Anatomy of a Pharmacy School Startup: Part 3

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ABSTRACT. This is a history of the decisions made and steps taken to build a school of pharmacy. It is based on observations and notes kept in a diary as well as correspondence and reports that were generated in creating the school. This article is the third of five and covers formation of the administrative team, creation of a technology-based curriculum, development of a nontraditional doctor of pharmacy program, and development of a combined MBA and doctor of pharmacy degree. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <http://www.HaworthPress. com> © 2004 by The Haworth Press, Inc. All rights reserved.]*

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INTRODUCTION

Year 3 was the realization of the planning in Year 2. The technology began to develop and have a measurable impact in the classroom. Content developed for use in the traditional curriculum was repackaged and delivered for the first time to a cohort of nontraditional pharmacists, and both students and faculty began to see the plan become reality.

DEVELOPMENT OF THE ADMINISTRATIVE TEAM

At the end of the second year, the faculty size had reached 13 with a staff of 6. More importantly, the administrative team was forming with the addition of Richard Stull as Associate Dean, Otto Wachsmann as Director of Experiential Education, and Tom Ellington as Director of the Drug Information Center. The administrative team was completed in January 1998, when Evan Robinson joined the Executive Committee as Director of Distance Education. The Executive Committee also included Ms. Mary Lou Stottlemyer, Executive Assistant to the Dean.

With the administrative team completed, it was time to begin implementation of several initiatives that would greatly expand the school's impact in the area of pharmacy education and significantly increase the complexity of our overall mission.

CREATION OF A TECHNOLOGY-BASED CURRICULUM

The initial plan submitted to the American Council on Pharmaceutical Education described the role that technology would play in the creation of the School of Pharmacy. From the beginning, the plan was to incorporate an emphasis on technology when it was appropriate. In Year 3, we evaluated the extent to which the use of technology was effective and efficient.

The growing body of research on the infusion of information technology into education is clear: students must feel comfortable with the tools of the Information Age if they are to be successful in rapidly changing fields such as health care. Computers have become indispensable to pharmacists and other health professionals as they struggle to become proficient at managing the growing bodies of information being introduced on a daily basis into pharmacy, medicine, and other health-related fields.

The first vision statement drafted for the School of Pharmacy reflected a strong commitment to the infusion of information management technology

into the curriculum. It was anticipated very early in the design of the curriculum that the use of information technology would be the defining quality of the educational program. The new health professions building and the recruitment of faculty comfortable with an information-rich environment were designed to accommodate that goal (Appendix A). It was anticipated that the most effective and efficient strategy was to shift some of the responsibility for information infrastructure from the school to the students. This encourages the students to become personally accountable for the maintenance of the technology (something that they will do in practice), and it allows the school to concentrate its limited resources on maintenance of information databases and on faculty development (institutional functions). For example, students could purchase a popular drug reference subscription such as *Facts and Comparisons* for $125 per year, or the same computer database could be mounted and maintained on the local area network (LAN) for $450. Students benefit from a centrally maintained data resource that is accessible from within the building and from remote locations via remote access connections.

At a very basic level, faculty were expected to invest time in the development of high quality instructional materials before the lecture began. The result was better designed and integrated content. Faculty were formed into teams, consisting of faculty with complementary skills and knowledge and specialized staff who were trained to visually and technically prepare Web-based materials to maximize the learning process. The presentation of Web-based materials to the student before the lecture began permitted students the opportunity to review the material and share in the learning strategy.

Students who entered the lecture hall with a copy of the faculty member's slides and notes in hypertext format challenged faculty to move from being the *sage on the stage* to being a facilitator of learning. Most faculty did not arrive at our school with the skills or the ability to use the unique learning environment effectively. Very few had experiences with a model different from a 50-minute block of spoken information. Students were often as unprepared as the faculty for the learning environment and naturally assumed that if they had a copy of the notes they could pass with less attention, which was often exhibited in the form of the sending of e-mails in class, participating in chat rooms, and Internet surfing. They quickly learned that faculty freed from having to stand behind a fixed podium were often standing next to them in the classroom, asking for their opinion of the materials that were on the Web page. Students were now expected to engage in dialogue with faculty and each other. Faculty, for their part, were encouraged to assume that *knowledge transfer* would be accomplished via the Web and, as a result, were able to experiment with often unorthodox approaches to learning. Students with laptops could be expected to explore for unanticipated answers in the classroom. Teams of students

could be formed in the classroom or in adjacent conference rooms and asked to report back to the entire group on a treatment strategy or approach. Online testing became routine, and both faculty and students benefited from the instantaneous feedback that the grading software provided.

The faculty and administration of Shenandoah University did not view the emphasis on technology as a substitute for sound educational content. The School of Pharmacy did, however, embrace the concept that information technology can and should be integrated into the academic lives of both faculty and students for the enrichment of the learning process. The innovative program design provided for easy access to information for teaching, learning, and, most importantly, communicating with one another. This freedom could only be achieved, however, through a uniform requirement that students purchase and use laptop computers.

Implementation of the technology initiative was started in Year 2 of the program because we wanted to ensure that the faculty had created enough quality Web-based material to justify the additional cost to the students and the university. The policy governing technology was authored January 17, 1997, and approved shortly thereafter by the university administration.

Prior to implementation of the technology initiative, the School of Pharmacy had placed 55 Pentium® workstations in the computer laboratory for use by both traditional and nontraditional students. In addition to the space allocated to the workstations, ample open seating and tabletops were created for students to use with laptops. The fixed workstations remained after implementation of the laptop requirement, but the numbers were gradually reduced from 55 workstations to 35 due to a desire on the part of students to use their laptops. Thirty-five workstations were maintained for use by students who did not have their laptops and for the nontraditional students participating in the Executive Weekend Technology Seminars. Workstations are leased for a two-year period, and half are replaced each year to maintain the power and utility of the workstations.

Students in both the traditional and nontraditional pathways were required to have a computer of sufficient power to manage the applications deemed critical by the faculty. In the case of traditional students, this was achieved through the use of a $600/semester technology fee that covered the cost of a 2-year laptop computer lease and support. After the first two-year lease period, students turned in their old laptops and received new laptops that contained newer software and typically a more powerful configuration.

We conducted an evaluation of wireless technology in May 1997 to determine the feasibility of replacing the original twisted wire pair technology with wireless but did not feel that wireless technology, which had previously only been used in large warehouse settings with low bandwidth and capacity,

would be sufficient to meet the needs of 70 laptop users accessing the system simultaneously. The decision was made to stay with twisted wire pair Ethernet technology until the reliability, speed, and cost factors of wireless were improved.

The first laptops arrived on June 28, 1997, and were formatted, tested, and prepared for distribution to the students in early August 1997. Because we implemented the program in Year 2 of the school startup, we decided to equip the first class that had started in 1996 with a laptop for 3 years. All subsequent classes and the second class to arrive (August 1997) leased a laptop for two years. At the end of two years, the laptops were returned and the students received a new laptop for two more years. At the end of the second lease period, the students were free to keep the laptops for the residual value or return them to the computer vendor. To accommodate some students who arrived with laptops, we permitted a small number to use existing computers that were comparably configured. Of the original 131 students, 11 students elected to purchase the laptops and 120 elected to rent. We equipped 13 faculty with laptops and acquired 4 laptops for placement in the Health Professions Library as backup units in situations where student laptops failed or were being repaired. Both student and faculty laptops received the following standard software configurations:

- Netscape browser
- Groupwise (e-mail)
- MS Office 1997 Professional Edition
- MS Windows
- McAfee Antivirus

In addition to installed software, each student was provided free access to the following databases:

- Iowa Drug Information System
- Lexicomp
- Clinisphere
- Silverplatter
- Micromedex
- Medline
- Merck Index
- USP-DI

Shenandoah University was one of the first schools of pharmacy to require laptops of all students and to integrate their use into each phase of the curricu-

lum. Planning for maximizing this educational tool included opportunities in the curriculum for students to increase their use of information technology each year that they were in the program, culminating in extensive use of these resources during their fourth (experiential) year. In the first year, students participated in a 3-hour laboratory each week for 16 weeks. Here they became familiar with a suite of software tools, including Word® for word processing, PowerPoint® for the creation of slides, and Netscape Communicator® for browsing the World Wide Web. Students were also given electronic mail accounts on the School of Pharmacy e-mail server. During the second year, the students received a second three-hour computer laboratory that emphasized the use of a variety of very powerful proprietary databases (e.g., MicroMedex, Lexicomp's Clinical Library, etc.) and the Health Sciences Library databases. The emphasis in this laboratory was on the effective and efficient use of the clinical problem-solving databases that would be used in the next semester, when students began the first of three semesters of integrated course work. Students received the last formal computer laboratory in the third year. That lab consisted of instruction in the use of spreadsheets, databases, and proprietary statistical packages to analyze clinical outcomes data.

Information technology was also the mainstay of the nontraditional education strategy. The information infrastructure that was constructed for use in the traditional pathway was repurposed to meet the needs of pharmacists in the nontraditional pathway. Pharmacists enrolled in the nontraditional program were required to return to the campus only four times in two years of study. The balance of their program was provided over the Internet, supplemented in some cases with information delivered at regular intervals via compact discs. These students had access to the same selection of proprietary databases as students in the traditional pathway. In place of physical interaction, the nontraditional students became very adept at Internet-based forms of communication such as e-mail, chat rooms, and threaded discussion forums.

In addition to acquiring new knowledge, it was expected that this emphasis on information management would lead to the development of a new breed of pharmacist who would acquire an impressive array of computer skills and information channels that would permit continued expansion of their knowledge base once they completed their formal education.

Evaluation of the first year of laptop use at Shenandoah University School of Pharmacy found students reporting that they brought their computers to the school an average of 3 days a week and averaged 2.4 hours of computer use a day (Appendix B). Use of computers was slightly higher for second-year students than for first-year students, and a large percentage reported bringing their computers to class five days a week. Students reported that they used their laptops most frequently in the classrooms, followed by the computer lab-

oratory, the lounge, and the library. The most frequent use of the laptops when in the Health Professions Building was accessing the World Wide Web to download lecture notes and slides, followed by word processing, electronic mail, and slide preparation. When outside the building, the most frequent use was word processing, followed by electronic mail, accessing the World Wide Web, and slide preparation. The indication of these last findings is that students generally reserved resource-intensive applications (e.g., downloading files) for the Health Professions Building, where they had access to high speed data connections (multiple T-1 lines) and used the laptops for local applications (e.g., word processing) when outside the building. Seventy-eight percent of the respondents to the survey reported having and using a local Internet service provider (ISP) for remote access.

Students provided a number of suggestions for improving access in the upcoming school year, and many of those suggestions were implemented in subsequent years. One major effort was the implementation of online testing. Several software products were evaluated and one selected for implementation. Computer-based testing permitted students to self-assess using test items drawn from a test bank, allowed for more rapid return of graded tests, and provided faculty with extensive item analyses to enhance the quality of the testing. Use of computer-based testing was also viewed as a way to better prepare students for the computer-based format used in the NAPLEX.

The first year was not without problems, as the survey confirmed. Students objected to the cost of the $600/semester technology fee. Most equated the technology fee with the cost of purchasing a laptop, and, from this perspective, the cost was high. In subsequent years, the administration made a stronger effort to describe the benefits of the technology fee in terms of:

- Technical support (e.g., laptop technician and systems administration)
- Software support (e.g., help desk)
- Insurance (extended two-year warranty and replacement)
- Proprietary databases
- Consumables.

It came as a surprise that switching to electronic notes and slides uncovered unanticipated "soft costs" in such things as the consumption of consumables. Students had unrestricted access to nine high speed laser printers located throughout the health professions building and both toner and paper were free. The result was liberal printing of notes, e-mail, slides, and other printed materials. The average student would print heavily in the first few weeks of each semester, typically averaging 200 pages per person per month, but the printing would rise to even higher levels in the weeks immediately before the end of the

semester as the students printed assignments, slides, e-mail, and old notes. Some students routinely exceeded 1,800 pages in a single month. The printing would drop to negligible levels between semesters and over the summer. Printing continued to increase each year until the administration established a print limit and print counter software. While the rate of printing did slow, it did not decline, probably as a reflection of students sharing their print allocation. It also resulted in students complaining that the "arbitrary" limit was not realistic and prevented them from having access to much of the curricular material. While this appeared to be more of an inconvenience than a barrier, it may have been a problem for students for whom English was a second language and those with learning disabilities.

One positive result of the laptop requirement was that students (and eventually preceptors) acknowledged that our students' ability to make clinical decisions was enhanced through access to the Internet and online databases. Student response to the question, "My ability to make clinical decisions is enhanced through access to the Internet and online databases" on the Laptop Survey was the highest of the ten questions concerning attitudes toward the policy, and it tended to edge higher with each passing year. The 2002 Laptop Survey contained responses from all 4 classes (P-1 to P-4). P-1 and P-2 students rated their responses on the 5-point Likert scale as 4.1 (1-5, with 5 reflecting agreement). P-3 students rated their response at 4.5 and P-4 students at 4.3. Similar responses were found on two related questions, "I feel the laptop enhances my education" and, "My knowledge of computers has expanded since I received my laptop." Students were not as pleased, however, with the hardware. Hard disk failures, early cracks in screen hinges, and slow processing speeds led to several changes over the years the students first were required to have a laptop:

1. Increased the number of high speed printers in the health professions building
2. Purchased a limited number of free Internet service accounts to be used by fourth professional year students while on rotation in selected areas outside Winchester
3. Earlier and enhanced training for students in the use of proprietary databases
4. Changed laptop manufacturers
5. Changed hardware configuration (e.g., replaced floppy drives with CD-RW drives and additional hard disk capacity)
6. Expanded the number and availability of Ethernet outlets, eventually switching to wireless access
7. Introduced a three-hour computer lab focused on lessons learned as part of the Introduction to Pharmacy Computer Laboratory.

The last remedy was designed to encourage students to assume responsibility for maintaining and protecting their laptops from recurring problems resulting from abuse, poor system maintenance, and damage from computer viruses.

In the spring of 1998, a second evaluation of wireless technology was conducted using an entire class of students who were provided with wireless Personal Computer Memory Card International Association (PCMCIA) cards for a two-week evaluation period. The response from the students was extremely positive, and an evaluation by university IT staff concluded that the wireless technology had substantially improved since our last evaluation. Concurrent with expanding into previously unused shell space, the school adopted wireless technology in January 1999. Prior to implementing the wireless technology, we had installed a total of 600 twisted wire pair Ethernet connections. The individual cost for each connection, including labor, materials, switches and routers, was $125 for a total system cost of approximately $75,000, exclusive of servers. The total cost of the first 8 antennas and related hardware was $14,400. The cost of PCMCIA cards, whether wired or wireless, was the same. We later installed two additional antennas to handle higher volume traffic in the two main lecture halls.

Students quickly adapted to the wireless environment and were frequently seen changing classes with their laptops cradled in the crook of their arm and still logged onto the network. We also learned of students who pulled into the drive in front of the building on weekends when the school was closed to download files. One student even asserted that he had accessed the network from a McDonald's over a mile from the building, although this was never independently corroborated.

NONTRADITIONAL DOCTOR OF PHARMACY PROGRAM

Planning for the nontraditional doctor of pharmacy (NTDP) program began in October 1996 with administrative meetings and progressed to a formal planning process in January 1997 with the formation of an advisory panel consisting of pharmacy practitioners, representatives from professional associations, and faculty. The panel's charge was to explore the provision of nontraditional education and to recommend a strategy for delivering the program to interested pharmacists.

NTDP Time Line

January 1997   Formation of Nontraditional Doctor of Pharmacy Planning Committee

February 1997	Focus group with pharmacy practitioners
March 1997	Draft curriculum and marketing strategy
July 1997	Survey of pharmacy practitioners
July 1997	Curriculum approved by pharmacy faculty
September 1997	Creation of NTDP Advisory Committee
December 1997	Program approval by Shenandoah University Board of Trustees
January 1998	Program startup funding from anonymous donor
January 1998	Program director hired
June 1998	Planned implementation date
September 1998	Actual implementation date–first cohort of 29 enrolled

Program Development

A survey was mailed to 869 pharmacists in a 4 state area in July 1997 at the request of the nontraditional doctor of pharmacy advisory group (Appendix C). Two hundred fifty-seven surveys (30%) were returned by the cutoff date. The purpose of the survey was to seek input from practicing pharmacists concerning educational programming (e.g., nontraditional degree and certificate programs) and to assess market demand.

As expected, most of the responses were from the four states from which the mailing lists were drawn (Virginia, Maryland, Pennsylvania, and West Virginia). Interestingly, however, responses were also received from 29 other states and the District of Columbia. This is a reflection of those pharmacists who may have their primary license in one of the four study states but now practice in other parts of the country. Another finding was that a majority of those responding practice in relatively large metropolitan areas (over 50,000 inhabitants). One hundred forty-eight (63%) of the 236 who responded to the question reported that they practiced in a municipality of over 45,000. This finding is important when the availability of an educational infrastructure (e.g., teleconferencing, Internet access, etc.) is considered. The chances of finding an infrastructure suitable for supporting a distance education program increases with the size of the municipality.

The potential audience for certificate and degree programs was evenly divided between males and females, with the average being 39.6. One hundred ninety-four indicated a desire to pursue a nontraditional doctor of pharmacy degree, while 133 indicated an interest in a certificate or a certificate combined with a degree.

The most popular topics for certification are listed in the table below.

Certificate Programs

Diabetes Care	75
Pain Management	60
Infectious Disease	57
Pharmacy Management	52
Pharmacokinetics	52
Drug Information	52
Nutrition	51
Respiratory Care	41
Geriatric Care/Administration	41
Cardiovascular Care	39
Intravenous Home Therapy	39
Managed Care	39

When asked to indicate the factors that would be most important in the decision to pursue a certificate program, most listed flexible scheduling (e.g., use of self-paced instructional materials), convenience (e.g., close to home), and cost as important factors. Not surprisingly, self-instruction materials led the list for pharmacists wishing to obtain advanced certification.

One hundred ninety-four pharmacists indicated a desire to obtain a nontraditional doctor of pharmacy degree. A strong majority (177, 91%) indicated a willingness to pursue the degree within the next two years. They indicated that two years would be the appropriate length for a program and that they would be willing to spend $4,500/year for a part-time program. When asked to list the areas they perceived as weaknesses in their personal skill set, they listed pharmacokinetics first, followed by physical assessment and clinical training. The most popular curricular pathway identified was disease management, followed by infectious disease and geriatrics.

When asked to check the methods of instruction they favored in the nontraditional program, 164 listed videotapes, followed closely by self-instruction workbooks (160), the Internet (96), lecture (65), and audiotapes (44). Respondents were asked a series of questions relating to computer use, beginning with, "Do you own a personal computer?" Seventy-seven percent responded positively. Of the remaining 56 respondents, 52 indicated a willingness to purchase a computer if necessary for participation.

It is apparent that there was strong interest among the pharmacists surveyed for advanced certification and degrees. It must be remembered that this survey was mailed to a subset of the pharmacists in the four states. The original sur-

vey was mailed as part of an admissions recruitment effort and may not have been received by all practicing pharmacists in those states. Despite the obvious limitations of the survey, a significant number of pharmacists were interested in pursuing certification and in joining a nontraditional doctor of pharmacy program within the next two years. The initial numbers were above those necessary to fill the first two classes of nontraditional students projected for the first year. It was equally apparent from the survey that pharmacists preferred distance education methods of instruction to traditional lectures offered on a college campus. That did not diminish the importance of live lectures; it simply implied that the respondents felt that compatibility with their work/family routines was more important. Pharmacists recognized the need for additional instruction in pharmacokinetics, physical assessment, and clinical practice areas–those areas that have expanded over the past 10-15 years and serve as a basis for disease state management. Disease state management areas (i.e., diabetes, infectious disease, and respiratory care) were listed relatively high by both pharmacists interested only in advanced certification and those interested in pursuing a nontraditional doctor of pharmacy degree. Those areas also made up a significant amount of the content included in the integrated curriculum being developed for the traditional doctor of pharmacy program.

Finally, pharmacists indicated a willingness to use distance education technologies (i.e., videotapes, workbooks, and the Internet) in their pursuit of advanced certification and degrees. This finding, coupled with the relatively large municipalities reported by the respondents, raised the possibility that even more advanced delivery mechanisms could be employed in the design and delivery of the Shenandoah University School of Pharmacy program. The results of this survey were used to shape and form the program proposal and subsequent goals and philosophy.

The results of the survey were reviewed by the advisory panel, which recommended interviewing pharmacists currently enrolled in existing nontraditional doctor of pharmacy programs to discuss specific issues such as program length, content, delivery mechanisms, and ease of access. A focus group was convened, and additional opinions were sought in February 1997. The results of the survey, focus group, and advisory panel recommendations were incorporated into a final proposal that was adopted by the faculty of the School of Pharmacy on July 1, 1997, and endorsed by the President of Shenandoah University on September 29, 1997 (Appendix D). The proposal was subsequently endorsed by the Board of Trustees on December 3, 1997.

Program Design and Philosophy

Phase I (4 months) of the program focused on orientation of the students to the technology and the instructional strategy. It involved a series of executive weekends spread over a two-month period. The goal was to introduce the students to the technology and the basics of physical assessment and therapeutic monitoring and to allow the students time to interact with the program faculty and one another. The 30-member cohorts were divided into 7-member teams that would serve as a reference group for the entire 2 years. Individual components of Phase I included:

- Orientation to technology
- Data collection techniques
- Principles of pharmacokinetics
- Basics of therapeutic monitoring
- Drug literature evaluation
- Participation in standardized patient assessment (SPA).

Phase II (16 months) consisted of student participation in four integrated courses consisting of five therapeutic modules each. Each integrated course was modeled after the traditional doctor of pharmacy program Web-based materials. This phase used a blended instructional strategy involving:

- Individual study involving local content (e.g., CD with slides and audio lectures)
- Individual interaction with online databases
- Team interaction
- Participation in cohort activities involving a virtual faculty member.

Phase III (4 months) was the experiential phase of the program and consisted of a minimum of between one and three rotations. Pharmacists in the program were encouraged to use locally available sites to reduce travel and to enhance the relevance of the rotation.

The original technology strategy was based upon the following precepts:

- Seamless access to campus and Internet-based resources regardless of remoteness of the experiential site
- Two-way interactive audio/video desktop conferencing meetings
- Synchronous or asynchronous project meetings and study groups
- Online electronic discussions, one-on-one or one-to-many

- Projects focusing on solving real problems in collaboration with students locally or anywhere we have experiential sites
- Use of electronic resources such as World Wide Web information sources, including real-time access to campus and global materials
- Use of digitized lectures or discussions, electronic films or libraries; access to comprehensive databases of primary (e.g., patient management data) or secondary (e.g., Medline) research materials
- Problem-solving exercises addressing real problems linked to current events (e.g., disease state management case studies)
- Facilitated practice research conducted jointly by faculty and learners.

Modifications to the Original Plan

Changes were made to the original proposal for the nontraditional program prior to the enrollment of the first cohort. Many of these reflected resource limitations and others reflected practical necessity. Some of these changes included:

- Elimination of teleconferencing as one form of synchronous communication
- Reductions in the original cohort projections
- Elimination of a laptop requirement in favor of a suitable configuration philosophy
- Substitution of virtual for core faculty.

Reconsideration of Teleconferencing

One of the original technological approaches that was discarded early was teleconferencing between the School of Pharmacy and students at remote locations. Enrollment in the nontraditional program dictated, to a great extent, the shelving of teleconferencing between the campus-based faculty and remotely located students. Each cohort, while enrolling large numbers from Maryland, Pennsylvania, West Virginia, and Virginia, always included a large contingent of pharmacists from states throughout the nation and, in some cases, Canada. The high cost of videoconferencing, particularly through dedicated gateways into other states and countries, precluded routine use of videoconferencing. The result was a heavier emphasis on Web-based instruction and content distributed via compact discs at two-month intervals. Both Web-based and CD-based materials were created from materials developed for the traditional doctor of pharmacy program.

Enrollment Projections

The initial start date and enrollment projections for the nontraditional program were modified during the spring of 1998 to better refine the business model. First, it was agreed that a program initiation date of September 1998 rather than June would permit more time to create the Web-based materials and to ensure recruitment of a full 30 members.

Another change made to the enrollment strategy was both in the number of students enrolled and the frequency of enrollment. Initially, the program was scheduled to enroll 4 cohorts per year at 3-month intervals starting with cohorts of 30 and increasing by 6 each enrollment period to a final stage of 48 per cohort. The frequency of enrollment was cut from four times per year to three times per year to allow more time for preparation of materials for delivery to enrolled pharmacists. Content in the traditional program was revised annually, and the addition of four cohorts, each dictating additional content revision, editing, and updating, proved too ambitious for support staff and unnecessary from a delivery perspective. It became obvious early in the implementation that revising Web-based materials three or four times a year would be too labor intensive and could lead to missed production target dates.

Laptop Requirement

The first two cohorts within the nontraditional program were required to lease the same laptop computers that the traditional students used within the School of Pharmacy. It was thought at the time that the standardization of the technology would benefit everyone involved, students, faculty, and staff alike. The reality of this turned out to be that the benefits of on-site standardization were not benefits to the nontraditional student and, in fact, turned out to be a hindrance. Maintenance of laptops on-site was relatively simple compared to the inconvenience experienced by pharmacists in the nontraditional program. The mandatory laptop lease for nontraditional students ended after the second cohort when it was decided that nontraditional students could use their own computers as long as a basic configuration was assured.

Creation of a Virtual Faculty

The original proposal for the nontraditional program was predicated on a reasonable–although not high–level of core faculty involvement and interaction with the nontraditional students. While the faculty time was built into faculty load, finding faculty who were willing to serve as virtual faculty and lead online discussions in the evening turned out to be harder than originally antici-

pated. On-site full-time faculty were used as facilitators for the first four to five cohorts, but after the fifth cohort, the program shifted to reliance on off-site, adjunct faculty as online facilitators. To ensure effective coordination and to control for quality of instruction, a full-time position was created for an online clinical coordinator within the School of Pharmacy.

Program Implementation

The nontraditional program was designed with a practicing pharmacist in mind, taking into consideration the demands of the pharmacist's professional and personal lifestyle. The instruction and content were designed to relate to the pharmacist's daily problems and to expanded practice opportunities.

Pharmacists enroll in the program three times per year (October, February, and May) and could complete their education in two years with a maximum of five weekend trips to campus. The format and delivery of the program allow the pharmacist to work full-time while pursuing his or her education. This was accomplished by delivering the program via the Internet and CD-ROMs and was consistent with the philosophy of distance education by eliminating the barriers of time and place, allowing the pharmacist to do the work when and where he or she wanted. Nontraditional students entering the program were oriented to the technology and the Internet, and as they progressed through the program, they became more technologically confident and literate. This occurred due to instruction as well as routine use of Internet-based resources.

Once enrolled, pharmacists were split into teams of six to participate in online, case-based discussions. This was an integral component of the nontraditional program and helped the learner to develop problem-solving, abstract thinking, and differential diagnosis skills. Each team was led by a virtual faculty member who has an entire patient case at his or her disposal and then guided the pharmacists through the problem-solving process. This approach to learning was comparable to the approach used with traditional students with the exceptions of virtual location and temporal disassociation. Students who were unable to participate during team meetings could review the chat room discussions at a more convenient time.

The nontraditional program started in September 1998 with a cohort of 29 pharmacists and currently has 145 pharmacists enrolled. The nontraditional student body includes pharmacists from 17 states, as well as Canada, and could grow to include as many as 20 to 25 states within the next year. The average age of the nontraditional learner is 35, and 60% of the students are female. With the graduation of the most recent cohort in December 2003, the program has now graduated 210 mid-career pharmacists who, through their own determination and dedication, were able to obtain an advanced degree through a

very nontraditional pathway. Throughout the history of the program, the original model evolved and adapted while the program continued to grow. This growth, however, would not have occurred without an organized and planned approach to marketing and strategic planning.

Student Enrollment

Year	Traditional	Nontraditional
1996	70	**
1997	61	**
1998	64	26[1]
1999	47	84
2000	68	78
2001	77	79
2002	73	79

[1]Program initiation–one cohort only in 1998

Marketing

The marketing plan for the program was based on repeated exposure through various media over time. Repeated exposure was needed to create brand recognition within the target market. Because this program was specifically designed for practicing pharmacists, it was necessary to specifically target media that were seen by high numbers of practicing pharmacists.

The marketing plan was developed to continually expose the program at the local, regional, and national levels. Local marketing was accomplished through visits to continuing education programs within the state as well as staffing of information booths at various state pharmacy meetings. In addition, advertisements were placed in state pharmacy journals, and a brochure was developed and mailed at regular intervals to pharmacists within the local and state markets. In terms of return-on-investment, the most effective means of marketing were the mailings, with the least effective being personal contacts (booths, attending CE programs, etc.). The repeated exposure of mailing, printed advertisements, and personal contact, however, combined to raise the visibility of the program among pharmacists in the local and state markets.

Regional marketing included having an information booth at several state association meetings in surrounding states. Brochures were mailed and repeated for the surrounding states as well as to other states with high numbers

of pharmacists and few or nonexistent nontraditional programs. The names and addresses of these pharmacists were obtained from mailing lists purchased from the relevant state agency or licensure board. These mailings were repeated several times and were supplemented by advertisements in several of the corresponding state journals.

National marketing included information booths at national pharmacy meetings and national advertisements in relevant professional journals. An information booth was used sparingly because it was extremely expensive and the return-on-investment was sufficiently low as to negate this as a routine form of personal promotion. National advertisements were placed in several pharmacy journals to market to a national audience. These advertisements were run at the beginning of the recruitment cycle to attract attention to upcoming enrollment periods, and no more than two advertisements were run in a calendar year. Different journals were targeted to attract pharmacists from a variety of pharmacy settings.

Lessons Learned

Creation of a unique, technologically advanced, nontraditional doctor of pharmacy program presents significant challenges. First, it is critical to ensure that you have adequate trained staff to develop, revise, and distribute the materials in a timely fashion. Unfortunately, most colleges and universities tend to be lean as far as technical support staff are concerned, and this can cause problems when a program is heavily dependent upon highly skilled and technologically capable staff. The staff play a critical role in allowing the faculty to serve as content experts *supported* by technologically savvy staff. Maintaining the technological skills of staff is equally important. Often the staff involved in these programs become bogged down in the performance of mundane tasks, have little or no time for mission-critical development and design jobs, and, as a result, they become demoralized and discouraged. In addition, the payscales for technologically literate staff, including Webmasters and informatics personnel, differ significantly between academia and the private sector, making it hard to recruit, retain, or replace key personnel. The lesson learned is to outsource as much as possible in order to focus your personnel on the internally important issues that need to be addressed, such as faculty/staff training and support. In this way, you are also freeing up their time to look into programmatic improvement and emerging technologies.

Second, be cautious about building the program into the budget as a fixed means of revenue. Distance education initiatives are often mistakenly considered as moneymaking ventures when in reality far more lose money or break even. Either way, committing revenue generated by nontraditional or distance

education programs to support infrastructure or personnel is a very risky proposition. The lesson learned is to hire those individuals you must have, outsource whenever possible, and avoid institutional dependence on the revenue stream. If possible, build the revenue into the budget so it is reflected in the program's operations and maintenance budget so that it can be adjusted annually as needed. Using programmatic revenue to fund fixed assets such as tenured faculty can be dangerous due to the volatile nature of programs and the relatively short life span of the market. In addition, try to develop a revenue recovery system that allows a portion of the revenue to be diverted into an endowment that can be added to annually. The endowment can then be used to support the nontraditional program over time.

Third, when considering how to start or sustain the program, make sure enough funds are committed to marketing. A major mistake associated with programmatic efforts such as nontraditional education is not understanding that it takes money to make money, and that is typically accomplished through marketing. If your program can afford it, hire someone with the skill and time to promote brand recognition of the program and to develop an effective marketing plan. If at all possible, start the program with a contract guaranteeing a certain number of students per class or cohort. For example, work to get a contract with XYZ pharmacy for a slight discount on the tuition that allows the program to fill seats without having to directly market the program. This eases the pressure of marketing and allows the program to be more selective regarding the students who apply.

Finally, make sure the faculty are informed and on board. It is very easy to market the program outside of the institution while not marketing it internally to the people who are critical to the program's success. The lesson learned is to spend time talking to the faculty about what is going to be done, why, and how they will be affected. Some of the more significant issues that may arise include faculty load, intellectual property rights, appropriate use of copyrighted materials, and a thorough understanding of the program's technological infrastructure. Addressing these and other issues early and often will ensure that faculty do not question the program's intent or validity.

Program Costs and the Concept of Repurposing

The nontraditional doctor of pharmacy program at Shenandoah University was created for two reasons. First, it provided a newly established school of pharmacy with mid-career alumni in two years. The objective was to expose dynamic, forward-looking, mid-career pharmacists to our faculty, educational philosophy, and curriculum. The expectation was that if they were satisfied with their experience, they would endorse our program, thus providing credi-

bility and, more importantly, experiential opportunities for our first graduating class. Second, we anticipated that we would need a second or third market for our Web-based content to provide an additional revenue stream to pay for the cost of development. We achieved both goals. Our first nontraditional class graduated with our first traditional class. They were invaluable in providing advice to our faculty and in permitting our students to use their facilities for rotations. The second goal of repurposing our Web-based content for secondary markets was also successful.

The initial cost of establishing the nontraditional program was $200,000, with the funds being provided by an anonymous donor. In Fiscal Year 1997-98, the donation paid for $86,850 in salaries[1] for 6 months, $77,950 for operations, and $35,200 for computers and equipment. In Fiscal Year 1998-99, the nontraditional program began enrolling students, and the budget for the second year of operations was $438,050. The total 18-month expenditure was $638,050, and the total amount of income (e.g., donation and student tuition) was $678,375. The program broke even financially in 18 months, even if a portion of the revenue was in the form of seed money.

Within two years, the program began returning overhead to the university, and it has continued not only to support the cost of delivering Web-based content to an average of 130 nontraditional students yearly but to return overhead *and* defray the cost of developing sophisticated Web-based instructional materials for approximately 300 traditional students. Without an aggressive strategy of repurposing content originally created for the traditional program to a secondary nontraditional market, it is highly unlikely that we could have afforded the highly skilled staff who created the materials.

Repurposing is a strategy that seeks to reuse educational content for different markets while keeping some fixed costs (e.g., faculty salaries, buildings, and infrastructure) as low as possible and reallocating other fixed costs (e.g., staff salaries, materials development, and hardware). A good example would be the development of one hour of Web-based instructional content.

In a traditional lecture, the faculty member, perhaps aided by a graduate student or administrative assistant, researches the topic, prepares the handouts and slides, and presents the material to a group of students at a fixed time and place. The amount of preparation time, based on previous studies, averages about three hours for each hour of delivered content. Once the hour of lecture is completed, the materials go back into a file cabinet only to be retrieved and updated a semester or year later when the instructor presents the topic to a different class of students. While the faculty member may occasionally use some or all of the materials for a continuing education program or presentation, the materials are generally the product of one faculty member's time and efforts, and the value is largely restricted to the one hour of instruction.

Typical Development Costs (Time and Effort)

Interactive video	300 hours
Computer-assisted learning	200 hours
Broadcast video	100 hours
Web-based instruction	40 hours
Videotaped lectures	3-10 hours
Small group discussion	1-10 hours
Lecture	2-10 hours

In our program, the faculty member collaborates with other faculty to create integrated content that is part of a learning module. The module may represent a concept, disease state, or system. The faculty member researches the content, prepares the initial draft of the materials, and may actually export the lecture and supporting materials in HTML format or portable document format (PDF). At this point, the content is transferred to a group of skilled Web-masters, document specialists, and instructional designers for development into effective Web-based learning materials. The final product is edited, linked to graphics and slides, placed in a standard Web format, and made available for final review by the content authors. The faculty member prepares assessment questions, and these are developed into a test database for use by the faculty at the appropriate time. Students retrieve the Web content prior to the lecture. The content may consist of lecture notes, slides, simulations, and links to reference sources (e.g., Web pages, assigned readings in PDF format, or databases) all within a standard educational framework. The goal is to develop a learning environment that is supportive, as complete as possible, and easily accessible over the Internet. Students in the traditional classroom use the materials while the faculty member lectures or engages the students in case studies or exercises. Students in the nontraditional environment access the same materials and interact with virtual faculty in an Internet-based environment.

Repurposing the content allows the school to spread the development costs over a wider number of students without incurring costs associated with classrooms and infrastructure. The additional revenue permits the hiring of skilled staff and educational experts who greatly enhance the quality of the educational offering.

Key considerations in repurposing educational content are:

- *Intellectual property rights*–The administration must be up front about how the content will be used and the potential benefits. Repurposing

cannot be done simply to inflate the university's revenue picture. Use of the additional revenue in our case was to defray the cost of developing high quality instructional materials. Later revenue from additional repurposing of content resulted in contributions to the professional practice plan.

- *Team development*–High quality, Web-based instructional materials are the result of a team effort. Instructional designers, graphic artists, Webmasters, document specialists (copyright issues), video and audio technicians, and coordinators are all involved in the development and delivery of the final product.
- *Designing for a dynamic virtual environment is critical*–Everyone, from the administration to the designers to the faculty, must be aware of the virtual environment when designing the content. Planning for delivery of content in a traditional classroom may significantly increase the development costs. Designing with a dynamic, virtual environment is conceptually one of the most important issues.
- *Tap into the vast wealth of Internet resources*–Design content that links to other layers of content, some local, others virtual. An example is the library. Whenever possible, substitute digital for real libraries to ensure that both in-the-class and online students have the same access to resources.
- *Design for the future*–Constantly reevaluate the mix of delivery systems used for better ways to convey the message. Better can be defined in terms of learner comprehension, user satisfaction, or delivery efficiencies. For example, we used CDs delivered at two-month intervals to permit online students with limited bandwidth (e.g., dial up modems) to use their CD drive for retrieval of slides and streaming audio while reserving the limited bandwidth of their dial-up connections for interactive modes such as chat rooms and e-mail. In the future, as bandwidth becomes less of a problem, we may migrate to Voice over IP, Push technology, and streaming video of educational conferences focused on late-breaking news.

COMBINED MASTER OF BUSINESS ADMINISTRATION/DOCTOR OF PHARMACY DEGREE

In July 1997, I met with the Dean of the Byrd Business School at Shenandoah University to propose the development of a joint program designed to graduate students with a combined MBA/Pharm.D. (Appendix E). The reception was positive, and we immediately began discussion with our re-

spective faculties about the creation of this unique joint program. We received administration approval to offer the joint program in September of 1997 and began promoting the program to incoming students in the winter of 1998.

The program was created for those students who had an interest in pharmacy careers where a management perspective and training were essential. Our initial estimate was that 10% (7-8 students) out of each entering class would choose the joint degree program. While that estimate was accurate for the first class, it rapidly increased to over 14 students out of each class of 70 choosing the option and, in one class, 21 elected the joint degree option.

Students in the program received credit in the pharmacy program (Pharm.D.) for nine semester hours of management course work, and the MBA program accepted approximately the same number of hours from the doctor of pharmacy curriculum (e.g., statistics, research design, and management) as satisfying MBA prerequisites. In addition, the students were required to take their two 4-week elective rotations in the fourth professional year as an 8-week management block to allow them an opportunity to obtain practical management experience with a major pharmaceutical company, a managed care firm, or a pharmacy setting where management was a major focus (e.g., Cardinal Healthcare).

First professional year students were briefed on the combined program in the spring of their first year. They could begin work on MBA prerequisites in the summer between their first and second professional year and then would take evening courses in the MBA program beginning in the fall of their second professional year. They would continue taking evening courses and a full trimester of course work during the summer between their second and third professional years. The MBA students would also take course work in the summer following their third professional year before beginning an accelerated experiential schedule in August of their fourth professional year. The program was rigorous and demanding, but students who pursued the joint degree expressed satisfaction with the program and the opportunity to complete both degrees simultaneously. The additional costs associated with the joint degree were approximately $5,000.

CONCLUSION

The third year of the startup found the faculty and staff developing the unique learning environment that was to become the hallmark of the program. We conceptualized, adjusted, and then implemented one of the most ambitious and technologically advanced learning environments in a school of pharmacy. We developed and then implemented an ambitious nontraditional

program that used the same technologically advanced learning environment with adult learners from across the United States and Canada. In cooperation with the School of Business, we created a unique career track for students interested in administrative and managerial careers in pharmacy. By the conclusion of the year, we were exhausted, proud, and poised to begin the development of our strategic plan. The plan was viewed as a comprehensive vision of our evolving program focused on a challenging and ever-changing health care landscape.

NOTE

1. Salary support included a program coordinator, administrative assistant, Webmaster, information system support (database manager), drug information specialist, and clinical coordinator.

APPENDIX A

Strategy for Enhancing Technology Skills in the Curriculum

The vision of the Shenandoah University School of Pharmacy is one in which information management is threaded within the professional program. Information management will be one of the impacting characteristics for the future delivery of pharmaceutical care. This vision highlights the importance of new electronic technologies for pharmacy and provides the basis for departmental and institutional support of pharmacy faculty members who use such technologies and integrate them into their work.

The following guidelines address means of evaluating the research, teaching, and service of faculty members who study, develop, and use electronic technologies in their work.

Because the role of computer technologies in the practice of pharmacy and its education is evolving, departments wishing to hire and retain faculty members centrally concerned with the application of these emerging technologies to the humanities need to consider the tasks, support, and evaluative procedures involved. And faculty members who pursue computer-related work as part of their formal assignments should be prepared to make explicit the results, theoretical basis, and intellectual rigor of their work, as well as its relevance to the discipline. The following guidelines, which deal with both the hiring and promotion processes, are designed to help departments and faculty members build productive working relations, effective evaluation procedures, and means of disseminating the results of computer-related work.

Guidelines for Search Committees and Job Candidates

When departments seek candidates with computer expertise or when candidates wish to have such work considered an important part of their positions, there should be an initial understanding of the recognition given to computer-related work and of what electronic facilities are available or planned.

Departments should ensure that computer-related work can be evaluated within their promotion and faculty development procedures. In particular, candidates need to know how the department evaluates research and publication in computers; what importance is attached to the development of new software and what criteria are used to evaluate such software; what credit is given for the integration of electronic technologies into courses; what recognition is given to professional activities relating to computing; and what criteria are used to evaluate faculty members who provide computing support to colleagues, staff, and students.

As candidates discuss the teaching, research, and service responsibilities of an academic position, it is important that they ask questions, such as the following, about the role of electronic technologies in the department and the university: Are technical support staff members available to the department's faculty members and students? Does the department plan to undertake initiatives in the use of electronic technologies? What access do faculty members and students have to computer facilities and resources?

Guidelines for Reappointment and Promotion Reviews

Computer-related work, like other forms of curricular innovation, scholarship, and service, should be evaluated as an integral part of a faculty member's dossier, as specified in an institution's guidelines for reappointment, promotion, and tenure. Faculty members are responsible for making a case for the value of their projects, articulating the intellectual assumptions underlying their work, and documenting their time and effort. In particular, faculty members expecting recognition for computer-related work should ensure that their projects remain compatible with departmental needs, as well as with criteria for reappointment and promotion. Periodic reviews provide an opportunity to assess the match between a faculty member's scholarly and pedagogical development and the department's needs and expectations.

Because appropriate roles for computer technology in pharmacy and healthcare and its education are still emerging, faculty members should be prepared to explain: what theory informs their work; why their work is useful to the discipline; the evidence of rigor and intellectual content in their work.

Documentation of projects might include internal or external funding, awards and professional recognition, and reviews and citations of work either in print or in electronic journals.

For subsequent evaluation of professional service, faculty members should maintain a record of the duties involved in activities such as organizing and managing a lab facility, increasing the meaningful use of electronic media in instruction, training student aides or faculty colleagues, and moderating an electronic discussion group.

Pedagogy and research involving technology often entail collaborative or interdisciplinary work. Departments need to find appropriate ways to evaluate the faculty member's role in such work. This process may include finding evaluators with expertise in both specific disciplines and computer technology; these experts are best qualified to evaluate and translate accomplishments in a rapidly changing field. Sources that may help departments choose appropriate evaluators include the editorial boards of computer-related journals, the committees focusing on electronic technologies in appropriate scholarly and professional organizations, the courseware review sections of modern science and practice journals.

Guidelines for Professional Curriculum Emphasis

In order to develop graduates with appropriate skills in information management, the professional curriculum must provide for introduction of theory, discussion of technique, and sufficient time for the student in all levels of the program to practice skills. The following specifics are indicative of how information management skills might be developed within the program at Shenandoah.

1. Pre-pharmacy requirement of computer literacy. Completion of this requirement can be fulfilled by a variety of coursework, but must be a course that requires utilization of the computer in its delivery.
2. Internet laboratory in 1st semester. Sixteen weeks of laboratory sessions introduced the students to the resource. Assignments included searching the WEB, downloading files from the Internet, scanning documents/graphics, and producing a PowerPoint presentation.
3. All coursework is available on the WEB. Each course of the professional curriculum has a WEB page where the syllabus, course schedule, individual lecture notes, slides, and other materials are available to students at Shenandoah, both on and off campus.
4. Faculties are encouraged to make course assignments that require technology (e.g. searching, word processing, PowerPoint slides, etc.).
5. Folders for each of the high impact disorders are placed within each student individual space on the network for input of materials throughout the program.
6. Annual progress examination requires computer skills for completion. Some aspects of the examination will be on the computer. Students may access patient profile information and complete part of the exam on the computer.
7. Database (Micromedex, Medline, Lexicomp) access via the network. These databases are available to students, both on and off campus.
8. Dispensing laboratories utilize management software that students access from their notebook computers to manage patients in a virtual environment.
9. All experiential preceptors at all locations have access to the School network and all materials. This strategy incorporates the emphasis within the School mission of community/rural care.
10. Notebook computers are provided (as part of their technology fees) to each student on entry into the program.

APPENDIX B

Survey of Laptop Usage
May 1998

Instructions: Circle the letter of the response that most closely matches your experience or perception. Your responses are important in allowing the faculty and administration of the Shenandoah University School of Pharmacy to modify or enhance the policy on laptop usage. Thank you in advance for your assistance.

1. Gender:

   a. Male   **48 (36%)**
   b. Female   **85 (64%)**

2. Class

   a. P-1   **72 (54%)**
   b. P-2   **61 (46%)**

3. Did you:

		P1	**P2**
a.	Lease your laptop	**63 (88%)**	**43 (71%)**
b.	Purchase your laptop	**6 (8%)**	**8 (13%)**
c.	Provide your own laptop configured to school specifications	**3 (4%)**	**8 (13%)**
d.	No Response (NR)	**0 (0%)**	**2 (3%)**

4. Estimate the total number of hours (to the nearest whole hour) that you use your laptop in an average day.

   P1   **Average = 2.3 Hours/Day**   **Range = 1-10 Hours/Day**
   P2   **Average = 2.5 Hours/Day**   **Range = 1-6 Hours/Day**

5. Estimate the total number of days a week that you bring your laptop to the School of Pharmacy.

   P1   **Average = 2.9 Days/Week**   **Range = 1-7 Days/Week**
   P2   **Average = 3.3 Days/Week**   **Range = 1-7 Days/Week**
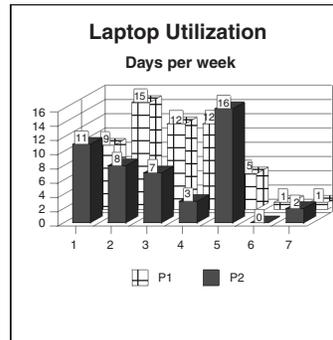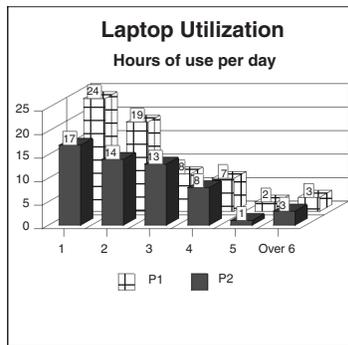
6. When you are in the School of Pharmacy with your laptop, indicate the location where you most frequently access the network/Internet:

	P1	**P2**
a. Computer Laboratory (Rm. 265)	**27 (38%)**	**17 (30%)**
b. Multi-media Classroom (Rm. 109)	**34 (46%)**	**34 (60%)**
c. Lounge (Rm. 102)	**4 (6%)**	**1 (2%)**
d. Library (Rm. 259)	**4 (6%)**	**3 (5%)**
e. Other (Please indicate location)	**3(4%)**	**2 (3%)**

7. When you are in the School of Pharmacy with your laptop, what is the <u>most frequent </u>use?

a. Word processing	e. Develop slide presentations
b. World Wide Web (WWW) lecture notes/slides	f. Access to databases
c. Internet searching	g. Access to library resources
d. Electronic Mail (e-mail)	h. Other _____

8. When you are outside the School of Pharmacy with your laptop, what is the <u>most frequent </u>use?

a. Word processing	e. Develop slide presentations
b. World Wide Web (WWW) lecture notes/slides	f. Access to databases
c. Internet searching	g. Access to library resources
d. Electronic Mail (e-mail)	h. Other _____

	Most Frequently Utilized Application			
	Health Professions Building		**Outside Health Professions Building**	
	P-1	**P-2**	**P-1**	**P-2**
Word Processing	17 (24%)	17 (29%)	33 (48%)	38 (64%)
WWW	28 (39%)	27 (46%)	11 (19%)	5 (8%)
Internet	6 (9%)	3 (5%)	11 (19%)	5 (8%)
E-Mail	12 (17%)	7 (12%)	9 (13%)	9 (15%)
Powerpoint®	7 (10%)	1 (2%)	4 (6%)	0 (0%)
Knowledge Bases	1 (1%)	1 (2%)	0 (0%)	0 (0%)
Health Sciences Library	0 (0%)	1 (2%)	0 (0%)	0 (0%)
Other	0 (0%)	0 (0%)	1 (1%)	2 (3%)

APPENDIX B (continued)

9. Do you currently have remote access to the School of Pharmacy?

		P1	P2
a.	Groupwise (E-mail access only)	21 (29%)	24 (39%)
b.	Internet Service Provider (ISP)	13 (18%)	17 (28%)
c.	Both Groupwise and Internet Service Provider	19 (26%)	8 (13%)
d.	Neither Groupwise or Internet Service Provider	18 (25%)	12 (20%)
e.	Indicate Internet Service Provider		

	P1	P2
Visual Link	22 (76%)	15 (65%)
Shentel	1 (3%)	1 (4%)
Adelphia	0 (0%)	1 (4%)
Erols	2 (7%)	1 (4%)
Intrepid	0 (0%)	1 (4%)
AOL	2 (7%)	2 (9%)
Hardynet.com	0 (0%)	1 (4%)
Advanced Computing	0 (0%)	1 (4%)
Netcom	1 (3%)	0 (0%)
MSN	1 (3%)	0 (0%)

Please indicate the strength of agreement with each of the following statements.

A = Agree   SA = Somewhat Agree   N = Neutral   SD = Somewhat Disagree   D = Disagree

	P1	P2	
10.	2.59	3.07	I receive a majority of information about school activities from the *Bottom Line*.
11.	2.61	2.42	I feel the laptop enhances my education.
12.	1.99	2.12	My knowledge of computers has expanded since I received my laptop.
13.	2.40	2.57	Overall, I am pleased with the laptop I was issued.
14.	3.30	3.29	The benefits of having a laptop outweigh the cost of the technology fee.
15.	1.86	1.63	I use electronic mail to keep in touch with my classmates and professors.
16.	2.10	2.15	My ability to make clinical decisions is enhanced through access to the Internet and online databases.

17.   Please list the most frequently encountered impediment you have personally experienced in using your laptop.

	P1	P2
Downloading class notes into MS Word	1	0
Access to Shenandoah University home page	1	0
Short battery life	3	9
Slow CPU	0	4
Limited hard disk space	2	0
CD-ROM drivers don't work	1	0
CD-ROM should be attachable, not built in	1	0
Durability of case	0	1
E-mail access from home	3	1
Remote access to databases	0	1
Slow access to WWW and Internet from home	1	0
Netscape Browser bookmarks file lost or corrupted	1	0
Screen size/type (dual scan)	4	1
Slow turnaround on repairs from IBM	2	0
Software problems (e.g., error messages, screen freezes, etc.)	2	2
More data ports in Health Professions Building	1	8
Difficulty accessing Ethernet in Health Professions Building	1	0
Laptop <u>and</u> bookbag are too cumbersome	2	0
Printing problems	3	0
Connecting and/or using 3 ½ floppy drive	3	1
Need more workshops/classes on downloading files	4	5
Limited computers in computer laboratory	1	0
Price of the lease	4	4
Allow students to chose own brand of laptop	0	1
Computers are not required in all classes	5	4
Delayed placement of notes/slides on web page	1	5
Lack of sufficient workstations in library	1	0
People typing in classroom is a distraction	2	2
No problems	3	8
No Response	20	4

18.   What one suggestion would you offer to enhance your use of technology in the coming academic year (1998-1999)?

	P1	P2
Provide additional workshops on downloading notes/slides	9	1
Add permanent workstations to computer laboratory	1	0
Add permanent workstations to library	1	0
Make laptop use optional	5	1
Decrease cost of the lease	7	2
Increase interactive learning with laptops	3	1
Increase interactive testing with laptops	2	1
Increase number of databases	0	1
Increase access to databases from home	1	0
Increase access to hospital and/or other pharmacy schools' resources	0	1
Make floppy drives internal	1	0
Require all lecture notes be on WWW prior to class	2	8
Require more assignments that utilize the WWW or e-mail	4	0
Improve quality of laptop screen	1	1
More powerful laptops	1	3
Add additional data ports to Health Professions Building	2	5
Add additional printers to Health Professions Building	0	1
No Response	32	35

APPENDIX C

Shenandoah University School of Pharmacy

Survey of Pharmacy Practice

Instructions: This survey is designed to provide answers to questions concerning the design and implementation of a distance education program for pharmacists interested in certificate and degree education (Pharm.D.). This is your opportunity to influence the future. **Shenandoah University** is committed to the goal of establishing an accessible education program that is relevant to the practice of pharmacy, in its many diverse forms. We are also committed to the design of a program that will equip pharmacists with the skills and knowledge they need in order to compete effectively in the years to come. Please take a few minutes out of your busy schedule to complete the following questions. Your responses will be tallied and reviewed by an advisory panel of pharmacy educators and practitioners. Their advice, based upon your input, will be vital to the design of this innovative and extremely important educational program. Thank you for your help. Please return the survey in the postage paid envelope before **June 16, 1997**.

1.   Pharmacist Name   _____

     Mailing Address   _____
                        Number   Street
                        _____
                        City   State   Zip Code
                        _____
                        Work Zip Code   Work Phone   Home Phone

Pharmacy and Pharmacist Information

2.   Gender: ☐   Male   ☐   Female

3.   Age:_____

4.   In what type of setting do you primarily practice?

     ☐   Independent community pharmacy
     ☐   Chain community pharmacy (*group of 10 or more pharmacies under one owner*)
     ☐   Hospital pharmacy
     ☐   Nursing home/consultant pharmacy
     ☐   Ambulatory care clinic
     ☐   Other (*please specify*)

5.   Primary degree in pharmacy (*check only <u>one</u>*)

     ☐   BS or B.Pharm   _____ Year
     ☐   Pharm.D.   _____ Year

6. Secondary degree(s) in pharmacy (*check all that apply*)

    ☐ Pharm.D.

    ☐ M.S.

    ☐ MBA

    ☐ Other (*please specify*) _____

7. What is the approximate size of the municipality (e.g., city, town, etc.) where you practice?

    ☐   1-15,000

    ☐ 15,001-30,000

    ☐ 30,001-45,000

    ☐ 45,001-60,000

    ☐ 60,001-75,000

    ☐ 75,001-90,000

    ☐ over   90,000

8. In which state(s) are you currently licensed to practice pharmacy?

_____	_____	_____	_____
State	State	State	State
Original License	Actively Practice	Secondary License	Secondary License

9. Please check the most appropriate box below:

    ☐ **I am interested in obtaining Specialty Certification (*please continue*)**

    ☐ **I am interested in obtaining a Non-Traditional Pharm.D. (*go to question 13*)**

    ☐ **I am not interested in either a certification or non-traditional education program in the next six (6) years. Thank you! Please return the survey in the self-addressed, postage-paid envelope**

Specialty Certification Programs

10. Which of the following **certificate programs** would be of interest to you? (*Check all that apply*)

☐ Pharmacy management	☐ Anticoagulation
☐ Managed care administration	☐ Diabetes care
☐ Respiratory care	☐ Cardiovascular care
☐ Infectious disease care	☐ Psychiatric care
☐ Pain management	☐ Intravenous home therapy
☐ Pediatric care	☐ Geriatric care/Administration
☐ Pharmacokinetics/drug monitoring	☐ Professional re-entry
☐ Drug information	☐ Pharmacy informatics
☐ Investigational drug services	☐ Immunizations
☐ Nuclear	☐ Nutrition

APPENDIX C (continued)

11. In participating in a **certificate program**, which of the following would be the most important consideration to you individually? (*check top three*)

☐ Availability of self-paced instruction   ☐ Inclusion of experiential component

☐ Continuing education credit   ☐ Credit for advanced degree (*e.g., Pharm.D.*)

☐ Close to home (*e.g., 50 miles*)   ☐ Association endorsement (*e.g., NCPA*)

☐ Executive seminar format (*compressed*)   ☐ Weekend seminar format

☐ Cost   ☐ Program length

☐ Relevance to my practice   ☐ Innovative program content

12. Which of the following instructional methods would be acceptable to you in delivering a **certificate program**? (*check top three*)

☐ Self-instruction workbooks   ☐ Audiotapes

☐ Videotapes   ☐ Conference Call

☐ Interactive television   ☐ Broadcast television

☐ Internet (*www, e-mail, etc.*)   ☐ Computer network (*e.g., conferencing*)

☐ Lecture   ☐ Small group discussion

If you are also interested in obtaining a non-traditional Doctor of Pharmacy Degree, please continue. If you are only interested in certificate programs at this time go to question 22

Non-Traditional Doctor of Pharmacy Program

13. When would you consider pursuing a non-traditional **Doctor of Pharmacy** degree?

☐ Within 12 months

☐ 1-2 years

☐ 3-4 years

☐ 5-6 years

14. How many years do you feel is a reasonable commitment to receive the Pharm.D. degree?

☐ 1 year   ☐ 2 years   ☐ 3 years   ☐ 4 years   ☐ 5 years   ☐ 6 years

15. What do you feel would be a reasonable annual cost to participate in a non-traditional doctor of pharmacy program (*assuming an average program length of 2 years*)?

☐ $1,800   ☐ $4,500   ☐ $7,200   ☐ $14,900

16. Which of the following evaluative mechanisms do you feel is appropriate for assigning credit for *life experiences* (*check all that apply*)?

☐ Experience portfolio   ☐ Pharmacy Specialties Certification

☐ Challenge Exam   ☐ Simulated patient encounters

☐ Transfer of degree credits   ☐ Professional certification

17. What do you perceive are the weaknesses in your personal skill set? (*Check all that apply*)

  ☐ Pharmacokinetics   ☐ Therapeutics   ☐ Pharmacology

  ☐ Computer training   ☐ Clinical training   ☐ Microbiology

  ☐ Patient counseling   ☐ Management   ☐ Physical assessment

  ☐ Pathophysiology   ☐ Statistics   ☐ Drug Information

18. Which of the following curricular pathways would you be interested in following?

  ☐ Disease management   ☐ Managed care   ☐ Institutional care

  ☐ Geriatrics   ☐ Biotechnology   ☐ Infectious disease

  ☐ Ambulatory care   ☐ Informatics   ☐ Community pharmacy management

19. Which of the following instructional methods would be acceptable to you in delivering a non-traditional Doctor of Pharmacy program? (*check top <u>three</u>*)

  ☐ Self-instruction workbooks   ☐ Audiotapes

  ☐ Videotapes   ☐ Conference Call

  ☐ Interactive television   ☐ Broadcast television

  ☐ Internet (*www, e-mail, etc.*)   ☐ Computer network (*e.g., conferencing*)

  ☐ Lecture   ☐ Small group discussion

20. Which of the following clerkships would you be interested in pursuing within the non-traditional doctor of pharmacy program? (*Please check <u>four</u>*)

  ☐ Ambulatory care/Family Practice   ☐ Adult medicine

  ☐ Community clinical   ☐ Geriatrics

  ☐ Institutional practice   ☐ Quality assurance

  ☐ Home infusion therapy   ☐ Investigational trials/Research

  ☐ Pharmacy administration   ☐ Pediatrics

  ☐ Informatics   ☐ Drug information

  ☐ Pain management   ☐ Managed care

21. Please complete the table below as if you were planning a hypothetical week of study in the non-traditional program. Indicate the number of <u>hours</u> you could devote to each activity on a daily basis. Remember to total each activity for the week.

  Travel   Transit time between your home/work and a classroom or practice site

  Computer   Time devoted to interacting with a computer for purposes of research, communication or documentation

  Ind. Study   Time devoted to reading, non-computer research, preparing cases and expanding your knowledge base

  Interaction   Time devoted to interaction with other students and faculty by telephone, e-mail or personal interaction

APPENDIX C (continued)

ACTIVITY	MON	TUE	WED	THU	FRI	SAT	SUN	**TOTAL**
Travel								
Computer								
Ind. Study								
Interaction								

Computer Technology

22. Do you own a personal computer?
     ☐ Yes   ☐ No

     If your response was **No**, would you be willing to purchase a personal computer if it was necessary for participation in the educational program you select?
     ☐ Yes   ☐ No (*Thank you for your participation*)

23. How often do you use a word processing program? (*i.e., Word Perfect®, MS Word®*)
     ☐ Daily   ☐ Weekly   ☐ Once a month   ☐ Never

24. Indicate the types of software applications you use regularly (*at least once a week*).
     ☐ Word processing   ☐ Spreadsheet
     ☐ Graphics   ☐ Accounting (*other than spreadsheets*)
     ☐ Database   ☐ Games
     ☐ Communications   ☐ Pharmacy dispensing
     ☐ None   ☐ Other (*Describe*) _____

25. How often do you use an e-mail system? (*i.e., America On Line, Internet Services Provider*)
     ☐ Daily   ☐ Weekly   ☐ Once a month   ☐ Never

26. How would you describe your typing skills?
     ☐ None ☐ Hunt & Peck ☐ Casual (*rough draft with errors*) ☐ Good (*40 wpm without errors*)

Please forward information concerning:

☐ Information on the non-traditional Doctor of Pharmacy program
☐ Information on joining the faculty of the experiential program

Please provide the name and mailing address of possible candidates for the traditional Doctor of Pharmacy program

_____
Name

_____
Street Address

_____
City   Zip Code   Phone Number

Thank you for your assistance! A summary of the results will be available July 4, 1997.

APPENDIX D

Non-Traditional Doctor of Pharmacy Program
Program Overview
August 1998

Market

District II of the National Association of Boards of Pharmacy/American Association of Colleges of Pharmacy is comprised of fifteen (15) schools in the states of New York, Pennsylvania, Maryland, West Virginia, Virginia and the District of Columbia. The table below depicts the current enrollment of pharmacy students in District II schools. Currently, Medical College of Virginia, Howard University, Duquesne, Philadelphia College of Pharmacy and Science and Pittsburgh are in transition from the Bachelor of Science degree to the Doctor of Pharmacy degree. University of Maryland, Wilkes University and Shenandoah University are all Pharm.D. The remaining programs in District II have announced or are studying the resource requirements for the Doctor of Pharmacy degree and may be anticipated to begin the transition in the next seven years. Until that transition begins and works its way through the curriculum of each program, they will continue to graduate into practice large numbers of Bachelor of Science degree holders who may desire a Non-traditional Doctor of Pharmacy degree.
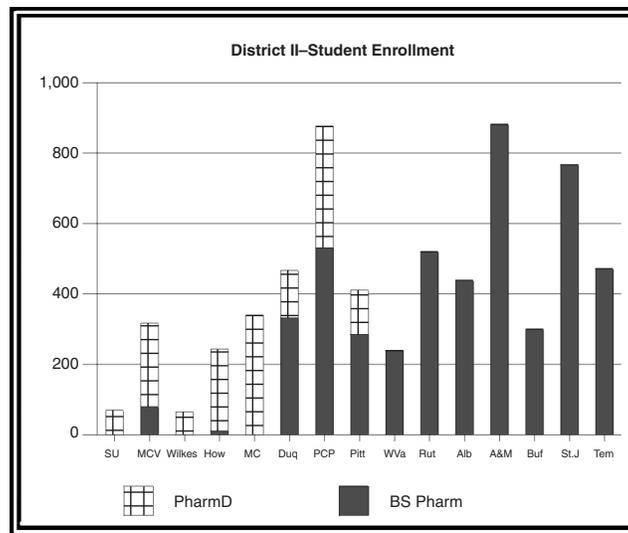
While it is difficult to predict the exact numbers of graduates who will enter the profession of pharmacy with a Bachelor of Science degree and the number that will subsequently seek enrollment in a Non-traditional Doctor of Pharmacy degree program, some statistics are revealing. It is estimated that approximately **18%** of currently practicing pharmacists hold the Doctor of Pharmacy degree. The numbers in the Northeast are lower, in part due to the number of schools that have not adopted the Doctor of Pharmacy degree. Estimates in the states of Virginia, Maryland, West Virginia and Pennsylvania are that there are 2,000 Doctor of Pharmacy degree holders and approximately 20,000 Bachelor of Science degree holders. The table below presents the number of graduates with each degree and the anticipated impact on the profession. It is apparent from the data that large numbers of Bachelor of Science degree holders will continue to enter the profession until the year 2000. By the year 2000, 17,487 additional practitioners will graduate. Of those, 1,601 (9.1%) will possess the Doctor of Pharmacy degree. As a percentage of the workforce, this represents only a slight increase over the existing ratio of Pharm.D.s to B.S. degree holders.

APPENDIX D (continued)

District II – Entry Level Degree Graduates

Year	BS Pharm	PharmD	Total
1991	1573	0	1573
1992	1638	0	1638
1993	1669	0	1669
1994	1832	0	1832
1995	1883	0	1883
1996	1850	0	1850
1997	1832	151	1789
1998	1638	284	1846
1999	1266	360	1626
2000	975	806	1781
	16156	**1601**	**17487**

Non-Traditional Doctor of Pharmacy Programs

There were approximately **450** pharmacists enrolled in the five (5) Non-Traditional Doctor of Pharmacy programs in District II (Maryland, Albany, Duquesne, Philadelphia College of Pharmacy and Science and Virginia Commonwealth). This represented just **2%** of the licensed practicing pharmacists in District II. Data on the number of pharmacists who would enroll in a Non-Traditional Doctor of Pharmacy degree program are not available, but the experience with one program (University of Arkansas) indicates that approximately half of all pharmacists would be interested in pursuing the degree if it were available and compatible with their work/family situation and approximately 25% would actually enroll. Application of this rough *rule-of-thumb* to District II would result in **5,000** who would enroll immediately and an additional **4,039** that would enroll over the next three years. Most programs (including Duquesne and Maryland) admit 25 Non-Traditional Doctor of Pharmacy candidates 1-2 times a year. It is doubtful that the existing and any newly developed Non-Traditional Doctor of Pharmacy programs will make much of a dent in the number of potentially interested pharmacists. These numbers must be considered against the backdrop of the continuing migration of District II schools to the Doctor of Pharmacy degree and the impact this may have on the desire by B.S. graduates to obtain a Doctor of Pharmacy degree. Detailed information concerning the status and characteristics of non-traditional doctor of pharmacy programs is presented in Attachment A. Finally, West Virginia University announced the development of a Non-Traditional Doctor of Pharmacy program slated to begin in January 1999.

Survey of Potential Participants in the Shenandoah University School of Pharmacy Non-Traditional Doctor of Pharmacy Program

A survey was mailed to 869 pharmacists in a four state area in July 1997 at the request of the Non-Traditional Doctor of Pharmacy Advisory group. Two hundred fifty-seven surveys were returned by the cutoff date. The purpose of the survey was to further elucidate the concerns of pharmacists who may eventually enroll in the Shenandoah University School of Pharmacy NTDP program. The results of the survey are presented in Appendix B. As expected, most of the responses were from the four states from which the mailing lists were drawn (Virginia, Maryland, Pennsylvania and West Virginia). Interestingly, however, responses were also received from twenty-nine other states and the District of Columbia. This is a reflection of those pharmacists who may have their primary license in one of the four study states, but now practice in other parts of the country. Another finding was that a majority of those responding practice in relatively large metropolitan areas (over 50,000 inhabitants). One hundred forty-eight (63%) of the 236 who responded to the question reported that they practiced in a municipality of over 45,000. This finding is important when the availability of an educational infrastructure (e.g., teleconferencing, Internet access, etc.) is considered. The chances of finding an infrastructure suitable for supporting a distance education program increases with the size of the municipality.

The potential audience for certificate and degree programs was evenly divided between males and females. The average age was 39.6. One hundred ninety-four indicated a desire to pursue a Non-Traditional Doctor of Pharmacy degree, while 133 indicated an interest in a certificate or a certificate combined with a degree.

The most popular topics for certification are listed in the table below.

Certificate Programs

Diabetes Care	**75**
Pain Management	**60**
Infectious Disease	**57**
Pharmacy Management	**52**
Pharmacokinetics	**52**
Drug Information	**52**
Nutrition	**51**
Respiratory Care	**41**
Geriatric Care/Administration	**41**
Cardiovascular Care	**39**
Intravenous Home Therapy	**39**
Managed Care	**39**

When asked to indicate the factors that would be most important in the decision to pursue a certificate program, most listed flexible scheduling (e.g., use of self-paced instructional materials), convenience (e.g., close to home) and cost as important factors. Not surprisingly, self-instructional materials led the list for pharmacists wishing to obtain advanced certification.

One hundred ninety-four pharmacists indicated a desire to obtain a Non-Traditional Doctor of Pharmacy Degree. A strong majority (177–91%) indicated a willingness to pursue the degree within the next two years. They indicated that they felt two years would be the appropriate length of a program and would be willing to spend $ 4,500/year for a part-time program. When asked to list the areas they perceived as weaknesses in their personal skill set, they listed pharmacokinetics first, followed by physical assessment and clinical training. The most popular curricular pathways identified were disease management, followed by infectious disease and geriatrics.

When asked to check the methods of instruction they favored in the non-traditional program, 164 listed videotapes, followed closely by self-instruction workbooks (160), the Internet (96), lecture (65) and audiotapes (44). Respondents were asked a series of questions relating to computer usage, beginning with *Do you own a personal computer?* Seventy-seven percent responded positively. Of the remaining fifty-six, fifty-two indicated a willingness to purchase a computer if necessary for participation.

It is apparent that there is strong interest among the pharmacists surveyed for advanced certification and degrees. It must be remembered that this survey was mailed to a subset of the pharmacists in the four states. The original survey was mailed as part of an admissions recruitment effort and may not have been received by all practicing pharmacists in those states. Despite the obvious limitations of the survey, a significant number of pharmacists are interested in pursing certification and in joining a non-traditional Doctor of Pharmacy program within the next two years. The initial numbers are above those necessary to fill the first two classes of non-traditional students. It is equally apparent from the survey that pharmacists prefer distance education methods of instruction to traditional lectures offered on a college campus. This does not diminish the importance of live lectures; it simply implies that the respondents felt that compatibility with their work/family routines was more important. Pharmacists recognized the need for additional instruction in pharmacokinetics, physical assessment and clinical practice areas; those areas that have expanded over the past 10-15 years and serve as a basis for disease state management. Disease state management areas (i.e., diabetes, infectious disease and respiratory care) were listed relatively high by both pharmacists interested only in advanced certification and those interested in pursuing a non-traditional Doctor of Pharmacy degree. These areas also agree with the initial content areas of the integrated curriculum being developed for the traditional Doctor of Pharmacy program.

APPENDIX D (continued)

Finally, pharmacists indicated a willingness to utilize distance education technologies (i.e., videotapes, workbooks and the Internet) in their pursuit of advanced certification and degrees. This finding, coupled with the relatively large municipalities reported by the respondents, raises the possibility that even more advanced delivery mechanisms may be employed in the design and delivery of Shenandoah University School of Pharmacy programs. The results of this survey were used to shape and form the program proposal and subsequent goals and philosophy.

Program Goals

The Shenandoah University School of Pharmacy Non-Traditional Doctor of Pharmacy program has the following goals:

A.   Have a positive impact on pharmacy practice

B.   Create and standardize our experiential program

C.   Foster the creation of new practice models

D.   Develop new models of educational delivery

    1.   Devise new methods for learning that take advantage of the technological revolution.

    2.   Devise multiple program types (e.g., certificate, non-traditional education and continuing education) that support shortened time-to-completion, smaller and more modular courses, and more extensive use of self-paced, immersion learning software resources.

    3.   Bring the instruction and the integration of course content as well as practice to the learner rather than bring the learner to the campus.

    4.   Increase productivity of a small dedicated faculty/staff while reducing or containing costs of instruction/learning.

E.   Establishment of information infrastructure that will continue to meet the needs of both the students practicing at experiential sites as well as the preceptors within those sites.

    1.   Seamless access to campus and Internet-based resources regardless of remoteness of the experiential site.

    2.   Two-way interactive audio/video desktop conferencing meetings.

    3.   Synchronous or asynchronous project meetings and study groups.

    4.   Online electronic discussions, one-on-one or one-to-many.

    5.   Projects focusing on solving real problems in collaboration with students locally or anywhere we have experiential sites.

F.   Enhance communication between learners and faculty/staff

    1.   Use of electronic resources, such as World Wide Web information sources, including real-time access to campus and global materials.

    2.   Use of digitized lectures or discussions, electronic films or libraries; access to comprehensive databases of primary (e.g., patient management data) or secondary (e.g., Medline) research materials.

    3.   Problem-solving exercises addressing real problems linked to current events (e.g., disease state management).

    4.   Facilitated practice research conducted jointly by faculty and learners.

Program Philosophy

A. The pharmacist will be treated with respect at all times.

B. Practicing pharmacists will be involved in the development and implementation of the program.

C. The pharmacist is a partner with the faculty in the learning process.

D. Methods of instruction should utilize two-way communications.

E. Demands of the program will be balanced against (and sensitive to) the demands of the pharmacist's professional and personal lifestyles.

F. Pharmacists should be encouraged to reflect on their and other participant's life experiences.

G. Instruction should clearly relate to the pharmacist's daily problems and opportunities.

H. Pharmacists will be encouraged and supported in their efforts to become effective agents for change in their practice communities.

Program Content

The Non-Traditional Doctor of Pharmacy program will involve three phases.

Phase I (2 months)–Initial orientation to the technology and basic skills evaluation (60 hours–4 semester hours)

- Orientation to technology–Internet, databases, file transfer and electronic mail

- Data collection techniques

- Principles of pharmacokinetics

- Basics of therapeutic drug monitoring

- Drug literature evaluation (including introduction to clinical research and statistics)

- Standardized Patient Assessment (**SPA**)

- Formation of clinical teams (6 pharmacists, 1 faculty mentor, 1 librarian and 1 computer support person)

Phase I will be offered through a combination of onsite and computer-based instruction. It will begin with two executive weekend seminars designed to orient the non-traditional student to the campus, the technology, systems resources (e.g., library, databases and Internet resources), and a skills assessment (knowledge and problem solving) and an orientation to the system resources. The orientation will continue on-line in which the learners will exchange e-mail, group problem-solve and retrieve information as part of structured exercises.

Phase II (16 Months)–Participation in four integrated courses consisting of five therapeutic modules each. Each integrated course will be modeled after the undergraduate curriculum. Each course will be approximately four months in length (344 hours; 8 semester hours each for a total of 32 semester hours). Each module will include an experiential component designed to integrate acquired skills and knowledge with practice problems.

Orientation	Integrated Modules				Capstone Rotation(s)
	Resource Team Support				
	Online Dialogue				
	Experiential Component				
	SPA		SPA		SPA

APPENDIX D (continued)

Certificate programs will be provided for pharmacists who only desire advanced certification or would like to try one module of the curriculum before deciding to pursue a non-traditional Doctor of Pharmacy degree. Hypothetically, the first four month module will contain many of the content areas desired by pharmacists responding to the market survey. Specifically, respiratory, renal, and cardiovascular care will be covered in the first module and will be packaged for delivery as certification programs.

A hypothetical integrated therapeutic module consisting of **344 total hours** (8 semester hours) is presented below. Activity in the module is divided between team or cohort instruction (asynchronous), team interaction and individual interaction with content resources (books, CD-ROM and Internet). Team interaction would be in either real or virtual (e.g., e-mail, synchronous and asynchronous computer conferences) environments. Individual interaction with fixed and dynamic content resources is activity devoted to study, completion of module assignments and exercises conducted with patients from the learner's environment. It is anticipated that learners will accumulate a <u>minimum</u> of 74 experiential hours in each module. The completion of some modules, together with the requisite number of experiential hours would constitute a **certificate** course. Certificate courses would be offered to a limited number of pharmacists as an alternative to the entire Non-Traditional curriculum. Pharmacists would be eligible for two (2) certificate courses per year.

Example of an Integrated Therapeutic Module (8 semester hours)					
	General Information	Core Principles and Concepts	Application of Core Principles and Concepts	Problem Solving (experiential)	Total Hours
Real-time interaction within **cohort** with structured instructional activities in virtual environments	2	21	21	20	64
Asynchronous interaction with **cohort** without structured instructional activities in virtual environments	4	15	15	10	44
Team interaction with fixed content resources in real or virtual environments	2	32	32	16	82
Individual interaction with fixed and dynamic content resources in real or virtual environments	10	58	58	28	154
	18	**126**	**126**	**74**	**344**

A Standardized Patient Assessment will be performed for feedback and to determine the number of Experiential Rotations each learner must complete. All learners must complete at least one Capstone Experiential Rotation. Determination of the number of required rotations will be made by the Progressions Committee.

Phase III (2-6 months)–Capstone Experiential Rotations (one-three rotations–2 months each–total of 9 semester hours)–conducted at approved experiential sites. The capstone experiential rotations will consist of up to six months of activity focused on skill integration, clinical problem-solving and will include documentation of the implementation of at least one (1) patient management program (e.g., diabetes monitoring).

Learners will be assisted by an onsite clinical coordinator and a resource team (1 mentor, 1 librarian and 1 computer support technician). Learners will be required to return to campus for a formal presentation of their evaluation of the patient management program and for a final Standardized Patient examination.

Program Size

Initial cohort	(September 1, 1998)	30 students
Second cohort	(January 1, 1999)	36 students
Third cohort	(April 1, 1999)	42 students
Fourth cohort	(September 1, 1999)	48 students
Subsequent cohorts	(January 1, 2000-later)	48 students

No more than 288 students will be enrolled in all phases of the program unless (and until) School of Pharmacy resources permit expansion

Methods of Delivery

A. Face-to-face instruction will be used during the orientation phase.

B. Videotapes may be used in selected areas (e.g., physical assessment) but sparingly overall.

C. CD-ROMs will be used as a means of information delivery linked to the non-traditional homepage for the purposes of delivering integrated material (e.g., anatomy). Interactive Multimedia–as component of integrated material.

D. Audio–Interactive Multimedia–as component of integrated material (e.g., physical assessment)

E. Computer

1. E-mail–extensively throughout all phases and post graduation

2. World Wide Web–extensively throughout all phases

3. Computer conferencing–extensively in Phases II and III

4. Chat Rooms–extensively in Phases II and III

5. Databases–extensively in Phases II and III

F. Information Channels

The information channels summarized in the following table further define the applications of the computer and the Internet in this program.

APPENDIX D (continued)

Information Channels (Distance Education Medium)

Channel	Channel Abbreviation	Concentration	Sync./Async	Author	Hours	Audience
Electronic Mail	EM	Throughout	Async	All groups	4	Resource Team–Team–Cohort
Push Content	PC	Throughout	Async	Resource Team	2	Cohort
Videotape	V	Introduction	Async	Content Team	2	Cohort
Telephone/WWW Conference	TWC	Modules	Sync	Content Team	2	Team
Computer Conference	CC	Laboratorie	Async	Facilitator/Resource Team	3	Team
Live Presentations	LP	Intro. To Modules	Sync	Content Team	.5	Cohort
Small Group Meetings	SGM	Cases/Review	Sync	Facilitator	1.5	Team
Streaming Audio/Video	SAV	Modules	Async	Content Team	5	Cohort

Electronic Mail–Informal, individual or group communication. Distribution of files and WWW pages.

Push Content–Preparation and distribution automatically of content. Example: practice protocols or DUE results.

Videotape–VHS studio quality lectures, generally expert panel discussions to emphasize overall changes in clinical practice.

Telephone/WWW Conference–telephone conference call with synchronized Web-based Powerpoint® slides

Computer Conference–Similar to electronic mail, but it is basically a group interactive exercise where all participants have access to everyone else's comments. Generally uses a facilitator to maintain order and to move the communication process to a timely conclusion.

Live Presentations–Generally reserved for content that cannot easily be distributed over the Internet. Examples: guest speakers, conferences, introduction to skills (Internet, physical assessment, etc.)

Small Group Meetings–case presentations, problem-solving and testing.

Streaming Audio/Video–distribution of pre-recorded audio or video over the Internet on an asynchronous basis.

Shenandoah University
Non-Traditional Doctor of Pharmacy Program
Revised Budget
August 4, 1998

Personnel	FY 1998-99
Program Coordinator (1 FTE)	$77,250
Administrative Assistant (1 FTE)	$24,308
Media/Web Page Support (1 FTE)	$45,577
Informatics Faculty (1 FTE)	$53,560
Drug Information Specialist (1 FTE × 10 months)	$34,167
Pharmacy Practice Faculty (1 FTE × 10 months)	$58,333
Pharmacy Practice Faculty (1 FTE × 12 months)	$75,000
Temporary Employee (1 × 0.5 FTE × 1.5 months)	$720[1]
Temporary Employee (1 × 0.25 FTE × 10.5 months)	$2,940[2]
Work Study Student (1 × 0.25 FTE × 12 months)	$2,000
	$373,855
Operations and Maintenance	
Faculty/Staff recruitment	$8,000[3]
Honorariums	$8,000[4]
Supplies	$5,000
Software	$25,000
Duplication and Printing	$10,000
Journals	$2,000
Document procurement & distribution	$4,000[5]
Postage	$5,000
CD-ROM mastering and duplication	$7,500
Telephone Regular usage	$2,000
Toll Free usage	$5,000
Advertising	$2,000
Travel	$8,000
Conferences	$5,000
Meal charge	$3,000
Continuing Education (ACPE Provider Dues)	$3,500
	$103,000
Equipment/Furniture	
Web server	$13,000
Electronic white boards (2)	$6,000
Workstations with 17" monitors (3)	$11,260
Videotape cameras and editing equipment (1)	$3,000
CD-ROM Replicator	$7,000
T-1 Line Annual Costs	$12,840
Office furniture (3 configurations)	$8,000
	$61,100
Total	**$537,955**

Total 12 month expenditure	$537,955.00	
Total 12 month revenue	$541,687.50[6]	
Revenue	$3,732.50	

[1]Based on $6.00/hr for 6 weeks of employment
[2]Based on $7.00/hr for 10 hours per week for Mike Weisburg's extension
[3]Funds transferred to the general pharmacy school account
[4]Includes payment for actors in two (2) Standardized Patient Assessments
[5]Includes provision for purchase of copyright releases for distributed documents

APPENDIX D (continued)

1998 Revenue Projections

Revenue based upon monthly fee

Cohort	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
1 (30)			$25,312.50	$25,312.50	$25,312.50	$25,312.50	$25,312.50	$25,312.50	$25,312.50	$25,312.50	$25,312.50	$25,312.50	$253,125.00
2 (36)							$30,375.00	$30,375.00	$30,375.00	$30,375.00	$30,375.00	$30,375.00	$182,250.00
3 (42)										$35,437.50	$35,437.50	$35,437.50	$106,312.50
													$541,687.50

Revenue based upon credit hour fee

Cohort	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
1 (30)			$54,000.00		$108,000.00				$108,000.00				$270,000.00
2 (36)							$64,800.00		$129,600.00				$194,400.00
3 (42)										$75,600.00			$75,600.00
													$540,000.00

Attachment A
Non-Traditional Doctor of Pharmacy Programs
(N = 18)
July 1995

Admission

Required for admission into a Non-Traditional Doctor of Pharmacy Program

Interview	9	
Demonstration of oral skills	9	
Demonstration of written skills	10	
Demonstration of computer skills	3	(AZ, FL, Creighton)

Administration

Class size admitted	25
Number of classes per year	1-2
Concurrent class size (program limit)	86
Time limit	5 yrs.

Fees

Application Fee	$37.00
Tuition	$244.45/credit hour
Total Estimated Cost	$14,277.91 (Range $5,427-$30,740)
Total Hours to Graduate	50 (Range 25-73)

Curriculum

Credit for Prior Life Experience	10
Credit for Challenge Exams	7
Core Hours Required	35
Elective Hours Required	7
Clerkship Rotations Required	4 (38 hrs./week)
Elective Clerkship Rotations	3 (37 hrs./week)
Weekend/evening courses	5 (28%)
Home study/Independent study	8 (44%)
Distance learning courses	9 (50%)

APPENDIX D (continued)

Attachment B
Survey of Pharmacy Practice[7]
(N = 257)
July 1997

Gender:	Male	153 (59.8%)
	Female	103 (40.2%)
Age:	Average	39.6
Practice Setting:	Hospital Pharmacy	88 (31.1%)
	Chain	60 (21.2%)
	Independent	46 (16.2%)
	Nursing Home/Consultant	17 (6.0%)
	Ambulatory Care Clinic	13 (4.6%)
	Other	59 (20.8%)
Licensed to Practice:	Virginia	156
	Maryland	122
	Pennsylvania	37
	West Virginia	22
	Washington, DC	17
	New York	16
	North Carolina	14
	California	10
	Other States (25)	70
Interested in:	Certification	133
	Pharm.D.	194
Certificate Programs:	Diabetes Care	75
	Pain Management	60
	Infectious Disease Care	57
	Pharmacy Management	52
	Pharmacokinetics	52
	Drug Information	52
	Nutrition	51
	Respiratory Care	41
	Geriatric Care/Admin.	41
	Cardiovascular Care	39
	Intravenous Home Therapy	39
	Managed Care	39
	Psychiatric Care	38
	Pediatric Care	36
	Anticoagulation	31
	Immunizations	30

[7]Results of a survey mailed to 869 pharmacists in a four state area (Maryland, Virginia and Pennsylvania, and West Virginia) in July 1997

Pharmacy Informatics	27
Investigational Drug Ser.	17
Nuclear Pharmacy	10
Professional Re-entry	6

Most Important Consideration:

Self-paced Instruction	84
Close to home	74
Cost	69
Credit for advanced degree	64

Most favored instructional method:

Self-instruction workbooks	121
Videotapes	102
Internet	58
Lecture	50
Audiotapes	33
Small group discussion	31
Computer network	22
Interactive television	14
Conference call	11
Broadcast television	9

Do you own a personal computer?	Yes	186 (77.2%)
	No	55 (22.8%)
If NO, are you willing to purchase a computer?	Yes	52

Willing to pay for Pharm.D.	$1,800	95
	$4,500	101
	$7,200	12
	$14,900	2

Length of study	1 Year	26
	2 Years	108
	3 Years	74
	4 Years	27
	5 Years	9
	6 Years	1

Consider pursuing degree	12 Months	89
	1-2 Years	88
	3-4 Years	24
	6-8 Years	8

APPENDIX E

Doctor of Pharmacy-Master's of Business Administration

Proposal

While completing the requirements for the Doctor of Pharmacy degree, students may take courses at the Harry F. Byrd Jr. School of Business toward the MBA degree. The prerequisite and core courses for the MBA degree are listed below:

Required Prerequisite Courses

Students may waive certain prerequisite courses if they have completed equivalent courses during their prepharmacy and pharmacy education.

ACCT 501   **Financial Accounting–May be waived if the student has taken the equivalent of Principles of Accounting I and II**

ECN 501   **Economic Concepts and Policies–May be waived if the student has taken the equivalent of Principles of Macroeconomics and Principles of Microeconomics**

BUS 501   **Introduction to Management and Marketing–Satisfied by successful completion of Professional Practice Management (PHAR 704)–3 Semester Hours**

MIS 501   **Decision Making Tools–waived upon completion of a pre-pharmacy computer skills course and Introduction to Pharmacy Practice Computer Laboratory (PHAR 502)–3 Semester Hours**

Core Curriculum

MGT 511   **Systems Management and Organizational Theory–An intensive study of the development of management and organization theory, the functions of management, and the systems approach to management. Emphasis will be placed upon modern tools and techniques of decision-making science, and computer-based information systems. Case studies will supplement and amplify theoretical considerations. Prerequisite: BUS 501. Three credits.**

MIS 511   **Quantitative Techniques in Business–Satisfied by successful completion of Biostatistics (PHAR 705) and Clinical Research Methods (PHAR 714)**

MGT 513   **Organizational Behavior–An examination of the behavior of individuals and groups within goal-seeking organizations, with a focus upon: (1) the fundamental theoretical arena that comprises the field of organizational behavior, (2) the link between the worlds of theory and administrative practice, and (3) the cognitive dimensions of the individual as an organizational actor. Prerequisite: MGT 511. Three credits.**

ACCT 511   **Managerial Accounting–A study of the utility of accounting data and other financial information available to management in the functions of planning, organizing, and decision-making, with focus on techniques used in analyzing and interpreting the financial statements of industrial and commercial business enterprises. Managerial accounting concepts and issues will be considered primarily from the viewpoint of the user of such information. Prerequisite: ACCT 501. Three credits.**

MKT 511   **Marketing Theory and Practice–An opportunity to provide students with a comprehensive understanding of marketing functions, institutions, and concepts, including studies of marketing functions and strategies of demand analysis, product planning, pricing, distribution, promotion, and marketing forecasts from the viewpoint of the manager. Emphasis will be placed on the analysis of marketing problems involving the creation, distribution, and sale of goods and services within the context of coordinated marketing planning and marketing information systems. Prerequisite: BUS 501. Three credits.**

MIS 513 **Management Science and Information Systems**–A study of the nature and uses of computers as an integral function in the operation of management information systems. Analysis of the techniques for collecting, recording, manipulating, and displaying internal and external information relevant to the planning for operation and control of the firm at various levels of management is stressed, with particular attention to forecasting methods as an element in planning for the future activities of the business enterprise. Prerequisite: MIS 511. Three credits.

ECN 511 **Macroeconomics for Management**–This course is designed to develop skill in: (1) understanding the structure and operations of the macroeconomic system; (2) forecasting the impacts of governmental policies and other influences on the economy; and (3) understanding the influence of the economy on individual firms. The business executive has a special interest in business fluctuations; the level of economic activity affects the volume of business and the ability to operate profitably. This course will provide the background which is needed by business executives to understand the factors which contribute to economic growth and stability, and to the level of national income. Since management decisions are made within the macroeconomic environment, the interrelationship of managerial and macroeconomic concepts is stressed. Prerequisites: MIS 511. Three credits.

MGT 527 **Health Care Management**–An exploration and analysis of problems, using the case method, affecting health care delivery and disease-prevention systems in the United States. This higher-level, problem-solving based course will explore the complex interrelationships between community, society, government, patients/clients, and professional groups. Students will be prepared as decision makers to act in the dynamic, challenging, and stressful environment. Prerequisite: MGT 525 or premission of instructor. Three credits.

MGT 611 **Management, Policy Formulation, and System Analysis**–A capstone course dealing with management responsibilities in the areas of managerial and business policy and corporate strategy with emphasis on the application of concepts through decision simulation methods and case studies on topics such as acquisitions, mergers, environmental protection, taxation aspects, political and social factors, and international business. The focus is on the management of these items toward the formulation and achievement of the objectives of the business enterprise. Prerequisite: This is the final course in the MBA program; students should have completed at least 30 semester hours of the degree program. Three credits.

Electives (3)

Drug Development and Marketing

Pharmacy Entrepreneurship

Pharmacy in Managed Care Environments

Pharmacy Informatics

Health Economics

Hospital Pharmacy Administration

Advanced Drug Marketing

APPENDIX E (continued)
Hypothetical Plan of Study

YEAR	COURSES	CREDIT
Year 1-2 (Summer)	Financial Accounting (ACCT 501)	3 hours
	Economic Concepts and Policies (ECN 501)	3 hours
Year 2 (Fall)	Systems Management & Organizational Theory (MGT 511)	3 hours
Year 2 (Spring)	Organizational Behavior (MGT 513)	3 hours
Year 2-3 (Summer)	Managerial Accounting (ACCT 511)	3 hours
	Health Care Management (MGT 527)	3 hours
	Marketing Theory & Practice (MKT 511)	3 hours
Year 3 (Fall)	Macroeconomics for Management (ECN 511)	3 hours
	Professional Practice Management (PHAR 704)[1]	3 hours
	Biostatistics (PHAR 705)[2]	3 hours
Year 3 (Spring)	Clinical Research Methods (PHAR 714)[3]	3 hours
	Professional Practice Management Elective (PHAR 712)[4]	3 hours
Year 3-4 (Summer)	Management Science and Information Systems (MIS 513)	3 hours
	Management, Policy Formulation & Systems Man. (MGT 611)	3 hours
Year 4 (September)	Business Internship (BUS 601)[5]	3 hours

[1]Represents first of three MBA Electives
[2]Represents partial completion of MIS 511 requirement
[3]Represents partial completion of MIS 511 requirement
[4]Represents second of three MBA Electives
[5]BUS 601 also counts as one professional rotation within the pharmacy curriculum and as the third required elective in the MBA curriculum

FN: mbapro.wpd
FD: September 11, 1997
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