

Design and Evaluation of Scholarship and Research Orientation Sessions in Academic Pharmacy Practice Experiences

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ABSTRACT

OBJECTIVE: Evaluate the efficacy of educating academic Advance Pharmacy Practice Experiential (APPE) students on scholarship and research (S&R). We hypothesized that academic APPE students gain more knowledge in scholarship and research in comparison to non-academic APPE students.

METHODS: As a component of academic APPE rotation, all academic APPE students assigned by the office of experiential education per year (the intervention group) ($n = 11$) attended S&R sessions during the first week of their academic APPE rotation. Student volunteers from the same graduating class were recruited as the control group ($n = 12$). However, 1 student from the intervention group and 2 students from the control group were excluded from the analysis, leaving 10 students from each group. These sessions were taken in small groups of 1 to 3 once in their assigned rotation. S&R sessions included many topics that were based on a S&R manual. Upon completion of the sessions, a hard copy of a 10-question knowledge-based quiz was given to both groups at the same time. APPE students' knowledge about S&R were assessed via grading the quiz. The anonymity of the quiz was maintained by requesting students only to mention whether they are from intervention group or controlled group.

RESULTS: While control group averaged $49\% \pm 4.58$ on the quiz, the intervention group averaged $71.5\% \pm 5.77$. Statistical analysis was performed using SPSS software. Based on independent sample *t*-test, students who took the S&R session show significant increase in their quiz score.

CONCLUSION: Compared to the control group, S&R sessions helped academic APPE students to gain knowledge on S&R. The students also perceived that S&R sessions increased their interest in S&R.

KEYWORDS: Scholarship, research, academic, students, APPE

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Introduction

A growing number of US Doctor of Pharmacy programs offer elective academic Advanced Pharmacy Practice Experiential (APPE) rotations to provide students who are interested in academic pharmacy opportunities to get hands-on experiences in faculty roles and responsibilities.¹ Some also suggest that such experience may address the issue of shortage of pharmacy faculty candidate and prepare students to be “preceptor-ready.”^{2–4} Although there is a debate on whether this kind of APPE outside of medication use system is beneficial for student practice readiness, some argue that these experience have potential benefits for student development and a favorable impact on pharmacy faculty recruitment and retention.^{2,4,5}

One study found that students who did participate in scholarly experiences were more interested in an academic career, as well as if they had achieved authorship on a peer-reviewed journal manuscript during pharmacy school.⁶ However, in recent years there has not been an increase in the amount of

publications coming for colleges of pharmacy, even though new pharmacy programs are opening yearly. The low publication rate could be due to lack of training, insufficient forums to publish work, or misaligned motivation for scholarship among faculty.⁷ Having students who are well educated in research and scholarship could also lead to an increase in publication rates.⁶ Currently the most common published research is related to the area of scholarship of teaching and learning. One of the things that was considered a significant predictor of publications was being part of an academic health center.⁸ If there were increased opportunities for students to be able to do research and be published, there could be an influx in interest in academic careers.

The 3 main pillars associated with the life of an academician are teaching, scholarship, and service. One can argue that an ideal academic APPE would cover all 3 themes to the level the students can understand the basics of them. But practically it might not be feasible. Based on a report from Haines et al, there is significant variation in the curriculum content and assessment of academic APPEs. Furthermore, few programs require prerequisites from students prior to participation in an academic

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APPE, suggesting that student pharmacists may not receive training on these topics with similar quantity and quality.^{1,9} Most of the academic APPE or similar activities cover an extensive list of topics for teaching from instructional design, curriculum development, to assessment, and feedback strategies.¹ While research and service are as important as teaching for pharmacy faculty, especially considering their weight in promotion and tenure criteria, they are much less of a focus covered in this kind of experience. Especially for research and scholarship, an area that is not easily being explored as service due to limited resources and may be a less aware, could be a daunting obstacle for students who want to pursue academic position for their career. One of the academic APPE students wrote in the reflection demonstrated an overall interest in academic career however “The only drawback for me is the research area.”⁹

Many programs provide elective research APPE or longitudinal research experience to students as well.¹⁰⁻¹² However, the cohort that is interested in this experience may not be the same who participates in academic rotation. Often time, the focus of research APPE or similar program is emphasized on a particular research type, such as laboratory-based science research, scholarship of teaching and learning, or community engaged scholarship. And students may only contribute to 1 aspect of a research study, for example, data collection. For that reason, offering a more standardized training may better prepare student pharmacists to gain understanding of this pillar of academician.

To provide a thorough overview of research and scholarship related to pharmacy faculty’s role, we developed research/scholarship orientation sessions for all students who participate in academic APPE.

Methods

Scholarship and research (S&R) session as a component of elective academic APPE rotation

Some of the final year pharmacy students take academic experiences as an elective APPE rotation. These rotations are 6-weeks long. During their first week they are required to attend an orientation session that includes several components such as, organization of college, bylaws, committee responsibilities, program outcomes, teaching synopsis, and scholarship and research (S&R). The duration of each component of orientation sessions is 60 minutes per group. There were 4 groups throughout the year, totaling 11 students. The instructors (co-authors of this paper) were assigned to carry out the S&R sessions to all 11 academic APPE rotation students. These 11 students (intervention group) participated in sessions throughout the year; 1 to 3 students were in a group per quarter. Each group participated once in their assigned quarter.

S&R manual and S&R orientation session setup

The S&R manual (Supplemental Appendix 1) for the academic APPE students’ orientation were designed by the 2 instructors (Instructor A & B, the first 2 authors of the

manuscript). The components of scholarship and research manual is illustrated in Table 1.

In brief, topics such as pathway of research, types of research, the pharmacist’s involvement in research, grant process, IRB procedure, types of publications, ethics in research, and scholarship opportunities are discussed in the manual. Throughout the year the students were assigned to academic APPE rotations by the office of experiential education. Based on the APPE schedule, students will take academic APPE rotation orientation either individually or as a group. The orientation session consists of two 20- to 25-minute instruction sessions and two 5- to 10-minute question and answer sessions. The sessions were carried out by the 2 instructors who wrote the S&R manual. The sessions were conducted in the office of 1 of the instructors. During each session, materials such as a copy of S&R manual, a sample grant proposal, sample publications, abstracts, and other learning materials were provided to the students. The study material except a copy of S&R manual was returned to the instructors after the session.

Selection of the intervention group and the control group

The intervention group is all academic APPE students in their final year assigned by the office of experiential education. A computer system randomly placed students in the rotation if they had interest in the rotation and ranked it. Student volunteers from the same graduating class was recruited as the control group via sending an invitation e mail to the whole class except the intervention group. There were 12 control group students and 11 intervention group students initially.

Design of the survey

The survey consists of 2 parts. Part 1 of the survey is based on 5 multiple choice questions, which were designed to receive feedback on how academic APPE students perceive the S&R orientation session (Table 2).

Part 1 should only be filled by the academic APPE students (students who participated in the S&R orientation session). Part 2 of the survey is a knowledge-based questionnaire consists of ten questions (Table 3, Supplemental Appendix 2). There were multiple choice, short answer, and case-based questions on various components of the S&R sessions (Table 3).

Both the control group (the students from the same class that did not take academic APPE rotation) and the intervention group were required to answer part 2 of the survey. The purpose of the questionnaire is to see whether academic APPE students gained knowledge on scholarship and research compared to the control group.

Execution of the survey

Both groups (the intervention group and the control group) of students were given a hard copy of the survey at the same day, the same time (during lunch break), and the same place 3 weeks

Table 1. Scholarship and research (S&R) session set up.

SESSION	DURATION (MIN)	INSTRUCTOR	S&R MANUAL COMPONENTS
First instructional	20-25	A & B	Pathway of research; Types of research; Pharmacists involvement in clinical research; Grant application procedure; Outline of a research grant proposal; Outline of IRB application.
First Q & A	5-10	A & B	About grant proposal and IRB procedure. Students receive samples of research grant proposals.
Second instructional	20-25	A & B	Components of scholarship in academic pharmacy; Other scholarship activities; Publication types; Pharmacy students' contribution/involvement in peer reviewed publications; How to decide authorship in a multi-author article; Ethics in research.
Second Q & A	5-10	A & B	About publications, scholarship activities, and ethics. Students receive samples of different types of publications.

Type of S&R session, duration, the instructors, and the topics covered are illustrated.

Table 2. Students perception (part 1 of the survey) questions and answers.

QUESTION	STRONGLY AGREE AND AGREE % (N)	DISAGREE % (N)	NEUTRAL % (N)
1. Do S&R sessions improve students' knowledge in research pathway?	80 (8)	10 (1)	10 (1)
2. Do S&R sessions improve students' knowledge in scholarship components?	60 (6)	10 (1)	30 (3)
3. Do S&R sessions improve students' interest in academic career?	30 (3)	10 (1)	60 (6)
4. Do S&R sessions improve students' engagement in future research projects?	70 (7)	20 (2)	10 (1)
5. Do S&R sessions improve students' awareness of research ethics?	70 (7)	20 (2)	10 (1)

Part 1 of the survey was taken only by the intervention group. N=10. Each question was mutually exclusive of others and students were required to answer each of the question.

before the graduation. The anonymity of the survey was assured by requesting students not to write their name. In the presence of the instructor (corresponding author/principal investigator) in the room, another random student collected and shuffled the hard copies of the survey and return to the instructor. The students were required to indicate whether they are from the control group or the intervention group.

Inclusion and exclusion criteria

Eleven intervention group students and 12 control group students (student volunteers from the same class) were included in the study initially. Students who unanswered (left blank) either completely or a portion of part 2 (knowledge-based quiz) of the survey were excluded from the study. The students were required to mention whether they are from the control group or from the intervention group. The control group should not complete the part 1 (perception) of the survey. Either of these 2 parameters distinguish the intervention group surveys from the control group surveys. The students who failed to follow instructions were excluded from the study. Three students were excluded from the study due to not answering the survey questions completely, illegibility or not

following instructions. Out of the 3 students 1 is from the intervention group. The other 2 were from the control group.

Assessment

The knowledge-based quiz was graded by 1 of the instructors/the corresponding author of the manuscript and a percent score was given (Figure 1). There were 10 questions; each question was worth 10% points. If a student answers a question partially correct, partial credit (5%) was given. The instructor hand graded each question and students are required to answer all 10 questions.

Results

Statistical analysis on knowledge-based assessment was performed using SPSS software. Independent sample *t*-test was performed. Each group, N=10. Majority of academic APPE students perceived that S&R sessions improve their knowledge on Scholarship and research (Table 2). Eighty percent and 60% of the intervention group agreed on S&R sessions help them to gain knowledge on research pathway and scholarship components, respectively. Seventy percent agreed on S&R sessions improve their engagement in future research projects as well as their awareness of research ethics. However, only 30% agreed

Table 3. Academic APPE students' knowledge assessment (part 2 of the survey).

QUESTION NUMBER	QUESTION TYPE	S&R SESSION/MANUAL COMPONENT
1	Multiple choice	IRB application information
2	Multiple choice	IRB application information
3	Multiple choice	Research pathways
4	Short answer	Research grant proposal
5	Short answer	Authorship of a publication
6	Case-based	Authorship of a publication
7	Case-based	Research ethics
8	Case-based	Research ethics
9	Abstract-based	Type of publication
10	Multiple choice	Type of research

Part 2 of the survey was taken by both groups. N=20. Each question was mutually exclusive of others and students were required to answer each of the question.

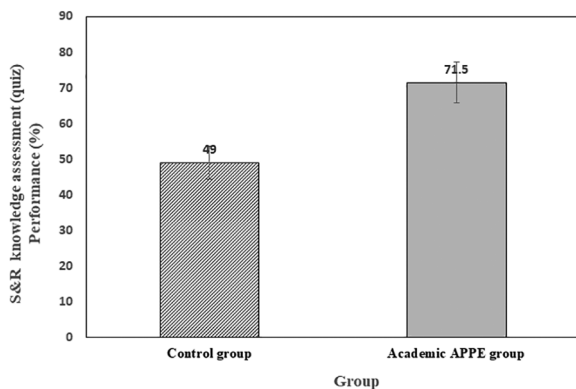


Figure 1. Academic APPE students' knowledge assessment on scholarship and research sessions. N=20. Average and SEM of control group=49% ± 4.58. Average and SEM of the academic APPE/intervention group=71.5% ± 5.77. $T=-3.052$ (18), $P=.007^*$, and 95% confidence interval of the difference is -37.9901 and -7.0099, $P=.007$. *Significantly different.

on S&R sessions being helpful in developing students' interest in academic career. The academic APPE students' knowledge on scholarship and research was assessed by grading S&R questionnaire (part 2 of the survey). While control group averaged 49% ± 4.58 the intervention group averaged 71.5% ± 5.77. According to the scores from the S&R questionnaire, based on an independent sample t -test, students who took the S&R session (intervention group) showed a significant increase in their score compared to the control group (Figure 1). $T=-3.052$ (18), $P=.007$, and 95% confidence interval of the difference is -37.9901 and -7.0099.

Discussion

During the first week of the 6-week academic APPE rotation, the students would attend various hour-long orientation sessions that would explain the components of the academic experience. The sessions would cover organization of the college, bylaws,

committee responsibilities, program outcomes, teaching synopsis, and research and scholarship.

In this paper, we describe our approach of providing uniformed training on this important topic of scholarship and research as a component of academic APPE rotation. This information will be helpful to provide some insights on providing standardization on designing academic APPE to ensure similar outcomes and quality between rotations. Previous studies have suggested that academic pharmacy rotations could provide students opportunities to experience and understand faculty roles.¹ One of the main roles of faculty is scholarship and research. Our study is focused on educating academic APPE students on the scholarship and research component during their orientation week of the academic APPE rotation.

One article looked at colleges of pharmacy that provided "academic toolkits" to prepare students for academic careers. AACP's Student Resident Engagement Task Force (SREFT) developed a toolkit with materials and provided them to students who were interested in academic careers. Eighteen institutions provided materials to their students on topics such as didactic coursework and academic-focused APPE rotations and only 1 institution provided its students materials on elective teaching-research APPE rotations.¹³

Although students were provided with these toolkits¹³ they found that there are still many pharmacy faculty vacancies and that it is important to continue educating students about teaching, scholarship, and service. If more students were given these toolkits or had options to attend a teaching-research APPE rotation, then more students might be interested in faculty positions in the future.¹³ Another study surveyed junior pharmacy faculty members on their experiences in college and knowledge of potential career options when they graduated, the results showed that exposure to academic careers and research related fields were low. If students do not have the opportunity to explore

research, scholarship, and academic careers, then they may not realize their potential interest in the various fields.¹⁴ Based on White et al's¹⁵ study, which surveyed pharmacy students and licensed pharmacists on the interest in academic career, 25% pharmacy students showed an interest in academic career. However, another study conducted by Eiland et al¹⁶ reported that around 6% of students were interested in academic career. In agreement with prior studies,¹³⁻¹⁵ 30% of our academic APPE students agree on the interest in future academic career. It is impressive that at least 30% of the students who took the 1 hour. S & R session has interest in academic career. Many other factors play a role in deciding future career options including students' financial need, available career options, peer-competition to obtain an academic position, and experience.

Haines et al¹ reported a study based on methods utilized by several colleges and schools of pharmacy to prepare students in future academic careers. Majority of schools (96%) utilized APPE rotations as their primary method. Academic-related experiences from 96 schools of pharmacy were evaluated.¹ Although some schools offer experiences on IRB (27%) and grant proposal writing (6%),¹ none of the experience involve S&R orientation sessions and providing comprehensive S&R manual.

Our study is unique because we have conducted Scholarship and research orientation sessions to the academic APPE students. In addition, we have provided students with comprehensive S&R manual, which includes information of grant proposal writing, IRB procedure, research pathway, types of scholarship, publication types, and ethics in research. We were the only ones to launch this type of comprehensive S&R sessions as a component of orientation to academic APPE rotation. Our study investigated the benefit of 1 hour. S&R session and provided materials for the purpose of increasing students' scholarship and research knowledge, ethics, and career interest. Hence our study provides novelty. Though they are pre-mature to decide on future career field, our S&R session benefit students' interest in scholarship and research and their knowledge as evident by the survey. Our results show that there are benefits from completing an academic APPE that involves S&R sessions and that these types of rotations can provide students information in areas they would not have been informed of otherwise. The intervention group scored significantly higher than the control group in the areas of pathway of research, IRB procedures, research ethics, and publication types. Scholarship and research sessions did improve student's overall knowledge and interest in scholarship and research. Current study only focused on the S&R sessions. In the future, a larger study will be carried out including majority of the orientation sessions mentioned above.

Conclusion

The majority of academic APPE students (intervention group) perceived that S&R sessions help them to gain knowledge in research ethics, scholarship pathway, and scholarship components. Although 30% of academic APPE students perceived that S&R sessions help them to develop future interest in academic career, compared to the control group, academic APPE group scored

significantly higher in the knowledge-based questions. The importance of S&R sessions in improving academic APPE students' knowledge on scholarship and research was evident.

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Author Contributions

WS designed the S&R manual and conducted the sessions, designed the research and the manuscript, wrote a major portion of the manuscript, created tables and the figure, and did the statistics. YZ contributed to the S&R manual and conducted the sessions, and wrote majority of the introduction portion of the manuscript. SL and AV conducted literature search, wrote some parts of the manuscript, and edited the manuscript.

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Supplemental Material

Supplemental material for this article is available online.

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