Viewpoint

Scholarly Pathway: Understanding, Planning, and Competency Mapping in Pharmacy Education

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Abstract

Pharmaceutical education has extensive integration of courses from life sciences to technology application and drug discovery to clinical trials. Pharmacy students are capable of diverse career selection due to acquired competencies during professional education. However, there is always a lack of real-time research exposure to pharmacy students at the undergraduate level. Therefore, the purpose is to design an effective research series that provides first-hand research experience to pharmacy students during 2–4 years of PharmD studies. The course design and delivery focused on three elements, namely, quality assurance, curriculum requirement, and assessment method. The outcomes of the course series are consistent with the emerging research skills and evidence-based practitioner role. The series and multilevel of course sequels comprising from knowledge – comprehension – argument – to – synthesis of research article. Students are expected to conduct independent research project under the supervision of college faculty. This will help them to develop and advance research skills for lifelong learning. The scholarly pathway series will develop critical appraisal skills to argue/support/value the literature and develop competency for evidence-based medicines. It will be highly beneficial to develop critical thinking, professionalism, and research skills among pharmacy students.

Keywords: *Application, course design, curriculum, pharmaceutical education, research methodologies*

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Introduction

Medical education is transforming from being teacher centered to student centered.[1] Research-based learning is one of the innovative educational strategies that promote active learning and improve students' critical thinking.[2] Professional competencies required for medical education is now commonly used different parameters like problem solver, critical appraisal, and innovation.[3] Students involved in research activities have shown proficiency in acquiring the clinical competencies of various health professions such as medicine, pharmacy, nursing, and allied health sciences.[2,4-6]

Research provides an opportunity for the students to apply their knowledge through active discussions within small groups.[3] Research experiences in curriculum improve students' self-awareness and understanding of literature critics.[4-6] Although research is student centered, it requires an instructional approach, needing direction from the supervisor to generate evidence, interrelate outcomes, and develop skills to argue/value and support findings.[6,7] Scholarly pathways (SPs) are aimed at developing the research potentials of pharmacy students and improve the pharmacy curricular design.

Idea/Hypothesis

Ideology of course design

The pharmacy curriculum required modification to design and implement a research course. The process of research SP course development required several multiple approaches. The program learning outcomes

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were created to guide curricular discussions among the academics and curriculum committees. The process involved a multidisciplinary approach including teaching faculty and clinical preceptors to discuss the model of delivery and required assessment methods within the school of pharmacy.

Elements of implementation

The course design and delivery should focus on three elements, namely quality assurance, curriculum requirement, and assessment method. The outcomes of the course series are consistent with the emerging research skills and evidence-based practitioner role. The course in charge worked on the content sequence and cross-mapped with the Center for the Advancement of Pharmaceutical Education (CAPE) and program learning outcomes.[5-7] The discussions during the conceptualization and development process had the representations from quality assurance, curriculum development, and assessment committee chairs. The literatures on pharmacy education and other health-care professionals were evaluated to provide evidence-based approach in course designing. The discussion moderated during the development process provided additional in-depth understating of course layout and reference materials.

Two independent reviewers of the college have done external benchmarking of the course contents. After the content verification, the last step was the external benchmarking of credit hours distributed among the five SP series. General themes and suggestions that emerged during discussions were helpful in the revision and development process.

Course hypothesis and design feedback

The following are the feedback called for:

a. Research skill and attitude required for the practice of evidence-based pharmacy practice
b. Emphasis on pharmacist's role in drug-related evidence synthesis and generation
c. Exposure to different research methodologies including drug development and innovation
d. Outcomes such as research skills, attitude, literature appraisal, and scientific writing, yet achievable and measurable
e. Minimizing the contents overlapping among the five series speared over five semesters in the pharmacy program.

Current Evidence and Design Application

Concept

The CAPE[7] developed 15 core competencies for practitioner pharmacists. These competencies must align with program learning outcomes and should be quantitatively measurable. Several of these skill-based competencies mapped with SPs to develop nonclinical critical thinking/analysis, professionalism, self-awareness, problem-solving, and lifelong learning attitude.

The SP for the pharmacy curriculum mainly based on the need to develop critical appraisal and innovation skills. The concept of course development aligned with Miller's pyramid[3] and Bloom's taxonomy[6] to measure the acquired competencies required in program learning objectives. Figure 1 depicts the detailed concept and framework of SP design.

Planning

There are five series of SP introduced as a sequel of learning objectives. There are several action verbs linked with Miller's pyramid[3] and Bloom's taxonomy.[4] The series of scholarly pathways developed in a way that learning objectives of knowledge to skills like evidence synthesis skills will be developed over

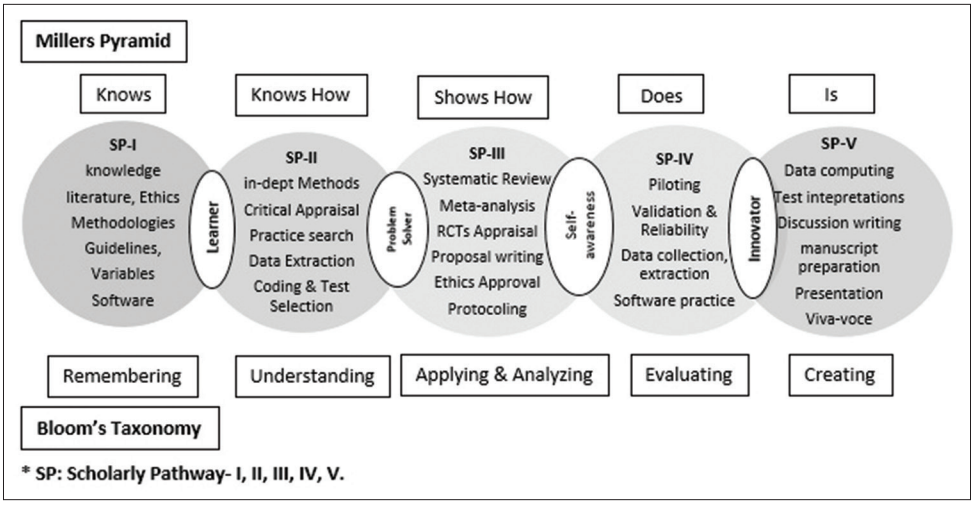

Figure 1: Concept and understanding of scholarly pathway design

six semesters of research-focused training. Students are expected to apprehend different research theories and methodologies at the early stages. Medially, the outcomes are focused on the thorough transformation of knowledge to applications (such as literature search and statistical software-based assignments). SPs IV and V mainly focused on self-awareness, literature argument, value/argue/support findings, create and defend research outcomes, etc.

Competency mapping

Students' personal and professional development skills incorporate several subdomains, including knowledge, professionalism, innovator, leader, and self-awareness subdomains.[4-7] SP series are designed to develop those skills. The series has a total of nine credit hours distributed across knowledge (two credits) to synthesis (seven credits). It is important to understand the concept of experiential learning elements in these series. Traditional lecture-based learning is minimized to more practice or practical-based approach. Table 1 presents the details of each series on the specific program objective and acquired credit hours.

Impact on pharmacy education

Pharmacy is one of the health-care professions with direct patient access and plays a vital role in health-care decision model. Individualization therapy involves pharmacists to provide optimum care to patients and helps to understand the medications used by them. Along with these communication and professional skills, pharmacists are required to equip themselves with literature updates. This literature critical appraisal also helps pharmacists to develop a proficient care plan for the patients and assist other health-care providers for rational prescribing.

Table 1: Learning objectives and credit distribution

Character	SP-I	SP-II	SP-III	SP-IV	SP-V
Credit hours	1	1	1	3	3
Semester/10	4	5	6	7	8
Knowledge					
Critical thinking					
Skills development					
Professionalism					
Creating/writing/publish					
Attitude development for research/learning					

SP: Scholarly pathway

Continuous professional development and/or lifelong learning is based on personal attitude, and these series are planned to encourage and motivate this trait. However, it would be highly subjective to the individual's circumstances.

Recommendation

SPs are research-focused and nonclinical practice-based courses. The concept and design of the series mainly focus on providing first-hand research exposure to pharmacy students. It will be highly beneficial to develop critical thinking, professionalism, and research skills.

Authors' Contribution

The manuscript has been read and approved by all the authors, and it is believed that the manuscript represents honest work and the authors are responsible for the content and writing of the article.

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Conflicts of interest

There are no conflicts of interest.

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