Redesign of a Drug Information Resources Course: Responding to the Needs of Nontraditional PharmD Students

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The required two credit drug information resource course in the Doctor of Pharmacy program was redesigned to meet the needs of the nontraditional PharmD program. The self-study drug information modules in the "Clinical Skills" program from ASHP and the computer-assisted drug information software (DI-Learn) from the University of Arizona were utilized. The structure of the course was changed from a focus on didactic teaching (weekly two hour lectures) supplemented with drug information laboratory to self-study learning, computer-assisted instruction, and recitations. The recitations emphasized a systematic approach to information requests. Both assigned questions and questions from the student's practice site were discussed. The students were also introduced to sources of information available on the Internet. An assignment to evaluate the accuracy of drug information from pharmaceutical sales representatives was added. Another addition to the course was an evaluation of ethical issues with a drug information question received from the practice site. The significant redesign of a drug information course was viewed and evaluated as a positive enhancement and is especially suitable for nontraditional PharmD students.

INTRODUCTION

Duquesne University School of Pharmacy has offered a PharmD degree since 1968. The AACP Commission to Implement Change in Pharmaceutical Education has called to address the needs of pharmacy practitioners regarding the ability to earn the PharmD degree(1). Duquesne University thus changed its existing program to allow pharmacy practitioners the opportunity to earn the degree on a part-time basis in 1993. Duquesne University during the Fall of 1995 offered the PharmD program for full time traditional

students (who are postbaccalaureate and not entry-level students), part-time pharmacy practitioners, *i.e.*, nontraditional students, and fifth year pharmacy students who had elected to track into the PharmD program while completing their BS degree requirements, *i.e.*, trackers.

A required two credit Drug Information Resources course was offered in the Doctor of Pharmacy program. This course was intended to address the topics of a systematic approach to handling drug information requests, keeping current with the literature, ethical and legal issues with drug information, drug information quality assurance and the formulary review process. These components are consistent with the consensus goals for drug information courses developend(2). The other topics recommended by the 1991 panel of drug information faculty, such as drug literature evaluation and adverse effect management, are covered in other distinct courses at Duquesne University. All of the PharmD students would subsequently take these other distinct courses.

Traditionally, the Drug Information Resources course was taught to all PharmD students using weekly two hour lectures supplemented with a drug information laboratory. During the laboratory, students would complete assigned drug information questions. We determined that a new paradigm to adapt to the needs of the nontraditional PharmD student would be worthy of our efforts. In particular, the needs of adult learners regarding less campus and more self-study time were considered(3-4).

COURSE REDESIGN

During the Fall of 1995, the instructional strategies used in this course were changed to respond to the needs of the Nontraditional PharmD students. Circumstances also required that the course be offered to our full time traditional and tracking students. This was the only option for the drug information course during the Fall of 1995. The total number of students in the course was thirty-three.

The ASHP Clinical Skills Drug Information Modules 1 and 3 were adopted as the required self-study resources(5-6). Students were asked to identify questions from their practice site in addition to receiving assigned drug information requests. The DI-Learn computer-assisted drug information software from the University of Arizona was also used as an instructional tool(7). The actual class time was changed from two hour weekly lectures to four three hour recitations. Assignments were expanded to include the use of the Internet as a source of drug information. An exercise in which students evaluated the accuracy of drug information from a pharmaceutical representative was also added and students were asked to interview the representative as if they were being detailed on a product. The third new assignment was to evaluate ethical issues involving drug information questions.

The specific course schedule is found in Appendix A. Less emphasis was placed on examinations for assesment of student learning. Grading was based on: assignments (30 percent), recitations (30 percent), self study continuing education exams (30 percent), and a final traditional type of exam (10 percent).

EVALUATION OF COURSE

The course was evaluated for the three groups of PharmD students: nontraditional (n = 11), post-BS full time traditional (12), and tracker (n = 10) students. A pretest and posttest comparison of the three groups was made (Table I).

Table I. Comparison of pretest to posttest results[a]

	Pretest		Posttest		
	Mean	**SD**	**Mean**	**SD**	***P***
Trackers (n = 10)	8.5	1.58	9.7	1.70	0.1030
Full timers (n = 12)	7.58	1.98	8.67	1.37	0.1028
Nontraditional (n = 11)	8.64	1.69	10.45	1.44	0.0096

[a]Maximum possible score is 15 points.

P value calculated using two tailed paired t-test.

All three groups noted an improvement in their posttest scores. However, only the nontraditional group had a statistically significant improvement in posttest scores. A two tailed paired f-test was used to test for statistical significance.

The overall course evaluation was positive for all groups using a five point Likert scale. The nontraditional students consistently were more favorable for all aspects of the course than the other two groups. In general the tracker students were the least favorable toward the course. Testing for statistically significant difference among the groups was performed using the Kruskal-Wallis nonparametric analysis of variance test. Comparison of mean course evaluations for questions pertaining to instructional methods is found in Table II. There was a statistically significant difference among the groups. Comparison of mean course evaluations for questions related to overall benefit is found in Table III. With the exception of question 1 relating to satisfactorily accomplishing course objectives, there was again a statistically significant difference among the groups. Comparison of mean course evaluations for questions relating to overall likes is found in Table III. Again there was a statistically significant difference among the groups.

Testing for statistically significant difference between the groups was also performed using the Mann-Whitney two tailed test. This data is not presented. The presence of statistically significant differences was also noted between the groups. The most highly significant differences were noted between the trackers and the nontraditional students followed by the full timers and nontraditional students and lastly the trackers and full time students.

DISCUSSION

The nontraditional group of students preferred the revised instructional methods and appeared to gain more benefit from the course than the other two group of students. The more significant differences between the nontraditional and tracker students is probably a reflection of their pharmacy practice experiences as opposed to their previous undergraduate coursework. None of the nontraditional students had previously taken an undergraduate drug information course. The baseline pretest results found in Table 1 do not support the idea that previous coursework was a confounding variable. Less differences are noted between the full timers and the other groups. The full timers are composed of both students with extensive pharmacy experience and recent pharmacy graduates with little pharmacy experience. The trackers, students with little pharmacy practice experience, had more difficulty with the drug information assignment requiring use of their practice setting. This was not

Table II. Comparison of mean course evaluation among groups for instructional methods[a]

	Students			
Question	**Trackers (n = 10)**	**Full timers (n = 12)**	**Nontraditional (n = 11)**	***P***
Appropriate methods	2.9	3.8	4.6	0.0020
Preference for methods	2.9	3.38	4.7	0.0021
Facilitated learning	4.0	4.69	4.7	0.0038
Effective team teaching	2.89	3.54	4.6	0.0062
Conducive to learning	4.0	4.38	5.0	0.0012

[a]1 = strongly disagree to 5 = strongly agree/favorable.
P value calculated using Kruskal-Wallis non-parametic ANOVA.

Table III. Comparison of mean course evaluations among groups as to overall benefit[a]

	Students			
Question	**Trackers (n = 10)**	**Full timers (n = 12)**	**Nontraditional (n = 11)**	***P***
Objectives accomplished	3.8	4.0	4.6	0.051
Feel benefited	3.73	4.15	4.7	0.007
Develop DI skills	3.91	4.23	4.7	0.047
Respond DI questions	4.09	4.08	4.8	0.026
Aware of liability issues	3.73	4.15	4.7	0.002
Familiar with DI resources	3.82	4.0	4.7	0.023

[a]1 = strongly disagree to 5 = strongly agree/favorable.
P value calculated using Kruskal-Wallis non-parametric ANOVA.
DI = drug information.

Table IV. Overall comparison of mean course evaluation among groups[a]

	Students			
Question	**Trackers (n = 10)**	**Full timers (n = 12)**	**Nontraditional (n = 11)**	***P***
Enioved course	3.09	4.0	4.8	0.0002
Recommend course	3.0	3.92	4.8	0.0007
Performance of instructor	3.55	4.54	4.5	0.0034
Ranking for long term value[b]	3.55	2.69	1.5	0.0001

[a]1 = strongly disagree to 5 = strongly agree/favorable.
[b]1 = top 10 percent to 5 = bottom 10 percent.
P value calculated using Kruskal-Wallis nonparametric ANOVA.

surprising. These students were allowed to complete another assigned drug information question if one from their practice setting was not identified. The classroom discussions for the trackers were also less dominated with self-learning motivation but more with attitudes of "tell me," "what is the answer" or "where do I look." The traditional students also required a more structured learning environment such as with the evaluation of the pharmaceutical representatives. For these students, a scheduled interview time was made between a group of students and a representative. In contrast, the nontraditional students had easy access to a pharmaceutical representative and were able to schedule their own interview on their own time. The nontraditional students also expressed a desire to broaden their use of drug information resources and appeared more attuned to the process of learning.

There were no significant differences between the pretest versus posttest scores in the various groups except for the nontraditional students. This may be of some concern in that the desired outcome for the redesigned course was to enhance process skills. A possible explanation could be the limitation of the testing instrument which utilized true or false and multiple choice questions and it may not have fully assessed process skills. The testing instrument was a similar assessment tool used in previous drug information courses which utilized a traditional design. It is also possible that a Type II error could explain the lack of statistical differences for the trackers and the full timers. Performance on the testing instrument was found to be highly individualized within the nontraditional, tracker, or full-time traditional types of students. We did not compare student performances on the exercises and assignments for the three groups. It is expected that especially if measuring nonprocess skills, each group of students will be composed of the entire spectrum of academic performers. In general the students achieved better test scores on the posttest.

The redesign of a Drug Information Resources course which met the needs of the nontraditional PharmD students was felt to be positive and acceptable. The approach described and evaluated supports its suitability for adult learners. It is not totally clear if the approach was successful in achieving the desired outcomes nor if the redesigned course was at least as effective or more effective than the previous traditional design. The statistical evaluation of the rede-

signed course was not intended to measure if enhanced process skills were achieved in comparison to a traditional design. It is possible that this group of adult learners were more highly motivated than a general population. Thus it may not be unusual that the perceptions of this design were positive. It is unclear how other nontraditional PharmD programs address this issue. However, a recent survey of drug information course curricula in schools of pharmacy only indicated that about 16 percent of respondents use some form of self-study instructional resources (8). It appears that the majority of curricula use traditional teaching methods.

CONCLUSION

The redesign of a required drug information course is viewed as a positive enhancement and is especially suitable for nontraditional PharmD students. The evaluations showed that the redesign of the course was positive for all groups but in particular was more favorably received by the nontraditional students.

Am. J. Pharm. Educ., **61**, 306-309(1997); received 8/22/96, accepted 5/26/97.

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APPENDIX A. COURSE SCHEDULE (FALL SEMESTER)

	Subject	**Assignment**
Week 1	Course introduction, pretest, syllabus and assignments	Module 1 (Unit 1)
Week 2	No class	Module 1 (Unit 2 & 3) Two categories of questions: identification/ foreign drugs & dosing.
Week 3	Recitation: Module 1 and identification/ foreign drug & dosing questions.	Due: Module 1(Unit 1- Two categories of questions. Turn in CE exam.
Week 4	No class	Module 3 (Units 1-3) Three categories of questions and use of Internet
Week 5	Recitation: Module 3 (Units 1-3) and IV compatibilities, ADRs, and drug interactions questions, and Internet use.	Due: Module 3 (Units 1-3). Three categories questions & Internet use.
Week 6	Schedule pharmaceutical representative interviews	Module 3 (Units 4-5) Pharmaceutical sales evaluation and review formulary module in DI-LEARN.
Week 7	Recitation: Module 3 (Unit 4 & 5) Pharmaceutical sales evaluation.	Due: Module 3 (Unit 4-5), Pharmaceutical sales evaluation. Turn in CE exam.
Week 8	No class	Ethics readings and identify & evaluate ethical issues in drug information request.
Week 9	Recitation: Ethical dimensions of drug information questions.	Due: Ethical evaluation of drug information request.
Week 10	Final Exam/posttest/ evaluations	