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Original Article

The role of educational management in improving pharmacy students' academic performance and professional competencies

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ABSTRACT

Pharmacy education faces rising expectations to prepare graduates who demonstrate strong academic achievement and practice-ready professional competencies. These expectations make educational management an essential concern for pharmacy schools seeking to align institutional processes with student development. Many pharmacy programs adopt management practices such as curriculum review, faculty development, student support, and assessment reform in fragmented ways. Without an integrated framework, it remains difficult to explain how specific management actions influence academic performance and professional competency formation. This article proposes a conceptual framework that positions educational management dimensions as drivers of pharmacy student outcomes. Strategic leadership, quality systems, faculty development, and resource stewardship are conceptualized as management inputs that shape academic learning and professional growth. The framework consists of four interrelated components: a typology of educational management practices, pathways to academic achievement, pathways to competency development, and mediating factors such as institutional culture and student engagement. Together, these components provide a structured model for understanding how management decisions shape educational outcomes. The framework would help deans, program directors, curriculum committees, and faculty diagnose weaknesses in management processes and align institutional actions with student needs. It also offers a basis for future empirical studies that examine how management practices operate across pharmacy education contexts. A management-driven approach can provide pharmacy schools with a coherent blueprint for strengthening both academic performance and professional competencies. By connecting institutional practices to student outcomes, the framework supports more intentional and evidence-informed educational improvement.

Keywords: Educational management, Pharmacy education, Academic performance, Professional competencies, Student outcomes, Higher education management

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Introduction

The evolving landscape of pharmacy practice requires graduates who possess advanced scientific knowledge, clinical reasoning, communication skills, and ethical judgment. Pharmacy education has therefore moved beyond the transmission of disciplinary content toward integrated preparation for complex patient care roles, interprofessional collaboration, and professional accountability [1, 2]. Competency-based and entrustable

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professional activity frameworks have helped clarify what graduates should be able to do at the point of entry to practice [3, 4]. These developments place sustained pressure on pharmacy schools to manage teaching, assessment, experiential learning, and student support in ways that promote both academic success and practice readiness [5, 6].

Educational management encompasses the coordinated use of leadership, planning, governance, quality assurance, faculty development, resource allocation, and monitoring systems to improve institutional performance [7]. In pharmacy education, these practices are increasingly relevant because curricular outcomes, experiential expectations, and assessment systems require organized decision-making rather than isolated instructional effort [8, 9]. The adoption of competency-based pharmacy education further implies that management must align curriculum design, faculty capability, assessment practices, and institutional culture with clearly defined graduate outcomes [10, 11]. Yet educational management remains less explicitly theorized in pharmacy education than curriculum content, assessment tools, or professional competency frameworks.

Existing studies suggest that particular management-related practices can shape student outcomes, including curriculum mapping, assessment coordination, preceptor development, simulation design, and structured professional development activities [12, 13]. Research on academic performance in pharmacy programs has also connected student achievement to institutional assessment practices, progression monitoring, and standardized outcome measures such as the Pharmacy Curriculum Outcomes Assessment and licensure-related indicators [14, 15]. Meanwhile, studies on communication, interprofessional learning, experiential assessment, and co-curricular development indicate that professional competencies require deliberate educational structures and sustained faculty engagement [16-18]. However, these strands remain dispersed, and pharmacy education lacks a unified conceptual model that links management practices to both academic performance and professional competency development.

This article proposes a conceptual framework that links educational management dimensions to pharmacy students' academic performance and professional competencies. The framework views management practices not as administrative background conditions but as active drivers of curriculum coherence, instructional quality, assessment validity, student support, and experiential learning quality. It also recognizes that student outcomes are shaped by mediating conditions such as institutional culture, faculty motivation, resource sufficiency, and engagement with quality improvement cycles. By integrating these relationships, the framework provides a holistic model for pharmacy schools seeking to strengthen educational quality through more intentional management.

Background

The pharmacy education context

Pharmacy education has increasingly been shaped by outcome-based expectations that define graduates in terms of demonstrable competencies, professional activities, and readiness for patient-centered practice. Entrustable professional activities have become especially influential because they translate broad competency domains into observable responsibilities that new graduates should be prepared to perform under appropriate supervision [1, 2]. Competency-based pharmacy education also requires schools to align curricular experiences with graduate outcomes, making institutional management essential for ensuring coherence across didactic, simulated, experiential, and co-curricular learning [10, 11]. Accreditation-oriented thinking, therefore, encourages pharmacy schools to treat curriculum governance, assessment systems, and continuous improvement as interconnected management functions rather than separate academic tasks [8, 9].

Educational management: concepts and scope

Educational management in pharmacy education can be understood as the deliberate coordination of institutional resources, people, policies, and processes to achieve desired learning outcomes. Its core functions include strategic planning, organizing curriculum structures, leading faculty and preceptors, controlling quality through assessment and review, and adapting programs to changing professional demands [19, 20]. When applied to pharmacy schools, these functions extend to curriculum committees, experiential education offices, faculty development systems, student progression policies, and quality assurance structures [21, 22]. This scope makes educational management a practical bridge between institutional decision-making and the everyday learning experiences that shape student achievement.

Academic performance in pharmacy programs

Academic performance in pharmacy programs is commonly represented through course achievement, progression, standardized assessment performance, and licensure-related readiness. Studies examining relationships among the Pharmacy Curriculum Outcomes Assessment, didactic performance, and NAPLEX-related indicators show that academic outcomes depend on the coherence of curriculum, assessment, and student monitoring systems [13-15]. Student success is also influenced by study behaviors, test anxiety, learning environments, and the support structures that help learners respond to academic demands [16-18]. From an educational management perspective, academic performance should therefore be treated as the product of aligned curriculum design, assessment management, instructional quality, and timely student support.

Professional competency development

Professional competency development in pharmacy education reflects a shift from knowledge accumulation toward observable performance in clinical reasoning, communication, collaboration, professionalism, and ethical practice [10]. Studies on simulated communication activities, structured clinical assessments, and interprofessional learning show that professional capabilities require intentional design, faculty preparation, and repeated opportunities for feedback [23-25]. The use of objective structured clinical examinations, continuing professional development processes, and co-curricular tracking systems further demonstrates that competency development depends on managed educational experiences rather than informal professional socialization alone [26-28]. Accordingly, pharmacy schools need management systems that integrate classroom learning, simulation, experiential education, and professional identity formation into a coherent developmental pathway.

Prior literature on management-outcome links

The literature provides important but fragmented evidence about how management-related practices influence pharmacy student outcomes. Faculty development and preceptor training studies show that educator preparation can support higher-quality learning environments, while curriculum and competency studies indicate that institutional alignment is essential for translating outcomes into practice [21, 22, 29, 30]. Work on entrustable professional activities and competency-based education further suggests that graduate readiness depends on coordinated assessment, governance, and experiential learning structures [5, 6, 9, 10]. The gap is not the absence of relevant practices but the absence of a unifying conceptual framework that explains how educational management dimensions interact to influence both academic performance and professional competencies.

Framework overview

High-level architecture

The proposed framework conceptualizes educational management as a set of institutional practices that influence student outcomes through educational processes and organizational conditions. Strategic leadership, governance, quality assurance, faculty development, resource stewardship, and student support systems are positioned as management inputs that shape curriculum coherence, instructional quality, assessment alignment, and experiential learning quality [8, 9]. These educational processes then contribute to two broad outcome domains: academic performance and professional competencies [13, 14]. Feedback loops connect outcome evidence back to management decisions, allowing schools to revise policies, curricula, faculty development priorities, and resource allocation in a continuous improvement cycle.

Figure 1 presents the proposed educational management framework linking institutional management inputs to pharmacy students' academic performance and professional competency development through managed educational processes and mediating organizational conditions.

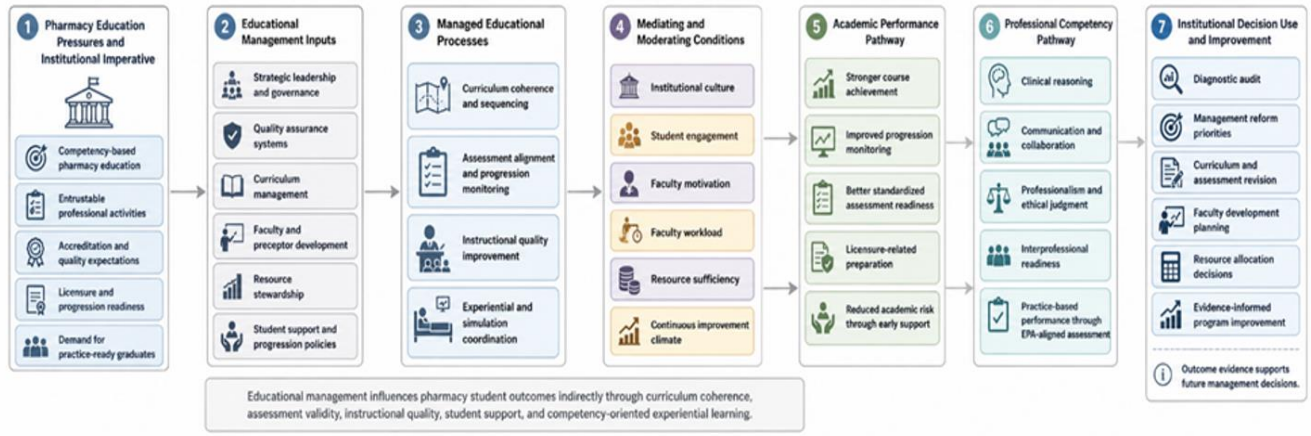


Figure 1. Educational Management Pathways Linking Institutional Practices to Pharmacy Student Academic Performance and Professional Competency Development

Core management-outcome pathways

The framework contains two primary management-outcome pathways that operate simultaneously. The academic performance pathway proposes that strategic leadership, assessment management, curriculum mapping, and quality assurance would be expected to enhance the coherence of learning objectives, instructional methods, and academic evaluation [15, 16]. The competency pathway proposes that faculty development, preceptor training, simulation management, experiential education coordination, and co-curricular oversight could foster professional skills such as communication, collaboration, clinical decision-making, and professionalism [30-32]. These pathways are interdependent because academically coherent programs create the knowledge base for practice, while competency-oriented educational

structures help students apply that knowledge in authentic professional contexts [23, 24].

Design principles

The framework is multidimensional, context-sensitive, theory-informed, and actionable for pharmacy education administrators. It is multidimensional because it connects management practices to educational processes, mediating factors, and dual student outcomes rather than treating management as a single institutional variable [19, 20]. It is context-sensitive because pharmacy education involves distinct requirements, including competency-based standards, experiential education, professional activities, licensure preparation, and interprofessional collaboration [1, 2, 33]. It is actionable because deans, program directors, curriculum committees, assessment leaders, and faculty development units could use the model to identify where management improvements are most likely to strengthen student learning and professional formation.

Educational management dimensions

Table 1 consolidates the framework's educational management dimensions by showing how each dimension contributes theoretically to academic performance, professional competency development, and institutional decision-making.

Table 1. Educational Management Dimensions and Their Theoretical Contribution to Pharmacy Student Outcomes

Educational management dimension	Core institutional function	Primary educational mechanism	Academic performance contribution	Professional competency contribution	Key decision-use implications for pharmacy schools
Strategic leadership and governance	Establishes mission alignment, graduate outcome priorities, committee coordination, and accountability structures	Creates coherence between institutional goals, curriculum policies, assessment expectations, and student outcome priorities	Supports consistent academic standards, progression rules, and program-level monitoring	Clarifies expectations for graduate readiness, professional activities, and competency accountability	Deans and program directors can use governance reviews to determine whether institutional priorities are visibly connected to student learning outcomes.
Quality assurance and curriculum management	Organizes curriculum mapping, program review, assessment review, and continuous improvement cycles	Aligns learning objectives, instructional sequences, assessments, and outcome evidence	Improves curriculum coherence, course progression, assessment validity, and standardized readiness	Ensures competency domains, simulation, experiential learning, and co-curricular expectations are integrated rather than fragmented	Curriculum committees can identify misalignment between intended outcomes, delivered teaching, and assessed performance.
Faculty and preceptor development	Builds educator capability for teaching, feedback, supervision, assessment, and competency-based education	Strengthens instructional quality and shared expectations across classroom, simulation, and experiential settings	Enhances student learning through better pedagogy, feedback quality, and assessment preparation	Improves clinical reasoning, communication, professionalism, and practice-based assessment through trained educators and preceptors	Faculty development units can prioritize training areas linked to documented student weaknesses.
Resource stewardship	Allocates time, staffing, simulation capacity, advising resources, educational technology, and experiential infrastructure	Enables implementation of curriculum and competency systems at a sufficient scale and quality	Supports tutoring, early alerts, learning technologies, and academic progression structures	Supports simulation, OSCEs, experiential placements, interprofessional activities, and competency documentation	Leaders can use resource audits to determine whether outcome expectations are matched by operational capacity.
Student support and progression management	Coordinates advising, academic alerts, well-being resources, remediation, and progression policies	Converts institutional resources into timely learner support and risk reduction	Reduces academic risk, supports persistence, and improves readiness for progression and licensure-related milestones	Supports professional identity formation, reflective growth, and accountability through structured guidance	Student affairs and assessment leaders can integrate academic, behavioral, and professional development indicators.

Experiential and interprofessional education coordination	Manages practice-site quality, preceptor expectations, interprofessional scheduling, and applied learning structures	Connects classroom knowledge to authentic practice, collaboration, and observable performance	Reinforces academic knowledge through application in patient-care and practice-like contexts	Builds collaborative practice readiness, EPA-aligned performance, communication, and ethical judgment	Experiential education offices can evaluate whether site quality and assessment tools support defined competency outcomes.
Continuous improvement and evidence use	Uses academic indicators, competency evidence, student feedback, preceptor input, and program data for improvement	Converts outcome evidence into targeted management action	Identifies course-level, cohort-level, and progression weaknesses requiring management response	Identifies gaps in professional capability, experiential readiness, and competency documentation	Pharmacy schools can move from isolated reporting to integrated educational decision-making

Strategic leadership and governance

Strategic leadership and governance provide the foundation for aligning pharmacy education with professional expectations, accreditation priorities, and institutional mission. Leadership practices include articulating a shared vision for graduate readiness, supporting participatory decision-making, coordinating curriculum committees, and ensuring that assessment and experiential education structures are connected to defined outcomes [8, 9]. Governance becomes especially important when programs adopt entrustable professional activities, because such adoption requires agreement on performance expectations, assessment responsibility, and progression decisions [1, 2]. Within the framework, strategic leadership is therefore conceptualized as the management dimension that creates coherence among educational goals, institutional policies, and student outcome priorities.

Quality assurance and curriculum management

Quality assurance and curriculum management refer to the systematic processes through which pharmacy schools monitor, review, and improve the educational program. Outcome-based curriculum mapping, assessment review, examination alignment, and feedback from academic performance indicators help institutions determine whether students are progressing toward expected knowledge and competency standards [13, 14]. Curriculum management also supports the integration of competency frameworks, professional activities, simulation, experiential learning, and co-curricular requirements into a unified educational sequence [10, 11, 28]. In the proposed framework, quality assurance functions as a control and improvement mechanism that links evidence about student learning to managerial decisions about curriculum revision and instructional support.

Faculty development and resource stewardship

Faculty development and resource stewardship are central management dimensions because educational quality depends on the capacity of faculty, preceptors, and support systems to deliver the curriculum effectively. Studies on faculty motivation, preceptor competencies, and national preceptor development programs indicate that educator preparation can strengthen teaching quality, experiential supervision, and professional assessment [19-22]. Resource stewardship includes allocating time, infrastructure, simulation capacity, advising support, and educational technology in ways that enable faculty and students to meet program outcomes [31, 32]. Within the framework, faculty development and resource stewardship operate as enabling conditions that translate strategic goals and curriculum designs into effective educational practice.

Mechanisms impacting academic performance

Enhanced curriculum coherence and assessment

Management-driven alignment of learning objectives, teaching strategies, assessment methods, and progression standards is a key mechanism through which educational management could influence academic performance. When curriculum committees and assessment leaders use outcome data to coordinate learning experiences, students are more likely to encounter a coherent sequence of knowledge development and evaluation expectations [13, 14]. Standardized academic indicators, including curriculum outcomes assessment and licensure-related readiness measures, can provide feedback on whether curricular structures are supporting student learning as intended [15, 16]. The framework, therefore, proposes that curriculum coherence and assessment alignment serve as direct educational processes linking management practices to stronger academic preparation.

Supportive learning environment

A supportive learning environment is another mechanism through which management practices could contribute to academic performance. Resource allocation for advising, tutoring, progression monitoring, early academic alerts, and learner well-being can help students respond to academic

challenges before they become barriers to advancement [17, 18]. Management decisions that address test anxiety, study behaviors, and student support structures would be expected to strengthen persistence and engagement in rigorous pharmacy curricula [16, 17]. In the framework, student support systems are therefore not peripheral services but managed educational processes that connect institutional resources to academic achievement.

Instructional quality improvement

Instructional quality improvement links faculty development, teaching evaluation, and pedagogical innovation to student academic learning. Faculty members who are supported through development programs, active-learning preparation, and educational research capacity are better positioned to design learning experiences that promote engagement, understanding, and assessment readiness [19, 20]. Preceptor and faculty development initiatives also create shared expectations for teaching, feedback, and performance assessment across classroom and experiential settings [21, 22, 29]. The framework consequently treats instructional quality as a management-sensitive mechanism through which pharmacy schools can strengthen academic performance while also laying the groundwork for competency development.

Mechanisms impacting professional competencies

Integration of experiential and simulated learning

Management decisions that prioritize experiential education, simulation, objective structured clinical examinations, and structured feedback would be expected to enhance students' professional competencies by creating repeated opportunities to apply knowledge in practice-like settings. Entrustable professional activity frameworks emphasize that readiness for practice depends on observable performance, making experiential and simulated learning essential sites for assessing clinical reasoning, patient care responsibilities, and professional judgment [3-5]. Studies of clinical pharmacy practice courses, curriculum review, and objective structured clinical examinations further show that competency development requires deliberate curricular organization and assessment design rather than incidental exposure to practice tasks [34-36]. In the proposed framework, experiential and simulated learning function as managed competency pathways through which institutional planning, faculty coordination, and assessment systems support professional performance.

Interprofessional education management

Interprofessional education requires active management because collaborative learning depends on scheduling coordination, faculty engagement, shared learning objectives, institutional partnerships, and assessment practices that extend beyond a single program. Pharmacy students' development of collaborative practice readiness can be supported when interprofessional experiences are mapped to recognized competency expectations and embedded within the broader curriculum rather than treated as isolated events [33]. Simulated interprofessional communication activities and structured team-based learning experiences also illustrate how managed educational design can strengthen communication, role clarification, and patient-centered collaboration [23, 25]. The framework, therefore, positions interprofessional education management as a mechanism through which pharmacy schools can intentionally cultivate collaborative competencies required for contemporary practice.

Professionalism and ethical development

Professionalism and ethical development require management structures that make expectations visible, assessable, and consistently reinforced across the curriculum. Continuing professional development processes, co-curricular tracking systems, and personal and professional development instruments provide examples of how pharmacy programs can organize reflection, accountability, and professional identity formation [26-28]. Such structures help connect institutional policies, faculty role modeling, experiential expectations, and student self-assessment into a coherent developmental process. In the framework, professionalism is therefore shaped not only by individual student disposition but also by managed educational environments that clarify standards and provide repeated opportunities for ethical reasoning and professional growth.

Mediating and moderating factors

Institutional culture and student engagement

Institutional culture mediates the relationship between educational management and student outcomes because policies and resources influence learning most effectively when they are embedded in a shared commitment to teaching excellence, student development, and continuous improvement. A culture that values competency-based education can support faculty agreement about graduate outcomes, consistent assessment expectations, and meaningful use of feedback from students, preceptors, and performance indicators [9, 10]. Student engagement also mediates management effects because even well-designed curricula require learners to participate actively in academic, experiential, interprofessional, and reflective activities [17, 26]. The framework, therefore, treats culture and engagement as connective conditions that determine whether management practices become lived educational experiences.

Faculty motivation and workload

Faculty motivation and workload moderate the effectiveness of educational management because curriculum reform, assessment

innovation, experiential supervision, and competency documentation all depend on sustained faculty participation. Research on faculty motivations for active learning and faculty development needs indicates that educators require institutional support, recognition, preparation, and manageable expectations to implement high-quality teaching practices [20, 21]. Preceptor development literature similarly suggests that practice-based educators need clear competency expectations, training resources, and feasible assessment tools if experiential learning is to support professional competency development [21, 22, 29]. In the framework, faculty motivation and workload are therefore treated as conditions that can either strengthen or weaken the translation of management plans into educational improvement.

Implementation and decision-support for pharmacy schools

Diagnostic audit tool

Pharmacy schools could use the framework as a diagnostic audit tool to examine whether management practices are aligned with desired academic and professional outcomes. Such an audit would assess the clarity of strategic leadership, the maturity of curriculum governance, the coherence of assessment systems, the adequacy of faculty and preceptor development, and the availability of student support resources [8, 9, 30]. It would also examine whether academic indicators, professional competency assessments, experiential feedback, and co-curricular evidence are used together in program review rather than reviewed in separate administrative silos [13, 14, 28]. The diagnostic purpose is not to rank programs but to help institutional leaders identify where management weaknesses may be limiting student learning and professional development.

Table 2 translates the conceptual framework into a dual-outcome pathway matrix that pharmacy schools can use to diagnose how management practices support academic achievement and professional competency formation.

Table 2. Dual-Outcome Pathway Matrix for Applying the Educational Management Framework in Pharmacy Schools

Framework pathway	Management levers	Intermediate educational processes	Observable indicators for academic performance	Observable indicators for professional competency development	Diagnostic question for institutional self-assessment
Curriculum coherence pathway	Curriculum mapping, sequencing review, committee governance, outcome alignment	Coherent progression from foundational science to applied clinical and professional learning	Course performance trends; progression rates; performance across mapped knowledge domains; standardized assessment readiness	Ability to connect knowledge to clinical reasoning, patient-care responsibilities, and professional decision-making	Are learning objectives, course content, assessments, and competency expectations aligned across the full curriculum?
Assessment alignment pathway	Assessment blueprinting, examination review, OSCE design, EPA-aligned assessment policies	Valid and coordinated assessment of knowledge, skills, judgment, and progression readiness	Examination reliability; remediation patterns; progression decisions; PCOA or licensure-related readiness indicators	OSCE performance; EPA documentation; preceptor ratings; professionalism assessments	Do assessment systems measure both academic mastery and practice-ready performance in a coordinated way?
Instructional quality pathway	Faculty development, active-learning support, teaching evaluation, and peer review of teaching	Improved pedagogy, feedback quality, learner engagement, and instructional consistency	Course achievement, student engagement, reduced failure or withdrawal patterns, and learning satisfaction	Communication performance, clinical reasoning in applied tasks, and the ability to respond to feedback	Are faculty supported to teach, assess, and give feedback in ways that match competency-based pharmacy education expectations?
Student support pathway	Advising systems, early alerts, tutoring, well-being support, and remediation policies	Timely identification of academic risk and structured support for persistence	Retention; remediation completion; improved performance after intervention; reduced delayed progression	Reflective development; professionalism remediation; accountability in learning plans	Are student support systems proactive, data-informed, and connected to both academic and professional development needs?

Experiential and simulation pathway	Simulation planning, preceptor training, practice-site quality review, and experiential assessment coordination	Repeated opportunities for applied performance, feedback, and readiness assessment	Reinforcement of didactic knowledge through applied tasks; readiness for advanced practice experiences	Clinical reasoning; communication; collaboration; ethical judgment; EPA-related performance	Are experiential and simulated learning activities intentionally managed as competency-development systems rather than isolated learning events?
Interprofessional education pathway	Cross-program scheduling, shared objectives, team-based assessment, partnership governance	Structured exposure to collaborative practice roles and patient-centered teamwork	Application of academic knowledge in team-based cases and problem-solving exercises	Team communication, role clarification, collaboration, and interprofessional professionalism	Is interprofessional education embedded in the curriculum with clear objectives, assessment criteria, and faculty accountability?
Professional identity and ethics pathway	Co-curricular oversight, reflective portfolios, professionalism policies, and mentoring systems	Structured reflection, accountability, role modeling, and ethical development	Academic integrity patterns; completion of reflective and co-curricular requirements	Professionalism, ethical reasoning, self-assessment, responsibility, and patient-centered orientation	Are professionalism and ethical development managed longitudinally rather than assumed to emerge informally?
Continuous improvement pathway	Program review, data dashboards, faculty committees, quality assurance cycles	Integration of academic, competency, experiential, and feedback data into management action	Improvement in course outcomes, progression patterns, assessment alignment, and academic risk detection	Improvement in competency documentation, experiential performance, and graduate readiness evidence	Does the school use student outcome evidence to revise management priorities, curriculum structures, faculty development, and resource allocation?

Roadmap for management improvement

The framework can also guide a staged roadmap for management improvement by helping pharmacy schools prioritize actions that are feasible, coherent, and linked to student outcomes. For example, a school with inconsistent experiential assessment might first strengthen preceptor development and entrustable professional activity alignment before redesigning broader competency documentation processes [1, 22, 31]. A school with concerns about academic progression might prioritize curriculum mapping, assessment review, advising structures, and early support systems before undertaking large-scale curricular restructuring [14, 16, 18]. In this way, the framework supports decision-making that is sequential, evidence-informed, and sensitive to institutional capacity.

Evaluation strategy for the framework

Case-study validation

The proposed framework should be evaluated through cross-institutional case studies that examine how different pharmacy schools organize leadership, governance, curriculum management, faculty development, assessment, and student support. Case-study validation would be useful because educational management practices are context-dependent and may operate differently across public, private, research-intensive, teaching-focused, and resource-constrained institutions [10, 11]. Comparative cases could explore how high-performing and lower-performing programs differ in the coherence of their management systems, while avoiding simplistic claims that any single practice directly determines student outcomes [13, 15]. Such work would help refine the framework by identifying which management configurations appear most plausible for supporting academic performance and competency development.

Survey-based quantitative testing

Survey-based testing could develop validated scales for the framework's management dimensions, educational processes, mediating conditions, and student outcome domains. Instruments would need to capture constructs such as strategic leadership, curriculum governance, faculty development climate, resource stewardship, assessment alignment, student engagement, and competency-oriented learning opportunities [19, 20, 27]. Quantitative testing could then examine whether the proposed pathways among management practices, educational processes, and outcomes are conceptually coherent across pharmacy colleges, while avoiding unsupported claims about numerical gains until evidence is established [14, 33]. This strategy would support theory refinement by identifying which relationships are most consistent across institutional contexts.

Longitudinal designs

Longitudinal evaluation would be needed to examine how management changes unfold over time and how they may influence academic preparation and professional competency development across student cohorts. Pharmacy schools could track curriculum reforms, faculty development initiatives,

preceptor training, simulation expansion, assessment redesign, or co-curricular changes alongside progression evidence and competency documentation [28, 31, 32]. Longitudinal designs would be especially useful because management interventions often affect outcomes indirectly through faculty behavior, student engagement, curriculum coherence, and experiential learning quality [5, 6, 36]. The framework should therefore be assessed as a dynamic model in which institutional change produces gradual educational effects rather than immediate or isolated outcome shifts.

Limitations

Conceptual and measurement complexity

A major limitation of the framework is the conceptual and measurement complexity involved in defining educational management and professional competencies consistently across pharmacy schools. Educational management includes leadership, governance, quality assurance, faculty development, resource stewardship, and student support, but institutions may vary in how these functions are distributed and documented [8, 19]. Professional competencies are also multidimensional, requiring evidence from classroom assessment, simulation, experiential education, reflective development, and entrustable professional activities [1, 5, 27]. As a result, future applications of the framework should carefully define constructs, align measures with local educational systems, and avoid treating complex management processes as simple administrative variables.

Contextual variability

A second limitation is that pharmacy programs differ in regulatory environment, curriculum length, institutional resources, faculty capacity, experiential site availability, and cultural expectations for professional education. Competency-based pharmacy education may require different implementation strategies in programs with different staffing patterns, accreditation pressures, practice systems, and student populations [10, 11]. Studies from varied educational contexts suggest that curriculum review, clinical preparation, and professional competency development must be adapted to local needs rather than transferred mechanically from one setting to another [34, 35]. Consequently, the framework should be viewed as a flexible conceptual guide that requires contextual interpretation rather than a universal prescription.

Conclusion

Educational management offers a powerful conceptual lens for understanding how pharmacy schools can improve both academic performance and professional competencies. The framework proposed in this article links strategic leadership, governance, quality assurance, faculty development, resource stewardship, and student support to the educational processes through which students acquire knowledge and develop practice-ready capabilities. It emphasizes that student outcomes are not produced by curriculum content alone but by coordinated institutional systems that shape teaching, assessment, experiential learning, and professional formation.

The framework's main strength lies in its integrated dual-outcome focus. Rather than separating academic achievement from professional competency development, it explains how both can be supported through coherent management practices. Its specificity to pharmacy education also makes it useful for deans, curriculum committees, assessment leaders, experiential education teams, and faculty development units seeking a practical structure for institutional decision-making. By framing management as an educational driver, the model encourages schools to connect administrative choices directly to student learning and graduate readiness.

Important challenges remain for future research and implementation. The framework requires empirical testing across diverse institutional and regulatory contexts, including programs with different resources, curricular models, and accreditation expectations. Researchers will also need validated instruments that can measure educational management dimensions and link them carefully to academic and competency outcomes. Without such tools, the framework should be used as a conceptual guide rather than as a basis for unsupported claims about institutional effectiveness.

Pharmacy schools should consider adopting the framework as a self-improvement tool for diagnosing strengths, identifying gaps, and prioritizing management reforms. Educational researchers should further validate their pathways through rigorous, multi-site, mixed-method, and longitudinal studies. Such work would clarify how management practices shape curriculum coherence, instructional quality, student support, and professional development over time. Ultimately, a more intentional approach to educational management can help pharmacy education prepare graduates who are academically capable, professionally competent, and ready to contribute responsibly to patient care.

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