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The Innovation Opportunity in Pharmacy Education Standards

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ABSTRACT

The changing landscape of healthcare and recent formal Standards for innovation in pharmacy education presents a unique opportunity. To realize this opportunity, pharmacy should learn from the successes of other fields to make use of the rich environment for improvement in healthcare. The University of Pittsburgh School of Pharmacy presents one example of a Program that utilizes a curriculum, projects, and partners to realize innovation. Educators in pharmacy can make use of the opportunity for innovation by learning from successful examples and embracing the process's challenges of iteration.

Keywords: Innovation, Entrepreneurship, Curriculum

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INTRODUCTION

Pharmacy education prepares student pharmacists to enter and evolve in the profession. The profession of pharmacy faces a future with new models of care, shifting reimbursement, expanded access to patient data, and constantly evolving technology. This future mandates that education move beyond a process of knowledge transfer from educator to learner. Critical thinking and the ability to execute change are invaluable tools that education can provide to students, especially in anticipation of a changing healthcare landscape. Even with the mandate of change, there is a constant challenge in offering these tools and abilities to students. Commonly grouped under the term “Innovation,” pharmacy education and practice seek to utilize the tools of creativity, design, and entrepreneurship, but the meaningful guidance on how to assess, incorporate, or apply them is lacking.

STANDARDS

“Innovation,” as a term, can be found in many of the mission, vision, and value statements in pharmacy. Numerous pharmacy practices claim to offer innovative services and educational institutions claim to foster and lead innovation. Despite the prevalent claims of innovation, education and practice are filled with errors, problems, and poor experiences. The presence of these problems does not demonstrate a lack of innovation. Rather, the struggle of pharmacy education and practice in solving these ubiquitous problems are evidence of the need to reconsider innovation in the profession. The constantly challenging environment of healthcare provides a fertile ground for improving the implementation of innovation, as shown in other fields like engineering.¹ The examples from other fields’ ability to realize the opportunity for innovation offer pharmacy the opportunity to learn from success.

To determine the role of innovation in pharmacy, it’s definition must be considered. Descriptions of Innovation range from long, explicit academic definitions to concise, broad applied descriptions both within pharmacy and from outside fields.² A particularly relevant definition of innovation, adapted for this context, is “something new and useful.”³ This definition extends across fields and settings to understand how success can translate. With such challenges to define innovation alongside the numerous opportunities, it is notable that the Accreditation Council for Pharmacy Education (ACPE) in 2016 included the element of “Innovation and Entrepreneurship (Innovator)” in the domain of “Standard 4 – Personal and Professional Development”. This element states that “the graduate is able to engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.”⁴

This commitment to innovation reflected by this Standard is positive in its goal to have pharmacy education prepare student pharmacists to solve the current and future challenges of the profession. With such a standard, however, comes limited precedent for development, application, and assessment that would allow the incorporation of innovation in curriculums. This Standard, combined with the limited guidance for Schools regarding innovation, presents an unstructured opportunity to realize the potential of innovation and the tools and abilities it offers students. Flexibility, however, poses unique challenges and rewards. The University of Pittsburgh School of Pharmacy has been attempting to realize the potential of innovation and, in the process, has encountered many of these challenges and rewards.

AN EXAMPLE

Pharmacy education should see innovation as both a characteristic and a content area in the curriculum. Innovation at the University of Pittsburgh School of Pharmacy is multifaceted, found in the curriculum, projects, and culture. A

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core component of this approach is the Innovation Program. This Program offers opportunities for innovation in the curriculum, through projects, and with partners. By applying concepts of user-centered design, the curriculum meaningfully incorporates student feedback to create an environment that nurtures personalized education. It was students' interest in projects and work outside of the classroom that led to the creation of formal elements in the curriculum. Student sought project opportunities outside the curriculum based on their interest and educational needs. The School created funded positions for these projects that required skills and abilities that were nurtured through informal meetings, mentorship, and discussion. From these, a course in Pharmacy Innovation was created to contextualize the elements of research, creativity, and entrepreneurship that could support student projects. These initial projects and course led to a more formal structure which built the current curriculum of the Innovation Program.

Currently, the Program includes elements of design thinking and entrepreneurship to supplement current foundational aspects of the curriculum, such as patient care or experiential learning. The Pharmacy Innovation elective offers structured guidance for students in theory, examples, and discussion. Experiential opportunities to present practice enhancement proposals are supplemented by the opportunity for students to compete for the funding to implement proposed changes in practice sites. In addition to the curriculum, projects offer students an opportunity to lead change in pharmacy. For example, students identified a wellness kiosk that was being presented to patients in a national pharmacy chain. This kiosk, however, had limited involvement with pharmacists at these chains. These students created a proposal which led to the installation and testing of a similar kiosk, in the building that houses the School of Pharmacy, to learn how patients interact with technology to maintain wellness. Students helped create advertising, wellness challenges, and follow-up surveys to determine the role and potential of the machines. The findings from this were discussed with the company that supplied the kiosk to guide future plans for the role of the kiosks in nationwide chains. Such projects are foundational to the role of partners in the Program. The partners acknowledge the relevance and value of innovation from a School of Pharmacy. Partners present current problems and collaborate on solutions with students, faculty, and stakeholders and include pharmacy chains, technology companies, and startups from various fields.

In addition to the Program's curriculum, projects, and partners, a major component is the Pharmacy Innovation Lab. This Lab provides the setting for students, faculty, and Program champions, such as alumni, business partners, and leaders in the profession, to discuss problems in the pharmacy, review the potential of technology, and reimagine the future for healthcare. This Lab is not traditionally structured in the sense

of test tubes, scales, and lab coats. Instead, the equipment it offers includes modeling clay for low resolution prototypes, mHealth technology for testing, and ample post-its to develop and record ideas. The benefit of such a setting is the physical and social space to discuss problems and solutions. Formal and informal association with the Lab allows students, faculty, and Program champions to find the best fit for their schedule and needs in the Lab's regularly structured meetings with students, game sessions, user testing, and impromptu discussions.

The problems and solutions presented and discussed in the Lab go on to become the foundation for curricular changes, projects, and work with Partners. When faculty approached the Lab for feedback regarding a drug development course's structure, it helped lead a restructure of that course from lecture-based didactics to a semester long game-like experience. The student insight on a faculty project for technology-aided medication reconciliation helped lead the project to funding for commercialization from the University. The previously discussed wellness kiosk project was the product of meetings, testing, and discussion from the Lab. This physical and social space allows the ideas and interests of motivated students, faculty, and Program champions to engage with the problems and solutions in current practice.

The combination of education and application offered by the Innovation Program allows for both structured and organic growth of innovation at the School. The Program was developed through iteration, transparency, and enthusiasm from learners, educators, and administrators. Such a development process is only one example of the potential for pharmacy to incorporate and adapt innovation from successes in other fields such as engineering, business, and design. Programs with storied success like the MIT Media Lab or the Stanford Technology Ventures Program provide examples of how education can use innovation to drive a field.⁶ Engineering curriculums allow students to solve real-world problems as a part of a capstone.⁷ Business programs prepare students to create companies that solve the problems identified by students in practice. Design programs rely on user-centered experience to focus the development of solutions to complex problems across a variety of fields. While these examples are representative of different applications of innovation, they collectively represent opportunities for pharmacy to learn and apply the methods that produce the students and practitioners that would be best equipped to face a present and future shifting healthcare system.

CHALLENGES

Even with these examples of Innovation in other fields, considerable challenges remain. Schools are looking for guidance, but there is limited prescribed methodology or assessment for innovation. Rubrics and guidelines provide structure to curricular elements, such as clinical skills or applying pharmacokinetics, but the ability to structure an

assessment of something innovative, that inherently has novel elements, presents a challenge. The variation in output of innovation, such as student companies formed, products developed, or temporary practice changes, demonstrate only superficial, short term outcomes. Rather than assessing solely the outputs of innovation, assessments should evaluate the process of innovation. Assessment should include the investigation, review, or implementation of something new and useful in pharmacy, not just outcomes. Assessment would have to be related to the context of the curriculum, program, or clinical setting. Student outcomes, for example, from their time in a Lab or in a “hackathon” may map to unique experiences they sought, but potential structure for review is possible. Clear identification of problems, prioritization of solutions, and planning of implementation are challenging but potential guidelines for assessment of innovation. These skills and abilities are the elements of innovation that contribute to lifelong learning and impact for students. These could offer the structure around which the assessment of innovation develop for a curriculum.

While assessment may consider elements of the process of innovation, the challenge of assessment is compounded by the variations in the process. There is no simple solution to applying innovation. There is, however, a benefit in the iterative process of implementation. Iteration can make for difficult assessment and challenge morale. Making innovation a part of education and practice will be faced with apathy, disinterest, and doubt from disengaged students, educators, and administrators. These challenges are prevalent in innovation across much of healthcare and overcoming these sentiments is a test of the commitment to innovation.^{8,9} Not all attempts to allow for innovation will be successful. In one example, the Innovation Program at the University of Pittsburgh School of Pharmacy found that, despite commonly expressed interest, few student pharmacists were motivated to apply for student funding through a large institution that was available for a project to develop technology for use in pharmacies. This example is telling in that the offer was made specifically to students, assuming some baseline level of interest, but found suboptimal engagement. The lack of application for funding could have been considered a failure on a part of the funder or the curriculum, and the opportunity could have been abandoned. The Program, however, found the disengagement to be subsequent to student confidence regarding technical skills and used an iterative approach to restructure the opportunity as an interdisciplinary capstone. Through this, student pharmacists serve as clinical stakeholders to present the problem to computer science students. Together, these students successfully created a minimal viable prototype of a mobile application. The initial motivation of student pharmacists may have been present, but the opportunity to act on the ability to create something new and useful was possible only when the opportunity was appropriately restructured to include collaboration with

appropriate resources. The success of such a collaborative led the Program to develop one of the first pharmacy focused “hackathons” to bring together students from various backgrounds, disciplines, and institutions to solve problems in healthcare. This example shows that while the initial opportunity for innovation was funding, the Program needed to iterate to find an opportunity that suited multiple contexts.

This example also shows how all pharmacists are not expected to have a career solely driven by the opportunity to apply innovation, but all pharmacists should have the knowledge of its benefits, understand its potential for collaboration, and have basic experience to practice it. The apathy, disinterest, and doubt may be prevalent during the implementation process, but these sentiments can be mitigated with an approach that embraces constructive iteration.

CONCLUSION

For all its prevalence and potential, innovation can be better utilized in pharmacy. Direct reference in educational standards offers motivation to incorporate it into curriculums, but a lack of guidance may limit benefits. Pharmacy should look towards other fields’ successes to learn how to best apply innovation to current problems for actionable change and benefit. While the iterative process in realizing the potential of innovation will be difficult, it offers unique benefits and learning essential for pharmacy to realize the opportunity.

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