Evaluation of Learning Skills Development and Computer-Assisted Learning Strategies Associated with an Orientation Program

Brian L. Erstad and Theodore G. Tong
College of Pharmacy, The University of Arizona, PO Box 210207, Tucson AZ 85721-0207

The promotion of the importance of self-learning skills to students has paralleled the increasing use of computer technologies both in and out of the classroom. The purpose of this investigation was to evaluate an extended orientation session for incoming pharmacy students that included instruction in learning skills development and the use of computer-assisted instructional strategies. Pre- and post-assessment surveys containing questions with Likert-type response scales were completed by the students. Overall, the students found the sessions to be useful, with statistically significant improvements noted in their perceptions of the importance of learning techniques and use of the Internet for health-related purposes. Learning skills development and computer-assisted learning strategies are important aspects of a student’s education, and this can be emphasized and initiated during orientation programs for incoming students.

INTRODUCTION
When describing methods to cultivate intellectual confidence in pharmacy students, Popovich discussed the covenantal relationship between student and faculty member that requires active cooperation by both participants(1). The student’s recognition of the importance of self-learning with ongoing self-assessment is essential for the success of this cooperative effort(2). For example, while the importance of studying for a test and achieving high grades is well-recognized by students, too often, little emphasis is placed on preparing for didactic sessions and learning from a test.

The promotion of the importance of self-learning skills to students has paralleled the increasing use of computer technologies both in and out of the classroom that has been pro-
Table I. Topics covered in extended orientation program

<table>
<thead>
<tr>
<th>First Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Management- discussion of the pressures of academic life in a university setting, along with suggestions for organization of the limited time that is available to maximize the learning experience.</td>
</tr>
<tr>
<td>Class Preparation Demonstration- discussion of how to prepare for classroom instruction with an explanation of the benefits associated with appropriate preparation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning from Questions- discussion of how critical thinking along with adequate class preparation will allow students to maximize the classroom learning experience through appropriate questioning techniques.</td>
</tr>
<tr>
<td>Internet Resources- description of the Internet, along with a discussion of common Internet terminology, the College of Pharmacy home page and other health-related web sites, and search strategies for the Internet.</td>
</tr>
</tbody>
</table>

The class was divided into smaller groups to make the learning experiences more interactive, so the instructors repeated the sessions during each orientation day. Handouts and software materials were provided as needed.

METHODOLOGY

The inception of an extended orientation session for incoming pharmacy students occurred when positive results were noted in a similar process that had been introduced at an adjoining college of medicine. Personnel involved in the development of the latter program assisted the College of Pharmacy in its efforts. These personnel included learning skills specialists and experts in computer-based instructional strategies.

Prior to this project, there was no specific instruction in self-learning processes included in the orientation session for the 50-60 students accepted into the school each year. Until recently, the same could be said of coursework, although self-directed learning is being increasingly promoted and instituted in the curriculum. With regard to the use of computer technologies, over half of the first-year pharmacy students at our institution have home computers, and those who do not have access to computer technologies through our college and the medical center. Not unexpectedly, there are marked differences in computer skills among students. Also, there are a substantial number of students who have apprehension associated with the use of these technologies.

During an introductory portion of the orientation session, students were given a ten-question self-assessment survey designed to appraise their understanding and abilities concerning learning skills development, including computer-based learning. Subsequently, the students attended an introductory pharmacology lecture without any advance preparation. Later, as part of the extended orientation session, the students were given instruction in learning skills development, which included comments concerning the benefits of appropriate preparation for class. The students were also introduced to time management skills. During the first part of this orientation session, the students were informed that they would be given another pharmacology lecture by the same instructor, and were encouraged to prepare for the lecture using the skills discussed in the orientation session. This preparation entailed reading the handout that was distributed for the upcoming pharmacology lecture and writing down questions that resulted from the reading that could be asked during the lecture session.

After attending the second pharmacology lecture, the students were given additional instruction in learning skills development, with emphasis on learning from a test. Also, students were informed about the use of computerized technologies with particular focus on the Internet. Table I contains the titles and brief description of the topics covered in the extended orientation session. Of the three day orientation session (four days counting an informal gathering on a Saturday for students and families), approximately six and one-half hours was devoted to sessions connected directly with this program. The following week, on the first day of scheduled classes, students were given a second survey that included the same ten questions on the initial survey. The second survey (see Appendix) also contained two questions concerning the quality of learning skills presentations and one question concerning the students understanding of the second pharmacology lecture compared to the first.

Two other indicators of the new sessions’ value to the students were available. An administrative official from the school of pharmacy attended the presentations and was verbally queried for his perceived value of the presentations. Also, for the first year of the revised orientation program, the students were asked to evaluate each component of the entire three day orientation period by an instrument that included four questions regarding satisfaction with the new sessions. The responses to the latter questions were used as additional data concerning the benefits of the new sessions.

The extended orientation program was evaluated for two years beginning with its inception in 1997. During the first year of evaluation, the Likert-type scales were compared using both parametric (two-tailed, paired Student’s t-test) and nonparametric (Wilcoxon test) testing. No substantial differences were found between the two testing methods. Subsequently, data from the Likert-type scales obtained during the pre- and post-assessment periods for both years were compared using ANOVA testing by SAS® software. There were three questions on the post-survey instrument that dealt with the students’ understanding of the second pharmacology lecture compared to the first lecture and the students’ assessment of the quality of the presentations. The responses for the two years were compared using an unpaired Student’s t-test. Significance for all testing was defined as P<0.05. Also, internal consistency measures of reliability (coefficient alpha) for the pre- and post-survey items was determined as an indication of scale homogeneity.

RESULTS

At the College of Pharmacy, the demographics of the students over the past several years have been relatively consistent, and the two classes involved in this report are not exceptions. The age range of incoming students is approximately 19 to 45 years (mean 25 years), and the majority of students are women (approximately 60 percent). Twenty to thirty percent of students enter of program with baccalaureate degrees.
were due to higher scores by students in the 1998 class. Isolated, (but significant differences) for some of the questions reflect- a result of the orientation sessions. The ability of the students to prepare for a lec-

For example, two of the questions (5 and 6) dealt with prepar-

The first two questions of the pre- and post-surveys concerned
the students' perceptions of the importance of techniques for
improving learning skills and use of time management princi-

The overall quality of the session on learning skills and
time management was rated above average (4.25±0.28 for
1997 and 3.80±0.95 for 1998 based on a five point scale) by the
students (see Table III), although the mean rating was higher
(P<0.05) for the first year’s session. A similar question con-
cerning the quality of sessions dealing with the Internet and
learning from a test were rated somewhat above average by the
students (3.79±0.32 for 1997 and 3.49±0.11 for 1998 based on
a five-point scale). The administrative official from the school
of pharmacy who attended the sessions said they were infor-
mative and worth keeping in the orientation program assuming
similar positive responses by students. Finally, for the first year
of the revised orientation program, students were asked to rank
the value of each part of the program using a five point scale
(very valuable, valuable, neutral, somewhat valuable, not valu-
able). Table IV contains a summary of the responses for the
questions pertaining directly to the new sessions. Overall, the
responses were consistent with the other survey (i.e., the ses-
sions were of value).

CONCLUSIONS

This investigation was designed to evaluate an extended ori-
enation session for incoming pharmacy students that included
instruction in learning skills development and the use of com-
puter-assisted instructional strategies. Overall, the sessions that
were added to the orientation program were thought to be use-
ful according the students and administrative official attending
the sessions. The lack of differences noted between pre- and
post-surveys for some of the questions was not unexpected.
For example, two of the questions (5 and 6) dealt with prepar-
ing for and taking an examination. Since the students had not
taken an examination using their recently acquired skills, it is
not surprising that they were unwilling to state that their skills
had improved. Also, the students were highly motivated to
learn more about improving learning skills and computers
according to responses on the pre-survey. Therefore, it was not

Table II. Significance (P< 0.05) comparisons of assessment surveysa

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Understanding of techniques for improving learning skills</td>
<td>0.0001</td>
<td>0.0125</td>
<td>0.0003a</td>
<td>0.5092</td>
</tr>
<tr>
<td>2. Understanding of time management for improving learning skills</td>
<td>0.0002</td>
<td>0.0611</td>
<td>0.0001a</td>
<td>0.0258a</td>
</tr>
<tr>
<td>3. Ability to use Internet for researching health-related questions</td>
<td>0.0001</td>
<td>0.0076</td>
<td>0.0001a</td>
<td>0.0377a</td>
</tr>
<tr>
<td>4. Ability to effectively prepare for attending a lecture class</td>
<td>1.0000</td>
<td>0.1716</td>
<td>0.0943</td>
<td>0.7741</td>
</tr>
<tr>
<td>5. Ability to effectively prepare for a test</td>
<td>0.8424</td>
<td>0.0251</td>
<td>0.0154a</td>
<td>0.7305</td>
</tr>
<tr>
<td>6. Ability to learn new information from taking an examination</td>
<td>0.2227</td>
<td>0.4696</td>
<td>0.1583</td>
<td>0.4696</td>
</tr>
<tr>
<td>7. Adequacy of current study skills</td>
<td>0.8508</td>
<td>0.6942</td>
<td>0.2331</td>
<td>0.5476</td>
</tr>
<tr>
<td>8. Comfort level with computers</td>
<td>0.0045</td>
<td>0.4308</td>
<td>0.0023a</td>
<td>0.2825</td>
</tr>
<tr>
<td>9. Motivation to learn more about the use of computers</td>
<td>0.8625</td>
<td>1.0000</td>
<td>0.7547</td>
<td>0.6295</td>
</tr>
<tr>
<td>10. Motivation to learn more about learning skills and time management</td>
<td>0.3289</td>
<td>0.4696</td>
<td>0.4574</td>
<td>0.0160a</td>
</tr>
</tbody>
</table>

aSignificantly higher scores for 1998 compared to 1997.

Table III. Students' evaluation of the orientation sessions (post-survey)a

<table>
<thead>
<tr>
<th>Question</th>
<th>1997</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Understanding of second pharmacology lecture compared to first</td>
<td>3.82±0.31</td>
<td>3.62±0.10</td>
</tr>
<tr>
<td>12. Quality of presentation on learning skills/time management</td>
<td>4.25±0.28</td>
<td>3.80±0.95b</td>
</tr>
<tr>
<td>13. Quality of presentation on Internet research and learning from a test</td>
<td>3.79±0.32</td>
<td>3.49±0.11</td>
</tr>
</tbody>
</table>

a Mean ± standard deviation based on five-point Likert-type scale with 1 being “not at all” and 5 being “very high” for question number eleven, and with a 1 being “poor” and 5 being “excellent” for questions twelve and thirteen.
b Statistically significant difference (P<0.05) between 1997 and 1998.
surprising that there was a lack of significant improvement noted on the post-survey.

Overall, the addition of these sessions to the orientation program appears to be useful from both the perspectives of the student and educators involved in the program. At this time, there are no plans for substantive changes in the material that is being presented. However, ongoing evaluations are planned for future sessions, particularly with some personnel changes that have taken place recently with respect to the educators involved in the new sessions.

Limitations of this study include the times when the surveys were administered and the number of questions on the surveys. The pre-survey results should be fairly indicative of each student’s baseline self-assessment, but the post-survey was administered within a few days of the instructional sessions and post-survey period. It is unknown if the responses would have changed over longer periods of time. Also, the surveys contained a limited number of questions, which hinders the interpretation of reliability. However, the positive results of the survey testing appear to be confirmed by other indicators (e.g., questions related to the sessions on the overall orientation survey and the increased number of students consulting the learning skills specialist throughout the semester). Overall, the addition of the sessions to the orientation program was thought to be a worthwhile endeavor and should be considered by other colleges of pharmacy.


References

APPENDIX. POST-SURVEY: LEARNING SKILLS

NAME __________________

Your identity and the information on this survey will be strictly confidential and will only be summarized with other surveys for the purpose of improving the orientation program. Please circle only one response for each question and complete all questions.

1. Rate your understanding of techniques for improving learning skills.
a. not at all  b. low  c. moderate  d. high  e. very high
2. Rate your understanding of the use of time management for improving learning skills.
a. not at all  b. low  c. moderate  d. high  e. very high
3. Rate your ability to use the Internet for researching health-related questions.
a. not at all  b. low  c. moderate  d. high  e. very high
4. Rate your ability to effectively prepare for attending a lecture class.
a. not at all  b. low  c. moderate  d. high  e. very high
5. Rate your ability to effectively prepare for a test.
a. not at all  b. low  c. moderate  d. high  e. very high
6. Rate your ability to learn new information from taking an examination.
a. not at all  b. low  c. moderate  d. high  e. very high
7. Rate the adequacy of your current study skills.
a. not at all  b. low  c. moderate  d. high  e. very high
8. Rate your “comfort level” with computers.
a. not at all  b. low  c. moderate  d. high  e. very high
9. Rate your level of motivation to learn more about the use of computers for health care education and training.
a. not at all  b. low  c. moderate  d. high  e. very high
10. Rate your motivation to learn more about the use of effective strategies for enhancing learning skills and time management.
a. not at all  b. low  c. moderate  d. high  e. very high
11. Rate your understanding of the second pharmacology lecture compared to the first pharmacology lecture after attending the session on learning skills and time management.
a. not at all  b. low  c. moderate  d. high  e. very high
12. Now that you have had time to reflect, rate the overall quality of the presentation on learning skills and time management that was given during your orientation for pharmacy school.
a. poor  b. below average  c. average  d. above average  e. excellent
13. Now that you have had time to reflect, rate the overall quality of the presentation on Internet research and learning from a test that was given during your orientation for pharmacy school.
a. poor  b. below average  c. average  d. above average  e. excellent

Do you have any additional comments?

Table IV. Students’ evaluation of the orientation sessions (1997 only)

<table>
<thead>
<tr>
<th>Session</th>
<th>Very valuable</th>
<th>Valuable</th>
<th>Neutral</th>
<th>Somewhat valuable</th>
<th>Not valuable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation for a lecture</td>
<td>66</td>
<td>21</td>
<td>9</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Time management workshop</td>
<td>64</td>
<td>28</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Learning from a test</td>
<td>39</td>
<td>28</td>
<td>26</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Internet resources</td>
<td>39</td>
<td>37</td>
<td>20</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

*These were questions extracted from overall survey of the three-day orientation process (1997 only).