A Survey of Instructional Technology Assets and Support Services at U.S. Schools and Colleges of Pharmacy

Z.Tom Grapes, Diane Johnson and Hewitt W. Matthews
Southern School of Pharmacy, Mercer University, 3001 Mercer University Drive, Atlanta GA 30341-4155

In order to assess the current state of informational technology in US Schools of Pharmacy, three surveys were sent to each of the 79 schools. These surveys addressed the resources and support services for three critical areas: computer services, educational media, and telecommunications. The overall, usable response rate was 129 (54.4 percent). Analysis of the data indicated that the vast majority of schools were utilizing these important resources to fulfill their educational mission; however, great diversity was reported in both the resources and support services that were provided. Moving into the new millennium, the utilization of these resources will continue to increase in importance.

INTRODUCTION

As pharmacy schools move from exploratory efforts to widespread use of instructional technology, do they possess sufficient hardware and support? Even where hardware assets are sufficient, support may be de-focused and spread among areas traditionally referred to as “media,” telecommunications, and “computing.” Support units may not be focused entirely on the pharmacy schools, as many schools receive services from general campus based operations.

Although there have been several studies regarding the instructional use of computing in pharmacy education, a literature review yielded a dearth of descriptive surveys of instructional technology resources at schools of pharmacy. The Bootman, et al. 1986 study(3) of the spread of computer technology in pharmacy schools and DeMuth’s 1991 survey of continuing education delivery systems(4) represent the readily identifiable published surveys. Also, in 1991, one of the co-authors of this paper surveyed pharmacy schools’ media services departments(5). This survey was conducted just before the proliferation of Internet connections and widespread deployment of multimedia personal computing systems. Considering the massive changes in computer-mediated communications, distance education, and other instructional technologies brought on by technical advances, and the declining acquisition costs, these computer and media surveys are outdated and may not adequately describe the present infrastructure.

Responding to a need for a more current comprehensive inventory, a descriptive survey of the instructional technology assets and support services was constructed and mailed to schools of pharmacy during the spring of 1997. The locus and types of instructional technology support were explored, and the degrees to which technology-intensive educational tools are being deployed were determined. Potential roadblocks such as a lack of hardware, insufficient support services, or defocused support were uncovered. This information is believed to be timely and valuable to pharmacy educators, pharmacy school administrators, technology vendors and granting agencies.

OBJECTIVES

The primary goal of this study was to inventory the information technology assets available at schools of pharmacy. The
Table I. Demographics*  

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Computer</th>
<th>Media</th>
<th>Telecommunications</th>
<th>Universe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry-level offered</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PharmD</td>
<td>25 (58.1)</td>
<td>23 (59.0)</td>
<td>26 (55.3)</td>
<td>45 (57)</td>
</tr>
<tr>
<td>BS</td>
<td>8 (18.8)</td>
<td>9 (23.1)</td>
<td>12 (25.5)</td>
<td>19 (24.1)</td>
</tr>
<tr>
<td>PharmD and BS</td>
<td>10 (23.3)</td>
<td>7 (17.9)</td>
<td>9 (19.1)</td>
<td>15 (19)</td>
</tr>
<tr>
<td>Institution type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State/Public</td>
<td>30 (69.8)</td>
<td>25 (61.1)</td>
<td>31 (66.0)</td>
<td>55 (69.6)</td>
</tr>
<tr>
<td>Private</td>
<td>13 (30.2)</td>
<td>14 (35.9)</td>
<td>16 (34.0)</td>
<td>24 (30.4)</td>
</tr>
<tr>
<td>Calendar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester</td>
<td>33 (76.6)</td>
<td>31 (79.5)</td>
<td>38 (82.9)</td>
<td>65 (82.3)</td>
</tr>
<tr>
<td>Quarter</td>
<td>10 (23.3)</td>
<td>8 (20.5)</td>
<td>9 (19.1)</td>
<td>14 (17.7)</td>
</tr>
</tbody>
</table>

*Chi Square analyses were run on each of the response rates. These analyses indicated that there were no significant differences between the percentage responding in the category and the universe.

METHODS

All 79 U.S. colleges and schools of pharmacy received questionnaires and prepaid addressed mail envelopes. One questionnaire was directed towards individuals responsible for “media,” sometimes thought of as “audiovisuals,” and more recently referred to as “instructional media” or “educational media.” This questionnaire requested information about the types of resources available, services offered, and demands placed on “media” support services. A second questionnaire targeted individuals responsible for “computing,” sometimes referred to as “information services,” “academic computing” or “computer services.” A third questionnaire focused on telecommunications and was routed to departments in charge of continuing education and/or telecommunications.

Questionnaires with cover letters were mailed to the Deans of all schools and colleges of pharmacy in the United States. A cover letter, which went out under the signature of the Dean of the Mercer University Southern School of Pharmacy, requested that the surveys be routed to the appropriate person as determined by the Dean of each school. This method was used to insure that the surveys went to individuals best able to provide useful answers. After 30 days, a follow up e-mail was sent to non-responding institutions. Data were entered into Statistix®(6) and statistics were generated.

RESULTS

A total of 129 usable responses were received. The overall response rate was 129(54.4 percent). The response rate by type of survey was 43(54.4 percent) for Computer Services, 39(49.4 percent) for Educational Media and 47(59.5 percent) for Telecommunications/Continuing Education.

Table I lists the responses which were received on the three surveys. Chi square analyses were conducted to determine if the respondents differed from the universe of 79 pharmacy schools on any of the three basic demographic categories upon which schools of pharmacy are normally classified. These demographic categories included educational degree offered, whether the university was a public or private institution, and whether the school operated on a semester or quarter term. No significant difference was found. Thus, it appears that on the three basic demographic variables that are often utilized to describe schools of pharmacy, respondents appeared to be very similar to the universe.

Computer Services

There was a wide variation in the number of individuals employed by the computer center that served the pharmacy school. The number ranged from 0 to 100 employees with an mean number of 14.5. Despite this wide variation over two thirds (67.4 percent) of schools provided training workshops for students and faculty.

Fewer than one-half of all schools (37.9 percent) purchase computers through a contractual agreement. Only six schools (14.3 percent) required students to have their own computers. Of those schools which did require students to have computers, four required students to have laptop computers.

The vast majority of schools (95.3 percent) had a computer laboratory with 53.7 percent of schools reporting that the laboratory serves only the pharmacy school. These computer laboratories were open an average of 94.1 hours per week. Almost all of the laboratories (90.2 percent) had direct access to the main computer server. The most frequently mentioned operating system available in the laboratories was Windows 95 (59.5 percent), followed by Windows NT (47.6 percent) and Macintosh (38.1 percent), and Unix (2.4 percent).

The number of laboratory computers varied from five to 2,000 with an average of 101.5 computers. Many of the schools (41.6 percent) are in universities where the laboratory serves many different academic disciplines.

The majority of computer laboratories offered Internet access (97.4 percent) and computer scanners (61.9 percent). Only 50 percent offered audio headsets. These laboratories are normally manned by a combination of staff and student workers (61 percent). Almost all of the computer laboratories (92.9 percent) provided unlimited printing capability to students. Only 11.9 percent charge for printing and 28.6 percent provide access to a color printer.

Fewer than one-half of the schools reported providing students dial-in access to a campus server. One important
related area is the number of modems per student. Although this question was asked, the majority of respondents indicated that they did not know (52.4 percent) or that there were not enough modems (38.1 percent).

One other trend that was reported in the computer survey was faculty computer connectivity. Over eighty-three percent reported that faculty were networked to their file server. Additionally, 90.7 percent indicated that faculty were networked to a central printer.

Educational Media

The vast majority of Education Media Departments (EMDs) (74.4 percent) reported that they served the pharmacy school with a lesser number indicating that they served a medical school (15.4 percent) and a health science center (10.3 percent). The number of employees in this department varied greatly ranging from one (22.6 percent) to 40 employees with 71 percent having 7 or fewer employees.

EDM’s functions can be divided into three specific activities: (i) provision of audio-visuals; (ii) production services; and (iii) provision and maintenance of classroom audio-visual (AV) equipment support.

Provision of Audio-Visuals. Figure 1 indicates the percentage of EMDs that provide specific types of audio-visual services to pharmacy schools. The majority of EMDs provided AV equipment scheduling and delivery, an IBM multimedia workstation, AV viewing and listening stations, and desktop computers for lecture support. On the other hand, fewer than 50 percent provided:
• Mac multimedia workstations
• non-print circulation
• audiovisual preview
• audiovisual collection development
• laptop computers for lecture support
• on-line searches for AV material

Production Services. The second type of service provided by EMDs is production services. These services include creation of educational materials by both computer and non-computer methods. Figure 2 indicates the production services provided by EMDs. This area appears to be one of the best-developed services of EMDs. Over two-thirds of the schools reported the provision of:
• videotape recording
• computer printing

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Table II. Classroom support services

<table>
<thead>
<tr>
<th>Service availability</th>
<th>Percent of colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Utilize Computer/Video Projection Systems</td>
<td>94.7</td>
</tr>
<tr>
<td>Videotape classes</td>
<td>75.7</td>
</tr>
<tr>
<td>Videotape situational role playing</td>
<td>73.0</td>
</tr>
<tr>
<td>Create classroom support materials (slides, etc.)</td>
<td>69.2</td>
</tr>
<tr>
<td>Faculty utilized CD ROMS in lectures</td>
<td>65.7</td>
</tr>
<tr>
<td>EMD responsible for classroom computers</td>
<td>60.5</td>
</tr>
<tr>
<td>Faculty produce videotapes for classroom use</td>
<td>52.8</td>
</tr>
<tr>
<td>Other department involved in classroom support</td>
<td>47.2</td>
</tr>
<tr>
<td>Have video production unit</td>
<td>44.4</td>
</tr>
<tr>
<td>Audiotape classes</td>
<td>43.2</td>
</tr>
<tr>
<td>Have video production studio</td>
<td>41.0</td>
</tr>
<tr>
<td>Other departments responsible for production of classroom support material</td>
<td>26.5</td>
</tr>
</tbody>
</table>

Table III Teleconferencing abilities

<table>
<thead>
<tr>
<th>Teleconferencing ability</th>
<th>Percentage of schools reporting availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video distribution network serves users other than pharmacy</td>
<td>72.2</td>
</tr>
<tr>
<td>Served by video distribution network consortia</td>
<td>51.2</td>
</tr>
<tr>
<td>Member of telecommunication</td>
<td>32.5</td>
</tr>
<tr>
<td>Satellite uplink capability</td>
<td>32.4</td>
</tr>
</tbody>
</table>

tween one and 21 classrooms equipped with this type of equipment. Specifically, the following equipment was available in three or less classrooms:
- Computer for Lecture Support: 76.2%
- Video Projectors: 66.7%
- Data/Video Monitors: 57.1%
- Videotape Players: 47.8%

A query was also made regarding the audio equipment available in classrooms. Seventy point four percent indicated that three or more classrooms were equipped with an audio amplification system while 47.4 percent indicated that three or more classrooms were equipped with an audio player/recorder.

The final topic investigated in this survey was the type of presentation software utilized by the faculty at the school. The percentage of schools indicating that some or all of the faculty utilized the type of presentation software is presented below.

Microsoft’s PowerPoint® was the dominant software. The vast majority of respondents indicated that their faculty utilized either the Windows version (97.4 percent) or the Macintosh version (61.5 percent) of PowerPoint®. Other presentation software that one-quarter or more of the respondents reported being utilized included Harvard Graphics® (Windows/DOS - 38.5 percent/35.5 percent), Word Perfect Presentations® (30.8 percent) and Corel® (25.6 percent). Lotus Freelance®, Aldus Persuasion®, Word Perfect Presentations® (DOS) and Delta Graphics® (Windows) was reported by less than one-fourth of the respondents.

Telecommunications/Continuing Education

The final questionnaire addressed the utilization of telecommunications to provide educational services to distant learners. Respondents were either the Director of Continuing Education or the Director of Telecommunications.

Most respondents (74.4 percent) indicated that their department provided continuing education to the pharmacy school exclusively. The remainder provided services to other schools or other campuses.

Variety of the size of the departments was striking. The number of employees varied from 0.1 FTEs to 40 FTEs with 54.8 percent having two FTEs or less and 71.4 percent having three or less FTEs. The next part of the questionnaire addressed the schools’ teleconferencing capability. The results of these questions are reported in Table III. The remainder of the questionnaire addressed the specific mechanism used for video conferencing. Results are presented in Figure 3.

Results of the survey indicated that 32.4 percent of schools reported that they had satellite uplink and downlink capabilities. An additional 50 percent reported that they had satellite downlink capabilities only. The majority of the schools also indicated that they had video and computer based capabilities within and between the buildings of the school. Fifty-five percent reported that they had videoconferencing systems. A large number of the schools that did not provide these services (16.2 percent to 27.5 percent) plan to add these communication tools soon.

Finally, a question was asked as to the method of teleconferencing in place. These results which are shown in Figure 4 indicated that the majority of the schools had T1 lines with a smaller percentage utilizing ISDN, OC3 or microwave capabilities.

DISCUSSION

The overall results of these surveys showed a wide variance in the technological infrastructure. Those schools that have taken advantage of information technology are poised to be...
leaders in the new millennium. Those schools who have not taken advantage of this teaching methodology may find themselves at a substantial disadvantage in the future.

The results of this survey suggest that perhaps AACP could play a role in facilitating the formation of a computer buying consortium. As more schools utilize information technology and the computer becomes an integral part of all pharmacy students’ education, many schools will begin to require that students either own or have ready access to a computer. Together, as a computer-purchasing consortium, the pharmacy schools would have the necessary buying power to help make this technology affordable.

Currently there are a variety of proprietary systems being used for videoconferencing. Although these systems can indeed communicate with each other, they must go through a bridge which is usually very expensive on a per minute basis. This may also provide AACP an excellent opportunity to establish a teleconferencing/continuing education consortium. With a majority of schools reporting these capabilities, such a consortium may lead to cooperative educational opportunities among member schools. There is an excellent opportunity for both a buying and a teleconferencing/videoconferencing consortium.

Human resources must not be overlooked. The successful development of human resources depends on training and continuing skill development. Sixty seven percent of the computer survey respondents reported that they provide workshops and training for faculty, students and staff.

CONCLUSIONS

The results of these surveys provide an assessment of the current state of instructional technology available at the 79 schools of pharmacy during the 1996-97 school year. Since technological advancements occur almost monthly, this information is not static.

This study provides a snapshot of the resources and utilization of information technology in pharmacy education. It is a benchmark in an area whose trend pharmacy leaders need to follow closely. A survey of this type should be conducted on a yearly basis for the next five-ten years as we move independently and collectively into the next millennium.


References