Developing and Assessing the Effects of a Pharmacy Graduate-Level Health Services Research Methods Course

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Received: 07-03-2025; Revised: 14-04-2025; Accepted: 24-04-2025; Published: 08-05-2025

Abstract

This paper gives a clear summary and analysis of the Health Services Research Methods graduate course taught at the University of Arizona R. Ken Coit College of Pharmacy. In this interactive and discussion-based course, students gain key knowledge about developing research in healthcare and how to review research methods. Performance by students is measured through written tests, making original research proposals and ongoing low-amount tasks. In five years, twenty-seven graduate students have finished this course. Most students have responded positively and suggested only a few things to make it better. Reviewing a course on pharmacy graduate research reveals that most students liked it and gives suggestions for changing or improving the course and idea for similar courses.

Keywords: ***Pharmacy education; research methodology; graduate curriculum; course assessment; health services research.***

1. Introduction

Doing research and analyzing statistics has revealed there is well-established literature on setting up, rolling out and assessing education programs in healthcare. Many journals describe the design of the curriculum and the results seen in Doctor of Pharmacy (PharmD) programs that teach research design and biostatistics. You can find similar documentation for learning in medical education, physician residency programs and other allied health professions that are helpful for understanding relevant approaches.

Even so, there is not enough research on graduate-level education in colleges of pharmacy. Social and Administrative Pharmacy (SAP) is an interesting area of pharmaceutical education because it represents an important category within the field. A range of organizations across the United States now have SAPs and many are focusing these programs on issues such as Health Economics and Outcomes Research (HEOR) and Health Services Research (HSR).

The University of Arizona R. Ken Coit College of Pharmacy launched a program related to this years ago and it is now called the Health and Pharmaceutical Outcomes graduate program. Here, students can earn an MS or PhD, taking courses on biostatistics, epidemiology, research methods, health technology assessment and health policy, as well as independent and thesis or dissertation projects(1).

This paper explains in detail the HSRM course, a crucial course in this graduate program. It includes a compilation of student opinions, their test scores and the director's observations gained from teaching the course for five years. The author reveals this information with the goal of strengthening the small literature on pharmacy graduate programs and, in so doing, helping instructors working on similar courses at other schools.

This is important because there are not many published plans available to guide graduate program development in research and its specialties. With health services research contributing to better policy, design and outcomes in healthcare and even more so in the future, we must ensure that new researchers are properly trained. This paper recommends a useful model for shaping curriculums, while starting a conversation about the best methods for educating graduates in pharmacy and related disciplines.

2. An explanation of the course

The program for Health Services Research Methods is a key experience within our school's curriculum. In most cases, the three-credit course takes place during the fall semester and helps set the foundation for all new MS and PhD students. The educational content attracts interested students studying in clinical medicine, public health sciences and business administration(2). At times, students from the field of pharmacy opt to take classes here too,

making it necessary for them to consider other viewpoints.

The course was tailored to help students master research techniques commonly found in studies focusing on health services. The course meets weekly for three-hour sessions and breaks down the curricular content by progressively introducing theory and giving space for its practical use. To meet our institution's credit hour requirements, students are asked to study and prepare for about six hours weekly by themselves.

Each of the ten learning objectives in the curriculum is based on the input from several faculty members who identified what graduate-level researchers must know. The concepts include ethical principles for research, the basic principles of science, outlines of research reports, studying various research strategies, assessing the effectiveness of research, sampling ways, data collection techniques, testing hypothesis in research, evaluating research for validity and developing research protocols.

Throughout the years, how education is approached has developed after keeping up with best practices and everyday considerations. Originally, many teachers worked together to teach the course, using their individual knowledge; now, after recent changes, it is the author who teaches it instead. Initially, the teachers use lectures to help students learn the fundamentals, while in later weeks, they focus on discussions about real-life examples in round-table settings.

The move was intentional, as it gave students a chance to study the main concepts before needing to think and apply them in different settings. Since students learn advanced and complex principles, the collaborative, discussion-focused method works well due to the relatively small size of the group. Having a round table helps students study alone and then come together to learn with the help of their peers in class(3).

Before each class, students read and study selected research papers using guides to help them analyze the approach used. Because of this, students are able to learn more from each other during class, while the faculty helps everyone in the discussion.

Course materials are neatly grouped within the learning management system (currently Desire 2 Learn) using weekly folders that contain documents describing what students should learn, their reading assignments and any pre-class work. Regular updates to the course ensure that students are exposed to what is relevant in today's world.

In general, the first courses on offer deal with scientific methodology, ethical research, protection of human subjects, searching for relevant literature and writing a proposal. They provide the key information needed to acquire more specific knowledge about research methods. Afterward, sessions focus on the acceptance of test scores (validity and its counterpart, reliability), the main principles of biostatistics and epidemiology and methods of taking samples, all while preparing the participants for exploring research designs.

After learning about experimental designs, students in the course learn about observational methods. Various subjects are studied too, for instance, various ways to conduct a literature review, survey approaches, qualitative research and methods for analyzing costs involved in using medicines.

While pandemic measures affected the school's schedule, lessons were held completely online and still presented the course content with the engaging elements. As a result, we learned that the curriculum could be adapted and different ways to offer courses might be possible in the future.

3.Methods

Health Services Research Methods course evaluates understanding and use of concepts through a well-designed approach. Using this model allows students to highlight their understanding in various ways and also assists them with their own interests and future careers.

Composition of the Assessment and Weight Distribution

The assessment framework has three main areas and each serves its own teaching purpose, while together offering an overall assessment of a student's learning(4). The table shows the planned assessment system, including its importance and relationship with the course's objectives.

Summative Examination

At the end of the semester, students are given a complete take-home test to complete. Generally, the assessment contains five essays that allow students to show how well they understand research approaches and how these should be used in research. Bloom's revised taxonomy suggests that the exam will pay attention to analysis,

evaluation and creation abilities.

In most cases, students are expected to come up with research study designs, examine already published works, point out the main advantages and disadvantages of methods, propose answers to challenges and justify the approaches they choose. It focuses not only on gaining knowledge from the research but also on using it in practical ways. The format provides students enough time to investigate, plan and present their answers, just like they would in day-to-day research work.

Preparing a research proposal

During the second phase, students are required to produce a research proposal and incorporate the essential concepts they learned in class. Students are given examples and details about proposal structure from the beginning of the course. Later in the term, students chart their own way of testing ideas through personal research protocols focused on what they prefer studying.

By using this method, students can use recently learned techniques to help develop their proposals. Students are given regular chances to talk with their instructor and peers, allowing them to continually improve their assignments. They are motivated to choose future research projects that reflect their interests and choices.

Scholars present their research proposals in the final class and get feedback from their teachers as well as the people sitting next to them. By creating presentations, students learn valuable research communication skills and get to work together as a group. Rather than look at this as only a course requirement, many students follow up on these proposals, either through extra research or through their thesis/ dissertation work(5).

Formative Assessments

To go along with main tests, there are frequent easy tasks that help students stay involved and let teachers see students' progress. Usually, students do reading assignments, use worksheets on teaching strategies, analyze articles and come prepared for discussions each week. Formative assessments ensure students understand the main ideas well, give them much-needed practice, help identify errors early and help distribute the workload over the course of the semester.

Another part of this component is evaluating participation in class by observing students' helpful discussions, effective questions, ability to work with others on problems and professional involvement. Because the classes are small, learning facilitators are able to focus on the value of students' participation instead of just counting their participation.

Assessment Component	Description	Weight	Primary Objectives Assessed
Summative Examination	Take-home, essay-based assessment covering major study designs and methodological applications	50%	2, 3, 4, 5, 7, 8, 9
Research Proposal	Development and presentation of original research protocol	30%	1, 3, 5, 6, 8, 10
Formative Assessments	Weekly pre-class activities, in-class participation, and discussion contributions	20%	1-10 (varies weekly)

TABLE 1 Assessment Structure and Objective Alignment in Health Services Research Methods Course

Assessments are carried out and the outcomes are observed

The process is based on ideas of being straightforward, linked to course objectives, providing helpful critique and giving thought-provoking questions. Information about what is looked for is provided in the rubrics for main assessments. The aim of feedback is to point out your strong and weak points as well as guide you in improving your independent learning and research habits.

Over the past five years, the students' results in these assessment areas have been excellent. Of the 27 students, 24 scored "A" grades while only three students got slightly lower scores. It is possible that the performance here is high because of the teaching approach and also because the graduate students are very enthusiastic.

4.Results

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An evaluation of the Health Services Research Methods course over five years is included here to give an overview of student participation, their performance and comments from students which helps assess the course and its impact.

Analyzing Students and Their Progress

During the review, the number of students enrolled in these courses each year remained between five and seven. Thanks to the small group size, both the active teaching style and the necessary amount of students are easily achieved. Seven of the twenty-seven graduate students completed the graduate course during the five-year period, specializing in pharmaceutical sciences, public health, clinical medicine and business administration(6).

As Table 2 shows, students have shown repeated strong performance in their academic work. Since many students are achieving excellence, the structure and teaching methods seem to fit students' skills. The failure in one course was caused because the student didn't complete the work and ignored chances to correct it afterward.

Academic Year	Enrollment	Performance Distribution	Average Final Score	Survey Response Rate
2019-2020	5	A (4), B (1)	94.2%	100% (5/5)
2020-2021*	6	A (5), C (1)	91.7%	83% (5/6)
2021-2022*	5	A (4), F (1)	88.3%	80% (4/5)
2022-2023	5	A (5)	95.6%	80% (4/5)
2023-2024	6	A (6)	96.3%	83% (5/6)
Total	**27**	A (24), B (1), C (1), F (1)	**93.2%**	**85% (23/27)**

TABLE 2 Student Enrollment and Performance Outcomes (2019-2024)

Qualitative Feedback Review

The course survey that is given to students helps to assess the program and 85% (23 out of 27) of them finished the given survey. The students are given twelve Likert-scale items to express their opinions on how well the course meets their requirements and open-response questions to provide additional feedback and offer advice for improvements.

For all years of the program, more than half of teachers had positive views, stating "strongly agree" or "agree" for almost every category. Except for times when online classes were required for pandemic precautions, no such responses were found in the data(7). It means that students are generally satisfied and targets of the course have been accomplished when teaching is done in person.

A study of open-response answers found that five themes describe how students feel and these themes were each confirmed by many examples and patterns seen over the years:

1. The way a course is structured and organized

Students often remarked on the well-structured nature of the courses, mentioning points such as "clear objectives," "orderly presentations of lessons," and "sensible progression of classes." Having the structure explained clearly was beneficial as the material on research methodology was rather complicated.

2. Materials Available

Students praised the instructional materials for being descriptive, clear, simple and straightforward, as well as for supplying them with many educational examples from lengthy research papers. These activities were seen as helping participants improve their ability to analyze information and apply it to furthering their research goals.

3. By using an interactive approach, the subject will be more engaging for students

The discussion sessions that took place at round tables were seen as effective and really got everyone involved. Preparing at home for lessons before class allowed for richer discussion in school. One individual pointed out that sometimes it was hard, though it ended up offering a useful experience that helped them develop critical thinking(8).

4. Cooperative Education

Students noted that having collaborative lessons in the classroom encouraged them to participate and interact with their peers. Students pointed out that working with others in the class and exchanging ideas allowed them to support each other even amid the heavy workload.

5. Instructor Effectiveness

Experienced teachers tend to highlight the role of an instructor's area of expertise, their teaching skills and the way they are supportive of students. The reviews highlighted how the instructor has "valuable knowledge" and an "encouraging attitude." They appreciated the way instruction was given without criticism and the quick replies to any extra questions asked outside of classes.

Most students said they were satisfied with the course and offered few suggestions on how to improve it. Examples of helpful suggestions were added resources for understanding difficult methods, a greater focus on knowledge exchange among students and including group projects with individual assignments.

When classes were disrupted by the pandemic, a few students suggested that flexibility in both how and when they attend classes would be helpful, recognizing that different students may prefer either hybrid or alternative schedules. This guidance is popular now along with the move to adaptable and accessible methods in graduate education.

5. Discussion

The evaluation of the five-year course gives useful highlights regarding how graduate research methods courses are used in pharmacy and health sciences. It looks into what was learned, how it can be applied in the future and how these points fit into modern trends seen in teaching health services research methods.

New Curriculum Development and Current Importance

Due to this evaluation, we realize that DBA programs should keep updating their curriculum to keep up with shifts in the field. As research methods develop, they often conflict with the importance of covering core research concepts. Recently, researchers in health services have adopted new techniques to analyze data in practice, develop implementable solutions for healthcare and use artificial intelligence tools for research.

Since there is a gap between required and essential skills and the most recent trends, it becomes tough to help students understand both. Since the course unit consists of three credits, teachers must carefully choose the subjects and their scope. Different solutions can be looked at for the course in the upcoming iterations.

By giving the course more credit, you can ensure the classroom time is spent on the new techniques without abolishing essential elements of the subject. At the same time, this remedy has to be adjusted for the completion requirements of the program and how much work students should handle. As an option, by creating an advanced follow-up course ("Advanced Health Services Research Methods"), a student's learning path could begin with more fundamental study and follow up with the more specialized study offered in the next course(9).

It is also possible for an advanced course to rely heavily on practical work, where students might be required to execute the research ideas from the basic course. The approach would ensure students understood methods in theory and could practice them in real situations, helping such principles be remembered. In today's context, relevant subjects could address varied ways to gather real-world evidence, practical ways of organizing trials, advanced uses of mixed-methods and suitable uses of AI in health services research.

Having access to the collection of comprehensive health services research methodological literature allows teachers to diversify the curriculum and explain additional techniques to students in a well-organized manner. Even now, striking a good balance between exploring many or few methods is a hard task that keeps needing to be addressed as time goes on.

You should consider the modality of the education program

It is also crucial to look at course delivery modes, especially after the changes needed due to the pandemic. Students are expressing more interest in flexible classes, a shift that is seen across graduate education and classes. As a result, teaching this course has its own set of opportunities and difficulties, mainly because students must discuss and cooperate in groups.

When teachers had to teach synchronously online due to the pandemic, we learned that students could still interact successfully in remote classes. According to open feedback, there is some decrease in enjoyment among students when courses are held online which reflects that reproducing the benefits of in-person round-table talk may not be achievable in this type of environment. Many graduate students participate in graduate studies that mix online independent work with live online discussions.

In a discussion-based course such as HSRM, elements like lectures, readings and individual tasks may be delivered through distance learning, while in class, students work together on analysis and puzzle-solving. To do this, we

might retain the Stevens method's interactive lessons and make the schedule more flexible for students.

Still, introducing different ways of education makes it necessary to assess if the teaching is up to standard and if enough resources are available(10). To achieve similar outcomes in classrooms and through remote learning, the strategies and assessment tools should be carefully planned. Making high-quality multimodal content also demands a lot of professors' time and appropriate support from the institution for creating learning materials.

Thinking about the duration of each session and how sessions should be scheduled is worthwhile. While the three-hour training sessions give the group enough time to talk about many issues, more difficult aspects of the methodology can cause some participants to feel overloaded. Some students shared that holding classes in shorter and more frequent sessions might help them process and remember the information. The current view of cognitive load theory agrees with this idea since it suggests dividing complex learning into several short sessions might be more effective.

The Support for Faculty Members and Sustainability

Moving from a multi-teacher approach to one where a single teacher leads a course points to key aspects of course sustainability. The present approach based on one instructor provides similar quality and arranged content but could have issues with maintaining the course's continuity and ensuring that all aspects are taught by someone knowledgeable.

Depending on the field of study, research methodology requires faculty experts in various research techniques. Individual teachers may understand many teaching methods, but it is unusual for one instructor to equally know a lot about every method. Teaching in a group allows more knowledge on different subjects, though a solo instructor must update their expertise constantly.

Furthermore, when one person teaches all the classes, a lot of work is given to one individual and school continuity could be disrupted if the instructor is suddenly absent. Consideration for shared teaching approaches or setting up thorough course materials applies to the longevity of specialized graduate courses. Alternative plans for teaching should involve selecting substitute staff members, detailing course instruction and planning how to teach each lesson as a single module for remote learning.

6.Conclusion and Future work

This detailed review and summary of a Health Services Research Methods course at the graduate level offer useful advice for effectively teaching PharmD and health sciences students how to carry out research. Students indicated continual improvements in their performance and found the course structure highly satisfying for five years. I found that using discussions around a table with peers was very helpful in learning about diverse methods in a way that allowed me to fully understand them and I appreciated how the course Data reveals that students achieved what the course intended, with most students comprehension and use of the course topics being strong.

Courses can be developed in the future by paying attention to modern approaches, considering flexible ways to provide instruction and designing measures for the future. They show how graduate education is changing to allow more flexibility, rely on technology and adapt quickly to new learnings in different fields. Experiences shared in this evaluation could help faculty and administrators improve or design new courses for pharmacy graduate study, given that curriculum models are not easily found elsewhere. Claude might make errors when preparing his summary. Make sure your responses are correct.

Future Work

The results of this assessment suggest some new ways to strengthen teaching and learning methods in research-focused graduate education in pharmacy programs. We must address how a systematic curriculum overview can identify possible gaps in methodology, seek out new forms of education and improve how we assess the ability of students to conduct research and the results they achieve.

Such an initiative could look at matching the curricula we currently use with the growing needs for new teaching methods in health services research. As a result such mapping might note that we should introduce and cover topics such as modern real-world analysis, science-based applications and using AI in health studies. Ensuring the course covers skills founded in frameworks by ISPOR (International Society for Pharmacoeconomics and Outcomes Research) may provide a full overview of the skills needed in the industry.

Further research should focus on developing and screening different technologies for multimodal delivery. Making use of both recorded and live learning sessions offers students greater flexibility and still allows for teamwork. Doing this would mean creating the curriculum with care, possibly using learning objects, interactive activities meant for individuals and different ways to interact during classes. Evaluating the outcomes of learning from different methods would demonstrate which methods work best for specific students and for achieving certain educational goals.

Studying the effects of a course on both a person's research and career achievements is a meaningful area to explore in the future. Based on current trends, the main ways to evaluate methodological training look at immediate progress and satisfaction. However, examining the way this training affects researchers' achievements, ability to publish and career advancement would show if the training is truly effective.

Acknowledgement: Nil

Conflicts of interest

The authors have no conflicts of interest to declare

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