

# Use of Conferencing Software for the Distance Education of Renal Pharmacotherapy

Sirada Maphanta

*Faculty of Pharmaceutical Sciences, Naresuan University, Phitsanulok Thailand*

Curtis A. Johnson<sup>1</sup>

*School of Pharmacy, University of Wisconsin-Madison, 425 North Charter Street, Madison WI 53706*

Pharmacy educators have become increasingly interested in distance education methods. This interest has been stimulated by the advent of the nontraditional doctor of pharmacy program that relies heavily on various means of distance technology. At the University of Wisconsin-Madison, renal pharmacotherapy, a one-credit course required in the nontraditional Pharm.D. program, has been offered to off-campus students since 1996. Non-degree candidates in Thailand also have participated in the course. The instructor utilized FirstClass®, a computer conferencing software program that allows students and faculty to interact electronically in discussion groups. This paper summarizes the favorable initial three-year experience with this course by presenting an overview of the pedagogical methods used, data from student evaluations, and faculty and student workload issues. The application of this instructional technology at international locations also is discussed.

## INTRODUCTION

Distance education methods have been used for over 100 years for a variety of academic, vocational and recreational courses. In the past, distance education involved minimal interaction between participants. With today's rapidly evolving interactive communication technology, learning experiences via distance education have become more interactive and accessible, and can occur at any time and in any place. The Internet has become firmly established as an educational tool(1). Academic degree programs are now available entirely via distance education. For instance, graduate degrees in nursing are available from the University of Minnesota(2) and the University of Tennessee-Memphis(3). Postgraduate training in clinical epidemiology is provided by the International Clinical Epidemiology Network(4). Interest in the nontraditional doctor of pharmacy degree, the opportunity for alternative on-campus learning experiences, and the worldwide demand for continuing professional development have spawned interest in distance education within pharmacy.

Nontraditional degree programs are built on the premise of allowing students to work at a pace and location suited to their lifestyles. The University of Wisconsin (UW) has introduced a nontraditional PharmD program (NTPD) that contains several courses in pharmacotherapy, one of which is a one-credit course entitled renal pharmacotherapy. This paper will describe the first three-year experience teaching this course with conferencing software called "FirstClass®," a technology that allows teachers and students who are separated by time and space to be able to create interactive learning groups.

## Renal Pharmacotherapy Via Distance Education Technology

Renal pharmacotherapy was taught previously using traditional methods, in the on-campus postbaccalaureate PharmD program. It was first taught via distance education technology

during the 1996 fall semester as a non-credit option for pharmacists wishing to enhance their knowledge of renal diseases and pharmacotherapy management. Thirteen non-degree students enrolled, including four pharmacists from Thailand. The opportunity for enrollment in Thailand was created as part of the University of Wisconsin's participation in the U.S. Consortium for the Development of Pharmacy Education in Thailand(5). With the implementation of the NTPD program in 1997, the course became incorporated into its curriculum. Fourteen students completed the course in 1997, and 16 students completed the course in 1998. Because of course enrollment limits, no Thai students participated in the course during 1998. Most students were enrolled in the NTPD, however a small number of U.S. and all Thai students enrolled solely for personal professional development.

## Hardware, Software, and Other Materials

To participate in the course, students had to have a computer with the FirstClass® software to communicate with the UW campus host server. The software, available in PC and Macintosh format, was mailed to the students, or students could download the software from the UW Division of Information Technology (DoIT) FirstClass® website. PC requirements included at least Windows 3.1 or Windows 95, at least 2MB of free disk space on the hard drive, and at least 2MB of available RAM. Macintosh requirements included a Macintosh Plus or newer Macintosh computer, system software 6.0.3 or later, at least 1MB of free disk space on the hard drive, and 600k or more of free memory after starting the Macintosh. Students also needed a connection to an Internet service provider in order to access the campus server. Course instructional materials includ-

<sup>1</sup>Corresponding author.

ed a textbook (*Primer on Kidney Diseases*, Academic Press) and printed handouts. The handouts contained references to sites on the World Wide Web, selected to enhance learning on given topics. The textbook and handouts were purchased by mail. DoIT provided technical support via web documentation and resources and a 24-hour telephone help desk. However, most students found the software intuitive and easy to use. Occasionally, the instructor posted a user tip online.

### **FirstClass® Program and Course Organization**

FirstClass® is a computer conferencing product that borrows from both electronic mail and bulletin board technologies. It allows an instructor to organize messages, readings, and information into conferences or folders. Permissions can be set by the instructor to determine who can read, write, and edit the files in the conferences. The class was organized into two conferences (discussion groups) to facilitate communication with the instructor and with other students. Each conference contained a maximum of eight students. Utilizing a resumé feature of the program, students and faculty created a personal resumé that could be viewed by all other participants. This activity fostered some sense of knowing fellow students and the instructor in the absence of any face-to-face interaction.

Students were authorized to send and view messages within their own group, however they were authorized only to view the messages created within the other group. Each Friday, the instructor introduced the pathophysiology and pharmacotherapy topics and readings for the following week. The course followed the topic schedule presented in the Appendix. The instructor posted discussion questions to each group, and the students were responsible for posting their answers and comments to their own conference during the following week. The instructor and students read and commented on postings frequently throughout the week. The instructor gave a summary of each week before introducing the next week's topic. The weekly schedule was strictly followed to ensure students did not fall behind in the course. In 1997 and 1998, to help illustrate the topics being covered during the week, a student from each conference was asked in advance to prepare a patient case, most likely based upon personal experience, then lead the case discussion. All discussion occurred asynchronously, permitting maximal personal flexibility in course participation. The course grade was based on a midterm and final examination, course participation and leadership of the case discussion. Examinations were distributed via e-mail and were considered to be take-home exams. Students were on their honor to do their own work.

One advantage of FirstClass® is the convenience of having distant guest faculty join the discussion. Each year the course has been offered, visiting faculty members from other U.S. schools of pharmacy have participated during selected weeks. These faculty members were able to log onto FirstClass® from their own locations at times convenient to them.

### **Student Course Evaluation**

At the end of the course each year, students were asked to complete and return an evaluation form. Over the three-year period, 57 percent of course evaluations were returned. Student opinion was measured on a rating scale of 1 (very poor) to 5 (very good). Overall student opinion of the course was very favorable. Student responses to selected evaluation questions are presented here. Ease of communication between course participants was rated high ( $X=4.54 \pm 0.65$ ). Students felt they were a part of the class and felt connected to the university ( $X=4.19 \pm 0.40$ ). Upon completion of the course, students felt they had

increased their knowledge of renal pathophysiology and pharmacotherapy ( $X=4.54 \pm 0.58$ ), and had achieved a depth of understanding of the material ( $X=4.25 \pm 0.59$ ).

Computer accessibility was an important factor determining the level of course participation. Sixty-nine percent of student respondents reported using FirstClass® from home. Ninety-six percent of the students logged onto FirstClass® more than once a week; 52 percent two to four times per week; and 44 percent more than five times per week. A small number of students reported having difficulty logging on to the FirstClass® network during the course. Log-in problems tended to occur early in the course. As students gained familiarity and problem-solving skills, few problems persisted. Ninety-five percent of the students rated the ease of using FirstClass® as good or excellent, while 21 out of 22 students (87 percent) described the convenience and feasibility of FirstClass® as good or excellent. Students indicated technology support was very important to be able to participate in the course. They suggested printed documentation and a usage guide for the FirstClass® program would have been the most desired additional technical support.

In the most recent two years of the course (1997-1998), the case discussion led by students was added into the course activity, and was worth 10 percent of the course grade. Using the same rating scale, students reported case discussion experience was valuable from the perspective of being discussion leader ( $X=4.18 \pm 0.53$ ) as well as discussion participant ( $X=4.19 \pm 0.66$ ).

Shifting of the learning responsibility to the students was perhaps the most challenging characteristic of the course for the students. Students were responsible for reading assignments from the textbook or for acquiring knowledge from other sources in order to participate in the discussion. This type of active participation differs markedly from the traditional classroom lecture format in which students passively listen to the instructor. As a result, the workload required by the course was reported as heavy by a majority of students (66 percent). There were an equal number of students (17 percent) who described the course as an appropriate workload or as an excessive workload. In comparison to traditional on-campus courses, the students rated this method of learning and teaching as very positive ( $X = 4.23 \pm 0.65$ ). Students rated their overall experience using FirstClass® technology in this course as highly favorable ( $X = 4.2 \pm 0.71$ ). Of 24 respondents to the question, Would you take another course taught via FirstClass?, 21 responded in the affirmative, one responded in the negative, and two were undecided.

### **Implications for Faculty Workload**

The use of FirstClass® provided individualized instructor-student interaction throughout the semester. This positive teaching-learning experience came at the expense of increased instructor workload. Preparation for the course began in the summer with the identification of the students enrolled. Handout materials, textbooks and FirstClass® software were distributed to students no later than two weeks prior to the beginning of the semester. Students then had two weeks to install the software, become familiar with its use and to complete their resumé. During that time, the instructor and students were engaged in problem-solving activities to ensure all students were ready to participate fully when the semester began. During the semester, interaction with the students occurred far more frequently than with a traditional one-credit lecture course. The average time spent on-line by the instructor was approximately three hours per week. Preparation of handout materials and other course-related resources was greatest during the first year of the course. However, annual revisions and

examination preparation and grading represented significant additional time investment in the course. Traditional university workload assessment tools may not currently work well for distance education teaching efforts in that these tools are designed for live classroom activity with larger groups of students. Experience with this course indicated that conferences of more than eight students would be difficult to manage, and that overall course enrollment exceeding 15 to 20 students would be very difficult for a single faculty member given the amount of individualized communication with students.

### Application to International Students (Thailand)

The features of FirstClass® technology allowed the possibility to offer this course for international students. The opportunity initially was created for Thai pharmacists as a part of the U.S. Consortium for the Development of Pharmacy Education in Thailand. Informational and registration materials were distributed in Thailand, resulting in four Thai pharmacists enrolling in the course in 1996. Four additional Thai pharmacists enrolled in the course in 1997. All Thai students enrolled as non-degree candidates and paid University of Wisconsin tuition and distance education fees.

A beneficial feature of the FirstClass® program for Thai students was the asynchronous discussion. Each participant worked at his or her own pace while preparing electronic contributions to the conference. Since Thailand is separated from Wisconsin by 12 time zones, there would have been limited opportunity for real-time discussion to occur. Although the language issue could have created a potential communication barrier, the asynchronous discussion also minimized this obstacle by giving each student enough time to work on the assignment until becoming comfortable with creating and submitting the responses. The Thai students were expected to participate fully in the course in a manner comparable to their U.S. counterparts. During 1997, the Thai students served as case discussion leaders and participants. After participating in the course via FirstClass®, the Thai students indicated that this cross-cultural learning experience with American classmates and an American instructor was valuable and enjoyable.

Difficulties with computer technology in Thailand were an intermittent but important barrier. Access to the UW FirstClass® server was entirely dependent upon a local Internet provider. Therefore, students required effective local Internet service. The Thai students experienced some intermittent difficulty accessing the Internet resulting in reduced frequency of class participation. Therefore, to gain fully the benefits and experience from a course taught with heavy reliance upon Internet access, there must be reliable computer technology infrastructure that permits full participation of international students.

As the pharmacy profession and pharmaceutical education in Thailand are facing dramatic changes, and as the clinical role of pharmacists is being introduced into Thailand's health care, Thai pharmacists are urged to participate in continuing education in order to gain knowledge and to achieve their new professional role. As in the U.S., many pharmacists find it difficult to leave their job to go back to school and pursue another degree. Distance education methods provide another possibility for pharmacists to acquire knowledge and new experiences.

### CONCLUSION

The University of Wisconsin three-year experience of teaching and learning renal pharmacotherapy via FirstClass® technolo-

gy resulted in a favorable outcome for students and instructor. The features of FirstClass® allowed interactive communication with off-campus students, resulting in an effective active learning experience. Participating students reported a positive and valuable experience. Increased workload for both students and faculty was one of the most challenging characteristics of this course compared to traditional on-campus lecture courses. Access to computer technology and local Internet service was needed for students to participate. This instructional technology makes possible the participation of international students, and can easily be used for non-credit continuing education.

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### APPENDIX. TOPIC SCHEDULE

- Week 1 Renal anatomy, physiology and function
- Week 2 Renal anatomy, physiology and function (continued)  
Case study
- Week 3 Acid-base problems
- Week 4 Fluid-electrolyte problems, diuretics
- Week 5 Fluid-electrolyte problems, diuretics (continued)  
Case study
- Week 6 Glomerular disorders
- Week 7 Diabetes and the kidney  
Case study
- Week 8 Acute renal failure and drug-induced renal disease  
Case study
- Week 9 Examination
- Week 10 Acute renal failure and drug-induced renal disease (continued)  
Case study
- Week 11 Chronic renal failure  
Case discussion
- Week 12 Chronic renal failure (continued)  
Case discussion
- Week 13 Chronic renal failure (continued)  
Case discussion
- Week 14 Dialysis outcomes
- Week 15 Antibiotics in dialysis patients  
Case study
- Week 16 Examination