

# Faculty Attitudes Toward Required Evaluative Projects for Doctor of Pharmacy Candidates

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This paper describes evaluative projects required of seniors in an entry-level PharmD program and results of a study examining faculty attitudes toward the projects. A questionnaire was sent to 66 internal and external faculty; 57 (86.7 percent) were returned. Thirty-nine (68.4 percent) respondents had served as a project advisor, supervising  $5.4 \pm 5.7$  students and spending  $31.4 \pm 23.8$  hours working with them. At least 32 publications and 68 professional presentations resulted from approximately 400 total projects. Mean responses were on the agreement side of neutral for all items. Respondents agreed most strongly that required research-related courses and the project are important and that the project improves analytical and presentation skills. Those on faculty  $\leq$  six years tended to have more positive attitudes than senior faculty. Project advisors and internal faculty believed more strongly that statistics and research design courses impart research related skills. The project is generally perceived as beneficial by the faculty. The course could serve as a model for others considering similar required or elective offerings.

## INTRODUCTION

*To study the phenomenon of disease without books  
is to sail an uncharted sea, while to study books  
without patients is to not go to sea at all.*

Sir William Osler

The Commission to Implement Change in Pharmacy Education (CICPE) stated "While most professionals prepared by pharmaceutical education are not scientists, all need to use scientific knowledge and scholarly principles in solving problems. An understanding of scholarship is absolutely necessary if students are to embark on a professional career of life-long learning." (1)

Advancement of the profession of pharmacy depends on action by its practitioners to improve the well-being of patients and to document benefits that accrue to patients. Demands for proof of the benefit of all therapies and services are increasing daily. Thus, pharmacists should learn research skills to document the benefits of their services and the therapies they monitor. Pharmacists must also be able to critically evaluate the literature and solve patient care and other problems analytically. Further, advancement of knowledge regarding drug therapy is vital to improving the health of patients. For the profession to continue moving forward, creation of new knowledge should be an aspect of the life of many pharmacists. To transmit new knowledge, written and verbal communication skills are important.

Several papers have been written on research and communication skill development approaches in colleges of pharmacy (2-7). Innovative approaches have been used to develop skills in research evaluation (2-3), writing and critical thinking (4), experimental design (5), and written and verbal communication (6). Each of these represent important skills for pharmacists that should be nurtured in pharmacy students to develop a fully refined graduate. A study reported in 1988 found that less than half of colleges of pharmacy with doctor of pharmacy programs required a formal research project of their PharmD students though most programs had some required coursework in research related areas, particularly statistics or drug information/scientific literature evaluation(7). Attempts to teach research skills without requiring actual application may unfortunately be, as Osler stated, to not succeed at all.

Another study examined factors affecting pharmacy students' perception of, and attitudes toward, research related activities (8). An underlying purpose of the article was to determine what is leading to the shortage of pharmacy students pursuing advanced research careers and graduate education, a theme echoed by the CICPE (1). Results indicated that students who had been involved in research projects were more favorable to research and more confident in their research abilities (8). The CICPE believed that stressing scientific inquiry and problem solving, actively recruiting promising students to engage in research, and

providing curricular flexibility to allow students to pursue courses in science and research are successful strategies for recruiting students into graduate study(1). In their document on the entry-level curriculum, the CICPE stated that "Teachers must concentrate on the concepts on which science is based and on the importance of the scientific process in solving patients' problems" and that "Pharmacy school graduates must have a comprehension of scientific methods and be cognizant of their use to discover knowledge" (9).

Since 1988, all students (average of approximately 55 per class) in the entry-level Doctor of Pharmacy program at the University of Arizona are required to complete an evaluative project before graduation. The primary purpose of the evaluative project is to introduce the problem solving process and, in so doing, develop an appreciation for the complexities and rewards associated with resolving questions in a systematic and scholarly manner. The project course is the responsibility of the Department of Pharmacy Practice and Science. Formal presentation of the paper is a further requirement. The projects follow courses in statistics, research design, and drug literature evaluation which help prepare students for the undertaking. Though there are considerable administrative, financial, and time commitments required for success of the program, it is generally considered, though perhaps not by all, to be a beneficial venture for those involved.

#### DESCRIPTION OF THE COURSE AND COURSE MANAGEMENT

Students must submit a project proposal with introduction and methods by August 1 of their final year (graduation the following May). The student's project advisor (project advisors may be internal or adjunct "external" faculty) must approve the proposals before submission. Within one month after submission two faculty members review and grade the submitted protocols and provide written advice to the students and faculty mentors. Projects are accepted, accepted with revisions, or rejected. After final approval, the student may begin the project or submit it to an institutional review board if human or animal subjects are to be used. Completed projects are due May 1. At least two faculty members review, grade, and offer comments on the final paper. Finally, the students must formally present the study results to their classmates and attending faculty, using visual support, in 15 minute sessions. Faculty in attendance grade the presentations. Coordination of the reviews, setting up the presentation schedule, and grading of proposals and final paper demands considerable administrative detail.

Tangible benefits such as publication and presentation of project results have accrued to some of the students and faculty who participate in the projects. Other benefits are more difficult to measure and the costs have not been systematically measured. Since most faculty must publish papers and make professional presentations for advancement, the projects have the potential to be of benefit in this endeavor. Working with students on projects is also considered part of the service and teaching commitment by College administrators and thus provides some evidence for retention and advancement decisions. Quality work can lead to other recognition as well. Four students have received the American Society of Health-System Pharmacists Research and Education Foundation's Student Research Award and others have been recognized with research awards from The Upjohn Company. These successes brought

prestige to the students, their faculty mentors, and the College. Useful information has also been added to the literature as a result of the projects.

Conversely, the student projects can be very time consuming for both the student and advisor. Projects can take away from the clerkship learning experience, particularly as deadlines approach, and faculty may not believe the outcome worthy of their efforts at times when they should be focused on their own activities for tenure and/or promotion. Projects can also fail due to a wide variety of problems, creating frustration and worries about graduation for the student and advisor. Though a failed project can also be an important learning experience, it is not the educational outcome desired. While all projects do not turn out to be worthy of an attempt, another drawback is the lack of follow-through by some students toward publication or presentation of a quality project after it has been submitted to meet the course requirements and the student graduates. This fall off in production of what should be one of the important reasons for a faculty member to work with a student is compounded when data are taken by the student upon graduation, preventing the faculty advisor from submitting the work.

Several challenges occur in managing the projects. None are insurmountable but all require attention. One problem is overburdening of certain faculty. The faculty who tend to be more enthusiastic about the projects tend to attract students in unequal proportions. Also, those who teach in the preparatory courses (*e.g.*, research design) tend to draw an inordinate number for consultation on project methods for obvious reasons. Clinical faculty also seem to draw a larger proportion of the students for projects. To decrease this problem all Department faculty are asked to submit research ideas for students. Students receive collated copies of these ideas early in the process. Some faculty actively recruit students for projects they wish to complete.

Another problem associated with the faculty side of the projects is use of adjunct external faculty as primary advisors for the projects. Some of these faculty have limited research experience, reducing the guidance that can be provided. On the positive side, these faculty are often able to identify projects of real value to their place of work. Conducting such projects may relate better to projects most students could conduct in their future careers.

Students often encounter problems in determining appropriate project design (*i.e.*, the methods) and determining relevant statistical analyses in advance of data collection. This problem is addressed, in large part, by providing students with an extensive document on research design and protocol development (document available on request from the author), by using graduate students for research design suggestions, and through the project proposal review process.

Another problem encountered by students is choosing a project of appropriate scope so that it may be completed in the allotted time (usually about seven to eight months). Students and faculty advisors occasionally underestimate the time required to get projects approved and overestimate the number of study subjects or data sets that can be obtained. Students may also underestimate the cost of the project. They are instructed to expect to pay \$125 of their own funds for their project (roughly the cost of a major textbook). The dean occasionally makes some funds available for the projects and provides limited travel funds to

students who present posters at professional meetings.

A potential problem that surfaced in the past few years is overuse of survey research methodology. Certain students seem to believe surveys are easier to conduct than other studies, which may be true in cases of rapidly developed, poorly designed questionnaires. Overuse of surveys could also lead to survey "burnout" among those receiving questionnaires. To address this problem the course coordinator exercises some control over the sample students may survey and survey instruments undergo additional review. With more rigorous review students begin to find that developing a defensible and useful questionnaire can take more time than many other approaches.

Evaluative projects have the potential to benefit both students and faculty, but the cost can be high when required of all students. Some benefits are tangible while others are assumed and there may be differing opinions of the overall value of requiring such projects. The purpose of this study was to evaluate faculty member attitudes toward the senior project experience and to seek suggestions for improvements. Further, potential differences in attitudes between internal and external faculty, between newer and more established faculty, between those who have reaped the benefits of publication or presentations from the projects and those who have not, and between faculty who have served as project advisors and those who have not were explored. A secondary purpose was to publish this information so that faculty in other colleges might evaluate the results for consideration of requiring such projects in their curriculum. Knowledge of the pros and cons and the attitudes of faculty actively participating as advisors in these projects could allow for a more informed decision.

## METHODS

A questionnaire was developed to assess departmental faculty attitudes toward the senior project experience. Few faculty from the other department in the College participate in the projects so their opinions were not solicited. The questionnaire contained demographic and attitudinal items as well as opportunities for respondents to make written comments. Attitudinal items were ranked using a Likert-type response scale from 1 to 5 with 1 = strongly agree through 5 = strongly disagree. Comments on draft questionnaires were received from various faculty on two occasions and the questionnaire revised. For questions asking a numerical response (e.g., number of publications resulting from a student project) that were left blank, it was assumed that the response was zero.

The questionnaire was mailed in June of 1996 to all 23 internal department faculty (salary paid by university funds) and to a random sample of 43 external adjunct faculty preceptors, drawn from the list of all 172 external faculty. Previous service as a senior project advisor was not required for inclusion. A postage paid return envelope was provided to external faculty. Internal faculty returned the questionnaire directly to a third party to maintain anonymity.

Descriptive statistics were used to profile the respondents. The Student's *t*-test was used to evaluate differences between various groupings of respondents and their responses to the attitudinal items. A  $P < 0.05$  was assumed to indicate significant differences.

## RESULTS

Of the 66 questionnaires mailed, 57 (86.7 percent) were

**Table I. Response to attitudinal statements<sup>a</sup>**

Statement	Mean (SD)
1. There is sufficient time for most of our students to do a senior project	2.6 (1.2)
2. There are sufficient resources for most of our students to do a project	2.5 (1.1)
3. Project advising is an efficient use of faculty time relative to the learning outcomes for the students	2.3 (0.8)
4. The senior project experience is successful in developing students' research skills	2.5 (0.9)
5. The senior project experience improves students' writing skills	2.3 (0.8)
6. The senior project experience improves the students' presentation skills	2.1 (0.7)
7. The senior project experience improves students' analytical skills	2.1 (0.7)
8. The senior project experience has been successful in increasing scholarly output of the department	2.7 (0.9)
9. The senior project experience has provided participating faculty with valuable research assistance	2.6 (1.0)
10. Students receive adequate faculty support to conduct their projects	2.9 (0.8)
11. All students in Doctor of Pharmacy programs across the country should be required to conduct a research (evaluative) project	2.5 (1.1)
<i>The following required courses designed to impart research related skills (including critique and evaluation) are very important for our students</i>	
12. Statistics	1.7 (0.7)
13. Drug information and drug literature evaluation	1.4 (0.5)
14. Research design	1.8 (0.6)
15. Senior project	2.1 (0.9)
16. Research electives (research clerkships, independent study courses)	2.1 (0.8)

<sup>a</sup>The scale was 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, 5 = strongly disagree

returned. Of these 38 were from external faculty (88.4 percent return rate) and 19 from internal faculty (82.6 percent return rate). The highest degree obtained of 12 (21.1 percent) respondents was a BS, 38 (66.7 percent) had an MS or PharmD degree, and seven (12.3 percent) held a PhD. Of the internal faculty, eight (42.1 percent) had clinical practices and the rest did not. Thirty-seven (64.9 percent) of the respondents had been on the faculty from 0 to 6 years and the rest seven years or more.

Thirty-nine (68.4 percent) respondents had served as a primary advisor in the senior project course. Of those working with the students on the projects, the mean (SD) number of students supervised was  $5.4 \pm 5.7$  (range 1 to 20). The average number of hours spent working on each project with the students was  $31.4 \pm 23.8$ . When asked to describe the factors that affected the amount of time spent with students, common themes expressed by 10 or more faculty were:

- the student's motivation and level of independence;
- the student's level of preparation/capability/analytical/organizational skills;
- the complexity/nature of the project; and
- the student's writing ability.

Five faculty stated that their level of interest in the projec

or how much it helped them or their practice site was a factor. Other issues affecting the time spent with students cited by three or fewer faculty respondents included: difficulty in recruiting patients, use of human subjects, human subjects committee approval time, unforeseen complications, the faculty member's availability, whether the student was living in the same city as the advisor, how organized the faculty member was with the student, and whether the student was doing a clerkship with the advisor. Two said they spent as much time as needed.

Nineteen faculty (12 internal and 7 external) reported that projects on which they advised had resulted in publications and/or presentations at professional meetings. Nine of the 19 faculty reported that projects they supervised had resulted in 23 instances of both presentation and publication of the project. Eighteen reported that 45 of the senior projects had resulted in a presentation at a professional meeting and six of the 19 faculty indicated that nine of their projects resulted in a publication. Thus, since three faculty answered "yes" rather than providing a numerical value and since nonresponders, external faculty who were not surveyed, and faculty who have moved out of the system may have also had publications and presentations, at a minimum there were a total of 32 publications and 68 presentations at professional meetings as a result of the senior projects. There have been approximately 400 projects conducted during the time period that projects were required (not counting 1996 projects as the final publication/presentation outcome will take time to develop).

Table I shows the responses to the attitudinal items on the questionnaire. All mean attitudinal responses were on the agreement side of neutral. The modal response was two (agree) for all but statements 8, 9, and 10 where it was three (neutral) and statement 13 where it was one (strongly agree). Table II shows statistically significant differences in attitudinal responses between groups.

Respondents were asked to describe any other benefits they thought came from requiring the students to participate in the senior project experience. Three respondents thought it broadened the students' perspectives and four thought it enhanced communication skills, particularly with other health professionals. Five respondents thought it a confidence builder that enhanced ability to take responsibility for difficult projects. Three others suggested it was a resume builder that could prepare students for other projects (e.g., residency project). Two thought it helped the students solve real world dilemmas that could help practice sites solve internal problems and two others thought it enhanced time management skills. One thought it developed resourcefulness, another thought it developed planning skills, and another thought it developed skills in assessing needs and in developing innovative ideas for the practice of pharmacy.

Respondents were also asked for recommendations to improve the project experience. There were many suggestions, few of which were repeated by different faculty. One recommendation made by seven faculty was to have a four-week clerkship in the fourth year just for the project or to schedule time off from clerkships to conduct the project. Three or more faculty made the following recommendations: provide competitive grant support for projects, start the projects earlier, require that all projects be clinically focused or important to the profession, have the students work in groups, and enhance the timeliness and quality of proposal review by internal faculty.

**Table II. Significant differences in attitude among respondent groupings**

Statement Number <sup>a</sup>	Groups	Group Mean (SD)	Group Mean (SD)
2	No/Yes <sup>b</sup>	2.3 (0.9)	3.0(1.4)
6	YrFac <sup>c</sup>	1.9(0.7)	2.6 (0.7)
7	YrFac <sup>c</sup>	1.9(0.7)	2.4 (0.6)
8	YrFac <sup>c</sup>	2.5 (0.9)	3.2 (0.7)
9	YrFac <sup>c</sup>	2.4 (0.9)	3.0 (1.0)
12	Advise <sup>d</sup>	1.6(0.6)	2.0 (0.8)
12	Int/Ext <sup>e</sup>	1.5(0.6)	1.9(0.7)
14	Advise <sup>d</sup>	1.6(0.6)	2.1 (0.7)
14	Int/Ext <sup>e</sup>	1.5 (0.5)	1.9(0.7)

<sup>a</sup>Statement number corresponds to statements in Table I

<sup>b</sup>Respondents with no publications or presentations agreed significantly ( $P = 0.05$ ) more than respondents whose students had published or presented their projects.

<sup>c</sup>Respondents on the faculty 0 to 6 years agreed significantly ( $P < 0.05$ ) more than respondents on the faculty seven or more years.

<sup>d</sup>Respondents who had served as advisors agreed significantly ( $P < 0.05$ ) more than respondents who had not.

<sup>e</sup>Internal faculty agreed significantly ( $P < 0.05$ ) more than external faculty.

Other recommendations by two or fewer faculty included: provide better guidelines for project development; better integrate didactic coursework to proposals in the research design course; provide counseling and assistance with statistics; develop awards for top papers; make sure projects can be completed in the allotted time; have projects presented as posters in addition to verbally (to gain poster presentation skills); pair internal and external faculty as advisors; have students participate in a limited manner on several projects before starting their own; greatly increase background, resources and time; enhance commitment of all faculty in the process and spread the load; decrease the length of student presentations; make it an elective rather than required; change to either true research, a few small written projects or one major written project; provide research design and scope of project programs for preceptors; provide formal education to students on communication and presentation skills; make sure all external faculty get a chance to submit project ideas to the students; reduce variability in depth of the projects; and don't allow the students to conduct surveys.

## DISCUSSION

Faculty respondents generally agreed that there are benefits to requiring the senior projects, though not as much so to them or the department. University administration and groups such as the CICPE(1) are of the opinion that all faculty have a responsibility to generate and disseminate knowledge through scholarship. It appears that both internal and external faculty generally embrace such a philosophy and are willing to spend the time to pass on the rudiments of this responsibility to the students. Faculty also appear to believe that there are costs involved and some appear to believe that the costs may exceed the value of the projects. Further, though the survey response rate was high, there remains the potential for nonresponder bias in the results.

With the mean value for all attitudinal items on the agreement side of neutral and the modal response agree or better on all but three items, there appears to be support for

the projects and for courses developing research and evaluation skills. The faculty agreed most strongly (2.1 or lower rating) that all of the required courses and the project are important in imparting research skills to our students and that the project course improves analytical and presentation skills. Previous research showed that faculty and administrators tended to believe that PharmD curricula should include orientation to research, but not necessarily application<sup>^</sup>). Though it is difficult to make comparisons due to the length of time since that study and differences in study design, it may be that the more positive attitude toward projects by the faculty at the University of Arizona is due to either the fact that we have been doing the projects for some time, that we are a research oriented university, or both. Thus, results from this faculty may differ from those of other colleges and schools of pharmacy involved in, or planning to add such projects in their curriculum.

There were several interesting differences in attitudinal response between the groupings of faculty. Those who had not had a publication or presentation resulting from a student project believed more strongly that there were sufficient resources for most of the students to do a project. The group with no publications/presentations would be comprised of those who had never worked with a student (n = 18) along with those who worked with students but never had a presentation/publication (n = 19). The faculty actually carrying a project to presentation/publication must deal with the difficulties of helping the student find resources or provide the resources themselves. Faculty advisors not garnering publication or presentation from the projects could possibly have a different attitude toward the project outcome and be satisfied with a different level of project, a level of complexity that might not require as many resources. Those who have not participated as advisors must form opinions on sufficiency of resources from hearsay or make a guess.

Respondents on the faculty six years or less tended to have more positive attitudes about the value of the projects than did faculty with lengthier affiliations. Specifically, they believed more strongly that the project course developed student analytical and presentation skills, increased department scholarly activity, and provided faculty with valuable research assistance. The latter two differences may reflect senior faculty members' more established research careers. That is, senior faculty may believe that their time could be more effectively spent working with graduate students, fellows, or laboratory assistants in terms of research output.

Those respondents who had served as advisors and internal faculty believed more strongly that the statistics and research design courses were very important in imparting research related skills to our students. Those who had not served as advisors would again be operating on hearsay or making a guess as to the value of such courses. Internal faculty, generally with greater research experience than external faculty, may have a better appreciation of how such courses benefited their own understanding of research processes.

Several of the recommendations made by respondents are already being acted on and others are being considered for improvement of the senior project experience. External faculty will be offered a short course in research design this year, students are now allowed to start their projects during the third year (and are encouraged to do so), and requests

for project proposal reviews are sent out via e-mail to department faculty with the project title listed. Fifteen projects were submitted early this year and faculty have been quick to volunteer to review projects. Lastly, a program is being developed for statistical consultation for the students. An adjunct faculty member who taught statistics for many years has volunteered to work with the students on study design and statistical analysis.

Though the publication and presentation rate is fairly good, it would be beneficial if more projects resulted in such outcome. As the CICPE stated, "knowledge is of little value unless it is disseminated."<sup>(1)</sup> Methods to enhance dissemination outcome will be considered in the future. However, it is unlikely that the majority of projects would end up being of publishable quality due to the many problems that can occur, not the least of which are limited funding and time. It should be noted that publication and/or external presentation of the project is not currently an objective of the project course and faculty were not asked in the survey whether such outcome should be an objective of the project experience.

My personal experience with the senior projects has been better than average. Over a four year period I worked with seven students. Five publications and five presentations at national meetings have resulted. Only one student conducted a project that did not result in a presentation and/or publication. One factor I consider important to this success is the making of a covenant with the students who approach me for a project. Each is told they are expected to present and publish their work. They are told it is likely they will work harder than most students and high expectations are set. They are also told that if they fully complete the submission of the paper they will be first author and that if I do so the order will be switched. So far only one student has opted to let me do the final submission and revision work. Finally, each is required to leave either the original data collection forms or a copy with me before graduation. I believe it unlikely that these approaches would be successful with all students though.

Other colleges and schools of pharmacy could adopt similar evaluative project requirements or variants for their students. This report has provided guidance and some expectation of the benefits and problems associated with the required projects as well as an idea of how faculty might respond.

## CONCLUSIONS

The required student evaluative project at the University of Arizona College of Pharmacy is generally perceived by the faculty to be beneficial. The costs of conducting the projects have not been evaluated and it may be best to simply assume they are of value in meeting the stated objectives of the project course. A reasonable number of projects have resulted in publication and presentation, though not all faculty have benefited in this manner. Enhancing these desired outcomes for worthy projects could be of benefit to the faculty and students. Whether the students find the projects to be of value after graduation and whether the projects lead students toward graduate school and the conducting of research in their practice careers will be examined in the future.

*Am. J. Pharm. Educ.*, 61, 73-78(1997); received 8/27/96, accepted 11/14/96.

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