effects in addition to system differences. The observed pattern was consistent with prior usability evaluations of digital learning systems in medical education [23,24]. The moderate overall effect size and larger improvement observed among faculty suggest that CMS2 addressed

usability concerns, particularly those relevant to academic roles.

Importantly, this comparison was not a controlled head-to-head exposure: CMS1 ratings reflected participants' prior routine experience, whereas CMS2 ratings followed study-specific orientation and a 2- to 3-week pilot period. The observed differences may therefore reflect system differences together with differences in familiarization, training, and exposure.

The SUS demonstrated excellent internal consistency at baseline and acceptable internal consistency postintervention, supporting the reliability of the usability estimates/evaluations. The modest reduction in Cronbach α following implementation likely reflects decreased variability in responses rather than measurement instability. Extensive literature supports the strong psychometric properties of the SUS across diverse technological environments, including educational and health care platforms [13,23,25]. Systematic reviews confirm that the SUS remains a robust, reliable instrument for evaluating perceived usability in digital learning environments [23]. Thus, the observed improvements are consistent with enhanced perceived system usability, although they should be interpreted cautiously given the small sample size, short exposure period, and potential novelty or training effects.

Interpretation of Qualitative Findings

Using Braun and Clarke's reflexive thematic analysis, informed by the TAM [26] and extended through digital education and workflow literature, qualitative findings illuminate the mechanisms underlying these usability changes [21,22].

Perceived Usefulness (Visibility and Reporting as Value)

Participants experienced CMS2 as useful when it enhanced curriculum visibility and competency mapping [26]. In this study, usefulness was closely tied to oversight and coordination functions, which are the core purposes of curriculum mapping platforms [1]. The system allowed users to "see" the curriculum calendar events, competencies, and alignment, thereby supporting systems' relevance to academic work. These findings aligned with prior work showing that mapping tools are most valued when they enable identification of curricular gaps and redundancies [8,11,27]. Our study extends this literature by suggesting that visibility may also carry operational value in day-to-day curriculum coordination.

Reporting functionality emerged as central. Teaching reports were described as essential for KPI documentation and promotion processes. Digital curriculum systems are increasingly positioned as tools for institutional accountability and monitoring. When reporting features were incomplete or difficult to access, perceived usefulness diminished. This is consistent with TAM2/extensions, in which output quality and job relevance shape usefulness over time [28]. In medical education contexts, where teaching contributions are formally documented, reporting is integral rather than peripheral.

Perceived Ease of Use (Friction, Labels, and Role-Based Access)

Ease of use was shaped by interface clarity and fewer procedural steps [26]. In health professions education literature, usability similarly emphasizes intuitive design and minimal cognitive load as determinants of adoption [29,30].

However, usability was disrupted by nonintuitive labels and limited access permissions. Ease was therefore not purely technical but organizational, shaped by role-based constraints. Extended models such as the Unified Theory of Acceptance and Use of Technology identify facilitating conditions as determinants of technology adoption beyond individual perceptions [29]. In this study, role-based access constraints affected how participants could meaningfully engage with the system, suggesting that permissions shape experienced ease of use.

Implementation frameworks emphasize that when technological complexity exceeds organizational capacity, risks of nonadoption or abandonment increase [31]. Together, these findings indicate that perceived ease of use in institutional settings is coshaped by interface design and governance structures. In this setting, ease of use was therefore sociotechnical: it reflected not only interface design but also whether users had the permissions, terminology, and workflow pathways needed to complete their expected tasks.

Attitude Toward Use (Optimism With Concerns)

Participants expressed positive attitudes toward CMS2, particularly in comparison with the previous system [26]. However, this positivity was tempered by concerns regarding monitoring, misuse, data visibility, and pilot awareness. Attitude was therefore not purely affective but institutionally situated. These findings suggest that in academic health environments, evaluative responses to technology are shaped not only by functional performance but also by perceptions of governance and accountability. Attitude toward use therefore appears influenced by institutional context as well as system design.

Behavioral Intention to Use (Conditional Commitment)

Participants expressed willingness to use CMS2, but intention was frequently conditional on access, training, and feature completeness [26]. In pilot contexts, intention may represent provisional openness rather than stable commitment. Longitudinal acceptance studies suggest that determinants of intention stabilize as systems mature and experience accumulates [28]. The conditional nature of intention observed in this study underscores that early acceptance in medical education settings may depend on structural readiness, not perceived usefulness and ease of use alone.

Actual Use (Workflow Gains and Persistent Administrative Burden)

Participants reported fewer procedural steps and smoother session management, suggesting perceived improvements in workflow during the pilot. From a process perspective, reducing procedural steps aligns with principles of workflow optimization [32]. Some participants also described how enhanced competency visibility informed curriculum planning, consistent with literature demonstrating that digital mapping tools support curricular reflection and alignment [4,8,11].

Yet administrative burden persisted where reporting and data extraction functions were limited, indicating that workflow gains were uneven across roles. Implementation scholarship cautions that digital systems may redistribute rather than eliminate work when integration is incomplete [31]. Sustained adoption may therefore depend on reducing parallel manual processes and strengthening system integration, particularly for administrative roles.

Facilitating Conditions (Organizational Readiness and Role Alignment)

Training alignment, support responsiveness, workload constraints, and system integration shaped engagement with CMS2, while original TAM emphasizes perceived usefulness and perceived ease of use as primary determinants of behavioral intention [26,29]. Role-specific training emerged as particularly important in medical education contexts, where faculty and administrative workflows differ substantially. Responsive support mitigated early technical barriers, whereas workload pressures limited opportunities for system exploration. These findings reinforce that adoption is embedded within organizational readiness rather than determined by interface design alone, echoing prior reports of institutional challenges in implementing CMSs [12,29,31].

Integration and Compatibility (Interoperability and Governance Alignment)

Participants consistently requested integration with Outlook and learning management systems. Curriculum management literature identifies interoperability as key to reducing duplication and fragmentation across institutional platforms [7,8]. Limited synchronization led to workarounds, such as reuploading materials, illustrating how incomplete integration can redistribute workload rather than eliminate it.

Compatibility concerns also extended beyond technical linking to governance and access alignment. Visibility of student data and grant information raised questions about appropriate permission structures and accountability. Implementation frameworks emphasize that compatibility with institutional systems and policies is critical to the sustainability of health technologies [31]. In this study, integration was therefore both technical and organizational, shaping the long-term viability of CMS2.

Suggestions for Improvement (Iterative Refinement and Role Alignment)

Participants' suggestions focused on clearer labeling, brief visual guides, automated notifications, and refinement of role-based permissions. These proposals indicate that users were not rejecting CMS2 but actively envisioned how it could better align with their workflow and responsibilities. Rather than signaling dissatisfaction, suggestions reflected engagement with the system and expectations of iterative improvement. From a technology acceptance perspective, refinement of usability features may strengthen perceived ease of use, while improvements in reporting and notifications may enhance perceived usefulness [26]. Implementation scholarship similarly emphasizes the importance of iterative adaptation during pilot phases, particularly in complex organizational environments such as medical schools [31].

Notably, many suggestions are centered on role-based permissions and governance clarity. This reinforces that adoption in academic health settings depends not only on technical functionality but also on alignment with professional accountability structures. In this context, improvement requests suggest ongoing institutional embedding of CMS2 rather than superficial critique. Together, these findings indicate that in medical education settings, digital curriculum systems are accepted not only as software tools but also as components of a broader institutional infrastructure requiring alignment across pedagogy, governance, and technical ecosystems.

Mixed Methods Integration

Integration showed convergence between the quantitative usability improvement and qualitative reports of fewer steps for routine tasks, improved calendar visibility, and clearer competency mapping. Divergence was most evident for administrative staff: the absence of quantitative improvement aligned with qualitative accounts of limited permissions, incomplete reporting/extraction functions, and continued manual workarounds. Together, these findings suggest that CMS2 usability gains were strongest where core workflows and access structures were fully supported. These priorities indicate that CMS2 implementation readiness depends not only on improved usability but also on completion of reporting functions, alignment of permissions with user responsibilities, integration with existing institutional platforms, transparent governance, and role-specific training (Table 4).

Table 4. Implementation priorities for CMS2[a] scale-up based on mixed methods findings.

Implementation priority	Evidence from this study	Recommended action before scale-up
Reporting and KPI[b] outputs	Participants expected teaching reports and KPI documentation but could not consistently locate or generate them during the pilot.	Prioritize teaching-load reports, KPI reports, and exportable summaries.
Role-based permissions	Faculty and administrative staff experienced different access limitations, which shaped their ability to use CMS2 meaningfully.	Map permissions to actual user responsibilities before rollout.
Interoperability	Participants requested integration with Outlook and Blackboard to reduce duplicated work and reliance on multiple platforms.	Develop phased integration with calendar and learning management system platforms.
Governance and privacy	Concerns were raised about visibility of grants, student information, and monitoring of potential system misuse.	Define data visibility rules, audit trails, and misuse-monitoring procedures.
Role-tailored training	Administrative users reported that orientation was more aligned with faculty and coordinator workflows than with administrative workflows.	Develop separate faculty and administrative training pathways.
Usability refinement	Participants reported nonintuitive labels, difficulty locating functions, and the need for practical user guidance.	Revise terminology, navigation labels, and quick-start visual guides.

[a]CMS2: newly developed curriculum management system.
[b]KPI: key performance indicator.

Reflexive Statement

This study used Braun and Clarke's [21,22] reflexive thematic analysis, acknowledging the researchers' interpretive role in constructing meaning from participant accounts. As members of the academic health environment, the research team remained attentive to potential assumptions regarding digital modernization and institutional innovation. Reflexive dialogue was maintained throughout the analytic process to examine positionality and ensure that interpretations remained grounded in participants' perspectives. This reflexive stance was particularly important given the researchers' proximity to the institutional context and the system under evaluation.

Limitations

This study has several limitations. First, the pilot sample was relatively small, particularly among administrative staff, which limited role-based quantitative comparisons and required descriptive reporting for that subgroup. Second, the study was conducted within a single institution, and the findings reflected one medical school setting and may not be fully generalized by other institutions with different curriculum structures, governance models, or digital ecosystems. Because CMS2 was developed in-house and evaluated within the same institution, participants may have been influenced by institutional expectations, perceived social desirability, or optimism toward local innovation, despite voluntary participation and confidentiality procedures. Third, the short pilot duration limits conclusions regarding longer-term usability, sustained adoption, curriculum quality, and reporting practices; the study did not assess accreditation outcomes or accreditation-related performance. Fourth, the evaluation relied on self-reported usability measures rather than objective performance metrics (eg, time-on-task, completion rates, and error frequency). Fifth, CMS1 was assessed based on participants' prior routine experience, whereas CMS2 was assessed following study-specific orientation and a 2- to 3-week pilot period. Prior CMS1 duration and frequency of use were not systematically measured. The comparison should therefore be interpreted as a legacy-use baseline versus a structured short-term CMS2 exposure rather than a controlled head-to-head comparison. Finally, the AI-assisted analysis introduces a potential methodological limitation. Although transcripts were anonymized and AI outputs were verified by the research team and reviewed by an independent qualitative expert, AI-assisted deductive coding may still reflect prompt sensitivity and model behavior.

Future Directions

Future research should evaluate CMS2 after full institutional rollout using a larger, multirole sample and longer follow-up across teaching, assessment, and accreditation cycles. Subsequent evaluations should include objective system-use and workflow metrics, including login frequency, task completion rates, time-on-task, error frequency, report generation success, and system-log data. Comparative studies across institutions would help determine whether the implementation barriers identified in this study, such as reporting, permissions, interoperability, governance, and role-tailored training, are context-specific or common across medical schools.

Conclusions

In this pilot evaluation, CMS2 was associated with higher perceived usability than CMS1 overall and particularly among faculty participants. Qualitative and integrated findings indicated that implementation readiness depended on whether improved usability was accompanied by adequate reporting, role-aligned permissions, interoperability, governance safeguards, and role-tailored training. These findings support an iterative approach to wider implementation that combines usability assessment with evaluation of workflow and organizational readiness.

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Generative AI Use

The authors disclose the use of generative AI tools (ChatGPT 5.5, OpenAI) as an analytic aid during a structured, deductive phase of the qualitative analysis aligned with Technology Acceptance Model constructs, and to support language editing for clarity and readability. All interview transcripts were anonymized prior to any AI-assisted processing. AI tools were not used to generate final codes, final themes, statistical results, or conclusions. AI outputs (candidate codes/construct-aligned summaries) were reviewed by the research team and were not used as final analytic decisions; all coding, theme development, interpretation, and conclusions were determined by the authors, with review of discrepancies in consultation with an independent qualitative research expert. NotebookLM (Google) was used to generate a conceptual thematic diagram based on researcher-developed outlines derived from the finalized themes. The resulting figure was reviewed against the finalized thematic structure and verified for accuracy by the research team before inclusion.

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Data Availability

The datasets generated and analyzed during the current study include quantitative survey data, qualitative interview transcripts, and annotated questionnaire materials. Due to the sensitive nature of the qualitative data and the potential risk of participant identification, interview transcripts are not publicly available. Deidentified quantitative data and selected qualitative excerpts supporting the findings of this study are included within the paper and supplementary materials. Additional data may be made available by the corresponding author (FMA) upon reasonable request and subject to institutional ethical approval.

Authors' Contributions

ASA and FMA conceptualized the study and contributed to the study design and methodology. MG Alameen led the design and programming of CMS2 and supported the technical aspects of the pilot implementation. ASA coordinated participant recruitment and data collection and managed study procedures. M Gaffar Alameen and AP conducted the quantitative analysis (SUS scoring and statistical analysis) and prepared the quantitative tables/figures. ATR, FMA, and M Gaffar Alameen conducted the qualitative analysis (coding and theme development) and contributed to interpretation of qualitative findings. TMA, M Gaffar Alameen, and AP contributed to interpretation of findings and critically revised the manuscript. All authors contributed to manuscript drafting and/or critical revision, approved the final manuscript, and agree to be accountable for all aspects of the work.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Individual participant characteristics with IDs.
[DOCX File (Microsoft Word File), 19 KB-Multimedia Appendix 1]

Multimedia Appendix 2

Survey questionnaire.
[DOCX File (Microsoft Word File), 20 KB-Multimedia Appendix 2]

Multimedia Appendix 3

Participant interview guide.
[DOCX File (Microsoft Word File), 22 KB-Multimedia Appendix 3]

Multimedia Appendix 4

Normality test System Usability Scale (SUS), all participants (n=15).
[DOCX File (Microsoft Word File), 107 KB-Multimedia Appendix 4]

Multimedia Appendix 5

Normality test, faculty (n=12).
[DOCX File (Microsoft Word File), 110 KB-Multimedia Appendix 5]

Multimedia Appendix 6

Thematic analysis of curriculum management system (CMS), aligned with COREQ (Consolidated Criteria for Reporting Qualitative Research), prompt.
[DOCX File (Microsoft Word File), 27 KB-Multimedia Appendix 6]

Multimedia Appendix 7

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), attitude toward use (ATU).
[DOCX File (Microsoft Word File), 24 KB-Multimedia Appendix 7]

Multimedia Appendix 8

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), perceived usefulness (PU).
[DOCX File (Microsoft Word File), 20 KB-Multimedia Appendix 8]

Multimedia Appendix 9

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), perceived ease of use (PEOU).
[DOCX File (Microsoft Word File), 19 KB-Multimedia Appendix 9]

Multimedia Appendix 10

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), attitude toward use (ATU).
[DOCX File (Microsoft Word File), 19 KB-Multimedia Appendix 10]

Multimedia Appendix 11

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), behavioral intention to use (BI).
[DOCX File (Microsoft Word File), 18 KB-Multimedia Appendix 11]

Multimedia Appendix 12

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), actual use/workflow impact (AU).
[DOCX File (Microsoft Word File), 19 KB-Multimedia Appendix 12]

Multimedia Appendix 13

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), facilitating conditions (FC).
[DOCX File (Microsoft Word File), 19 KB-Multimedia Appendix 13]

Multimedia Appendix 14

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), system integration and compatibility.
[DOCX File (Microsoft Word File), 19 KB-Multimedia Appendix 14]

Multimedia Appendix 15

Technology Acceptance Model (TAM)–informed reflexive analysis of newly developed curriculum management system (CMS2), suggestions for improvement (S).
[DOCX File (Microsoft Word File), 19 KB-Multimedia Appendix 15]

Checklist 1

COREQ checklist.
[DOCX File (Microsoft Word File), 26 KB-Checklist 1]

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Abbreviations

CMHS: College of Medicine and Health Sciences
CMS: curriculum management system
CMS1: existing curriculum management system
CMS2: newly developed curriculum management system
COREQ: Consolidated Criteria for Reporting Qualitative Research
KPI: key performance indicator
SUS: System Usability Scale
TAM: Technology Acceptance Model
UAEU: United Arab Emirates University

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