

REVIEW

A Systematic Review of Entrepreneurship in Pharmacy Practice and Education

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Objective. To review literature pertaining to entrepreneurship in pharmacy practice, education, and the knowledge, skills, and attitudes (KSAs) identified for pharmacist entrepreneurs.

Findings. In terms of pharmacy practice, entrepreneurship was most frequently identified with innovation and creativity to develop new opportunities for pharmacists. The most frequent role for entrepreneurship in pharmacy education was related to schools putting a greater emphasis on innovation, creativity, or divergent thinking. Risk-taking and creativity/innovation were the most frequently identified KSAs, with 17 (63.0%) manuscripts mentioning these as important for a pharmacist entrepreneur. Other KSAs pertaining to pharmacy entrepreneurship that were mentioned in the articles included self-starter, management, proactivity, communication, strategic planning, positivity, decision-making, teamwork, versatility, marketing, critical thinking, competitiveness, proposal development, numeracy, technology, self-reflection, persistence, social responsibility, and cultural competence.

Summary. No consensus for entrepreneurship in pharmacy practice or education currently exists. In order to improve instructional design and assessment for pharmacy entrepreneurship education, a core set of KSAs for a pharmacist entrepreneur construct must be identified. The most commonly cited KSAs in related literature that are not already part of the Accreditation Council for Pharmacy Education standards include risk-taking, strategic planning, marketing, competitiveness, and social responsibility. These may serve as a starting point for enhancing pharmacy curricula to embrace pharmacist entrepreneurship.

Keywords: entrepreneur, knowledge, skills, attitudes

INTRODUCTION

Entrepreneurial outcomes in education refer to new venture development, business start-ups, and job creation contributing to economic growth and development.¹ More broadly, entrepreneurship can be defined as identifying or creating new opportunities within uncertain environments.² Business school experts have debated about whether entrepreneurship should be considered a construct for the classroom, or whether real-world experience is more appropriate as a delivery method for this type of education.^{2,3}

Within pharmacy education, entrepreneurship has been identified as a key factor driving innovation in pharmacy practice. To guide the Academy in this area, the Center for the Advancement of Pharmacy Education (CAPE) included entrepreneurship within domains in 2013. This action influenced the Accreditation Council

for Pharmacy Education (ACPE) to include entrepreneurship within the standards used to evaluate professional pharmacy programs in 2016.^{4,5} The 2010-2011 American Association of Colleges of Pharmacy (AACCP) Academic Affairs Standing Committee identified entrepreneurship as an affective domain trait, thereby enabling students to develop sustainable practice models.⁶ The Committee suggested using Rubino and Freshman's entrepreneurship competency clusters (decision making, strategic thinking, risk taking, confidence building, communicating ideas, motivating team members, tolerance of ambiguity, and internal locus of control) as a potential framework for developing a pharmacy entrepreneur.^{6,7} Many schools have developed educational programs to address entrepreneurship in pharmacy. In addition to the lectures taught in traditional pharmacy management courses, multiple schools now offer certificate programs or entrepreneurial tracks where students are able to complete additional coursework that identify with entrepreneurship in a pharmacy context.⁸⁻¹¹ In March 2017, the

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University of Maryland School of Pharmacy trademarked the term “pharmapreneurism” to describe the process by which pharmacy entrepreneurs achieve their career aspirations by addressing the nation’s health care, research, policy, and societal needs through leadership, and innovation.¹²

The efforts of many pharmacy organizations and educational institutions seem to reflect a desire to develop an entrepreneurial ecosystem, ie, an environment that supports the development and growth of new ventures through social, political, economic, and cultural elements, for the profession of pharmacy.^{13,14} While the importance of entrepreneurship in pharmacy has been stressed, an appropriate role for innovation and entrepreneurship within pharmacy practice and education, along with an agreed upon set of knowledge, skills, and attitudes (KSAs) for a pharmacist entrepreneur, have not been identified. The objective of this review was to identify and describe the role of entrepreneurship within pharmacy practice, the role schools and colleges of pharmacy play in developing pharmacist entrepreneurs, and the KSAs that should be incorporated in a pharmacist entrepreneur construct.

METHODS

A literature review was conducted using the SCOPUS, EMBASE, and PubMed databases in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.¹⁵ The following search strategy was used: [ALL (entrepren*) OR ALL (capitalis*) OR ALL (“academic capitalism”) AND ALL (“college of pharmacy”) OR ALL (“pharmacy school”) OR ALL (“pharmacy education”)]. No date restrictions or study types were imposed on the database searches. After removal of duplicates, two reviewers participated in screening all abstracts independently for relevance to pharmacy education and entrepreneurship. An *a priori* screening discrepancy threshold between the independent reviewers was set at 20% to indicate the need for a full second screening. All discrepancies were discussed until consensus for inclusion for full-text review was reached. Full-text articles were retrieved and further assessed for eligibility based on the relevance of the study objectives to identify the role of entrepreneurship in practice, education, and mention of potential KSAs of entrepreneurs.

Data extraction and synthesis included citation details (authors, article title, journal title, year published), study type, the roles of entrepreneurship in pharmacy and pharmacy education, and the KSAs of an entrepreneur that were identified. A narrative review of study types, roles, and KSAs was conducted to identify themes based on frequencies (number of sources found) for each.

RESULTS

In the initial search, 483 articles were identified. After removal of duplicates, 404 unique abstracts were identified for screening. The independent reviewer abstract screening process resulted in a 91% initial agreement on which abstracts to include in the study. The two reviewers then discussed points of disagreement until full agreement was reached. After the application of inclusion criteria during the abstract screening and full-text assessment of eligibility stages, 27 articles were included for analysis (Figure 1).^{4,6,24-33,16,34-40,17-23}

The types of papers included in the study were surveys (10 [37.0%]), instructional design manuscripts (6 [22.2%]), commentaries (5 [18.5%]), qualitative interviews (4 [14.8%]), and committee reports (2 [7.4%]). Years of publication ranged from 1999 to 2017, with 20 (74.1%) of the 27 articles published in a pharmacy-specific, peer-reviewed journal.

The most frequent roles for entrepreneurship in both pharmacy practice and pharmacy education are described in Table 1. In terms of pharmacy practice, entrepreneurship was most frequently associated with innovation and creativity to develop new opportunities for pharmacists. Subsequently, the most frequent role for entrepreneurship in pharmacy education related to schools putting a greater emphasis on innovation, creativity, or divergent thinking. Additional roles identified in the literature for entrepreneurship in pharmacy practice included service development, problem-solving, benefiting society, service promotion, risk-taking, proactivity, service implementation, job satisfaction, and evaluating sustainability. Additional roles for entrepreneurship in pharmacy education include application, business management, emphasizing proactivity, problem-solving, no role identified, cultivation, teaching versatility, better communication, self-reflection, identification, ownership training, and continuing education.

Table 2 summarizes and describes the most frequent entrepreneurial KSAs identified. Risk-taking and creativity/innovation were the most frequently identified with 17 (63.0%) different manuscripts mentioning these as important KSAs for a pharmacist entrepreneur. Other KSAs themes identified include self-starter, management, proactivity, communication, strategic planning, positivity, decision-making, teamwork, versatility, marketing, critical thinking, competitiveness, proposal development, numeracy, technology, self-reflection, persistence, social responsibility, and cultural competence.

DISCUSSION

The concept of entrepreneurship in pharmacy education in the literature generally reflects that in the broader

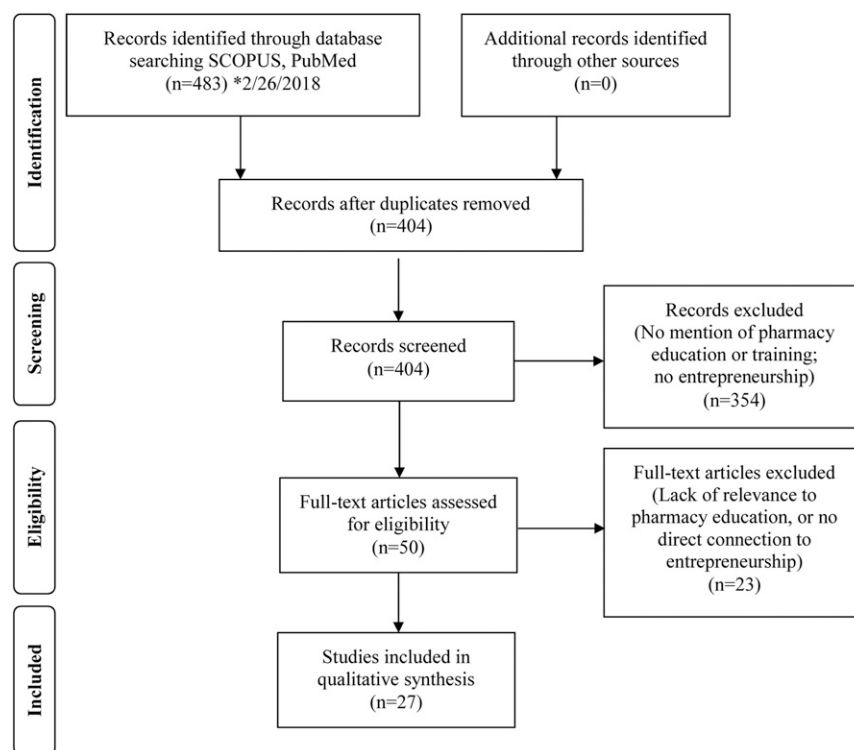


Figure 1. Flow Diagram in Accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement¹⁵

business literature in the sense that entrepreneurs seek to innovate and create opportunities amid an environment of uncertainty.^{2,13} Lupkin and Dess describe the act of launching a new venture as essential to entrepreneurship, including entering a new or existing market with new or existing goods or services.⁴¹ Research involving the application of entrepreneurial orientation theory in the context of advancing pharmacy practice appeared between 1999 and 2012, with five different studies by a similar set of authors. Aside from that, however, there has been little consistency in the methodological approach to understanding entrepreneurship in pharmacy.^{30,33,35,36,40-42} Articles addressing entrepreneurship in pharmacy predominantly focus on the development and implementation of an innovative service without specifying a final outcome of the new venture. The recommended outcome identified by CAPE, “engaging in innovative activities by using creating thinking to envision better ways of accomplishing professional goals,” may be limited in that it fails to evaluate whether pharmacy-led entrepreneurship education actually increases new pharmacist-led ventures.⁴

Strategy and Decision-Making

Strategic planning^{4,6,18,25,27,28,32,39} and decision-making^{4,6,18,24,25,27,31} appeared frequently as key areas for pharmacist entrepreneurs. The field of strategic

management frequently overlaps with entrepreneurship, revolving around assessing and evaluating market opportunities.⁴¹ Shahiwala describes the use of a strengths, weaknesses, opportunities, and threats (SWOT) analysis to help students determine the feasibility of a new pharmacy business.¹⁸ The SWOT analysis is widely used and provides a simple framework to get new students engaged in business planning. In terms of decision-making, most articles refer to establishing priorities and allocating resources effectively. Strategic planning was typically a component of decision-making in the studies we reviewed, but none of the studies directly assessed whether effective strategic planning improved decision-making for the pharmacist entrepreneur. This may be a potential area for instructional design, ie, to test whether students exposed to more robust strategy education achieved better outcomes, or in lay terms, made the right business decision.

Critical Thinking

Critical-thinking or problem-solving skills were cited frequently as components of pharmacy entrepreneurship.^{6,16,24,26,27} Multiple validated critical-thinking instruments have been studied in pharmacy education. These articles describe the implementation process and study design challenges, which varied depending on

Table 1. Most Frequent Roles for Entrepreneurship in Pharmacy Practice and Education

Role	Count	Brief Description
Pharmacy Practice		
Innovation	13 studies ^{4,18,32–34,19,20,23,24,26–29}	Entrepreneurship identified with innovation, creativity, and new opportunities.
Service Development	9 studies ^{17,21,25–27,35–37,40}	Entrepreneurship related to the process of developing a new pharmacy service.
Problem-Solving	6 studies ^{16,19,24,25,30,39}	Entrepreneurship tied to problem-solving, critical thinking, and addressing problems in pharmacy.
Benefiting Society	5 studies ^{6,18,22,26,31}	Entrepreneurship in the context of improving public health, the quality of care, or social entrepreneurship.
Service Promotion	5 studies ^{17,19,21,25,35}	An entrepreneur's as an effective communicator to promote services to multiple stakeholders.
Risk-Taking	4 studies ^{16,22,29,30}	Courage or willingness to take risk and tolerate ambiguity.
Proactivity	4 studies ^{6,16,22,30}	Taking action in anticipation of events rather than passively reacting to issues.
Service Implementation	2 studies ^{17,21}	The process of effectively implementing an idea after development.
Job Satisfaction	2 studies ^{22,38}	The intrinsic motivation described by some entrepreneurs could improve pharmacist job satisfaction.
Evaluating Sustainability	1 study ²¹	Entrepreneurship's role in assessing the financial benefits of a new program or service.
Pharmacy Education		
Emphasize Innovation	9 studies ^{4,16,19,23,25–28,34}	Pharmacy schools should emphasize creativity, innovation, and divergent thinking.
Application	8 studies ^{4,16,18,24–27,34}	Using active learning, problem-based learning, and other applied methods to teach entrepreneurship in a real-world setting.
Business Management	7 studies ^{4,17,21,24,25,27,39}	Teaching basic managerial/operational skills (human resources, workflow, financial, etc.).
Emphasize Proactivity	6 studies ^{6,16,23–25,27}	Articles focusing on encouraging students to take initiative and being proactive.
Problem-Solving	5 studies ^{4,16,19,25,26}	Entrepreneurship in the context of improving critical thinking skills and problem-solving.
No Role	5 studies ^{30,33,36,37,40}	Articles that mentioned education but did not explicitly define a role for pharmacy schools.
Cultivation	4 studies ^{29,31,32,35}	Schools serving as a catalyst that motivates and inspires future entrepreneurs.
Teaching Versatility	3 studies ^{16,23,25}	Articles emphasizing the need for students to adapt to any situation and remain versatile throughout career.
Better Communication	3 studies ^{6,19,34}	Schools providing avenues for students to improve written and verbal communication skills.
Self-Reflection	2 studies ^{4,23}	Encouraging self-reflection of strengths and weaknesses.
Identification	2 studies ^{29,35}	Schools actively working to identify, attract, and recruit students with interest in entrepreneurship.
Ownership Training	1 study ²²	Development for future pharmacy-specific ownership.
Continuing Education	1 study ³⁸	Advancing entrepreneurial education for current practitioners.

whether the assessment tool was developed for use with undergraduates or specific to health care practice.^{43,44} Educational activities aimed at improving broad critical-thinking skills may indirectly benefit the development

of future pharmacy entrepreneurs, but no direct link has been demonstrated between pharmacy students' performance on critical thinking assessments and long-term entrepreneurial outcomes.

Core Business Management

The pharmacy education literature puts a greater emphasis on KSAs typically identified with traditional management roles (operations, workflow, human resources management, accounting, resource management, etc) than do other entrepreneurial frameworks.* Expanding business management education for pharmacists may have many indirect benefits pertaining to previously identified entrepreneurial competency clusters.⁷ For example, greater understanding of financial statements may allow for better communication with a hired accountant or improve student confidence when evaluating financial decisions. Whether meeting traditional business management competencies improves pharmacy students' willingness or ability to start new business ventures remains to be seen. Many schools allow students to pursue the Doctor of Pharmacy (PharmD) and masters of business administration (MBA) degrees concurrently. Future investigations may want to consider how the combination PharmD/MBA influences entrepreneurial activities.

An Entrepreneurial Attitude

Multiple articles referred to entrepreneurship constructs as reflecting an attitude or orientation rather than a knowledge base or skill. The pharmacist entrepreneur could be summarized as a proactive, confident self-starter with a positive disposition who is willing to take risks and compete. An entrepreneur's attitude towards uncertainty seems to be a defining feature in many of the articles included in this review. Cain describes risk aversion as a barrier to creativity and employs methods that challenge students to take "intellectual risks" that encourage creative thinking.¹⁹ Confidence was a reoccurring attitude in the pharmacy entrepreneurship literature, which coincides with entrepreneurial self-efficacy research that argues confidence as a distinguishing feature between entrepreneurs and managers.⁴⁶ Additionally, domains within the Lumpkin and Dess model of entrepreneurial orientation (risk-taking, innovativeness, proactiveness, autonomy, and competitive aggressiveness) were used in multiple pharmacy-specific surveys, demonstrating a potential framework that could be further developed for application to pharmacy education.^{30,35,36,40,41}

Application to the Real World

The use of active-learning or problem-based approaches to teach pharmacist entrepreneurship in a real-world setting was frequently identified in the articles we reviewed as an important instructional method.^{4,16,18,24-27,34} This supports the subjectivist theory of entrepreneurship, which

suggests one's experience in business settings is fundamentally important to the process of discovery and creativity.⁴⁷ However, the extent to which active learning while in pharmacy school can replace real-world entrepreneurial experience may determine the overall pedagogical efficacy of the construct.

Recommendations for ACPE Standards

The 2013 CAPE Outcomes served as the framework for the 2016 Standards published for pharmacy school accreditation. Many of the most frequently cited KSAs are incorporated directly and indirectly within the ACPE Standards and Guidance documents, suggesting that many schools may already be at least partially preparing graduates to become pharmacist entrepreneurs.^{4,5,48} The KSAs that do not clearly map to existing ACPE Standards are risk-taking, strategic planning, marketing, competitiveness, and social responsibility. As the Association considers updates to the Standards, engaging successful entrepreneurs and experts in entrepreneurial education in the development process could help identify ways to incorporate the most important components previously identified for pharmacist entrepreneurs. Additionally, drafting policy that defines the role of entrepreneurial education in schools and colleges of pharmacy could lead to a formal Association stance on its place in accreditation standards.

While many pharmacist entrepreneur KSAs may be mapped to the standards, several were intended to solve therapeutic problems or prioritize a specific patient's needs (eg critical thinking, decision-making, technology, communication) and may not be completely transferable to the construct of a pharmacist entrepreneur. For example, the process of communicating a medication action plan effectively to an interprofessional health team may not fully capture the communication skills identified in the literature as necessary for pharmacist entrepreneurs. Additionally, some KSAs identified in this review may be included in other courses built to address the affective domain. The CAPE suggested various learning objective examples throughout the "Personal and Professional Development" domain that could address some of the entrepreneurship KSAs.⁴ For example, displaying confidence and positive self-esteem may serve to advance a pharmacist's professional development while also advancing one's ability to exhibit the "Positivity" domain of entrepreneurship. While educators can reasonably assume that some of the clinical KSAs overlap, additional research in this area would validate the true gaps.

This review included commentaries, instructional design manuscripts, and organizational committee reports, which often place more weight on opinion or testimony

* References 6,21,45,23,24,26,27,29,32,37,39

Table 2. Most Frequent Skills, Knowledge, and Attitudes Identified

KSA	Study Count	Brief Description
Risk-Taking	17 studies ^{4,6,31-33,35,36,39,40,16,18-20,22,25,28,29}	Tolerance of uncertainty and the willingness to take calculated risks.
Creativity / Innovation	17 studies ^{4,16,33-36,38-40,18-20,22-25,29}	Developing new ideas.
Self-Starter	11 studies ^{4,16,40,17,18,23,24,30,31,33,36}	Articles focused on developing a self-starter attitude and a sense of autonomy/responsibility.
Management	11 studies ^{6,21,39,23-27,29,32,37}	Traditional business management knowledge and skills taught in business schools.
Proactivity	10 studies ^{16,24,25,30,31,33-36,40}	Focusing on assertiveness and taking initiative.
Communication	8 studies ^{4,6,18,19,24-27}	Traditional communication skills including written, oral, public speaking, interpersonal, negotiation, networking, etc.
Strategic Planning	8 studies ^{4,6,18,25,27,28,32,39}	Ability to develop a strategic plan or conduct a SWOT analysis.
Positivity	7 studies ^{4,6,18,22-24,27}	Building confidence and a positive attitude.
Decision-Making	7 studies ^{4,6,18,24,25,27,31}	Ability to establish priorities for effective resource allocation.
Teamwork	6 studies ^{4,6,24,26,27,34}	Effective work in small groups or teams to achieve goals.
Versatility	5 studies ^{16,23-25,37}	Encouraging adaptability for a variety of situations.
Marketing	5 studies ^{17,26,28,37,39}	Traditional marketing and sales knowledge and skills.
Critical Thinking	5 studies ^{6,16,24,26,27}	Improving critical thinking skills to solve problems.
Competitiveness	4 studies ^{33,35,36,40}	Encouraging competitive aggressiveness.
Proposal Development	4 studies ^{18,21,26,39}	Knowledge and skills pertaining to raising capital (business plan, proposal, pitch, etc.).
Numeracy	3 studies ^{24,26,34}	Traditional mathematics and working with numbers.
Technology	3 studies ^{24,28,34}	Effectively using new technology.
Self-Reflection	2 studies ^{23,24}	Identifying personal strengths and weaknesses.
Persistence	2 studies ^{24,30}	Work ethic and persistence to succeed.
Social Responsibility	1 study ³⁴	Skills addressing moral and ethical decisions and the importance of serving the community.
Cultural Competence	1 study ³⁴	Developing a basic understanding of other cultures and perspectives.

Abbreviations: KSA=knowledge, skill, or attitude. SWOT=strength, weakness, opportunity, or threat

than do original research submissions. Peer-reviewed opinions, committee recommendations, and faculty descriptions of new courses could add value to the stated objectives of this review despite the limitation in methodological rigor. Frequencies for roles and KSAs were assessed by number of manuscripts, with no qualitative rating given to them other than that potentially implied by the study type. Attempting to add subjective ratings to these types of studies may have introduced different biases, so we decided to focus on the mere mentioning of the role or KSA. The search terms used in the literature search did not include “innovation” or similar terms because including such terms within the current search strategy would have retrieved articles on drug innovation and innovations in pharmacy education that were not specific to entrepreneurship and increased the number of potential articles to 5,917.

CONCLUSION

A wide range of roles for entrepreneurship in pharmacy practice or education were identified. A list of KSAs from the pharmacy education literature related to entrepreneurship was developed to assist with establishing a “pharmacist entrepreneur” construct. Further research into the agreement with the KSAs and potential instructional design and assessment strategies is needed to help guide faculty members interested in incorporating entrepreneurship education in schools or colleges of pharmacy.

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