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

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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[a]

First Day
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.
Class Preparation Demonstration- discussion of how to prepare for classroom instruction with an explanation of the benefits associated with appropriate preparation.
Second Day
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.
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.

[a]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.

moted by AACP(3). Examples of computer-based instructional strategies have been published in the Journal(4,5), and some educators have advocated courses devoted specifically to increasing computer proficiency by pharmacy students(6).

Although it is hoped that the recognition and development of self-learning and self-assessment skills occurs prior to a student's entry into a school of pharmacy, there is no guarantee that it will. Therefore, the student's orientation to a school may be the first opportunity to begin this educational process. 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.

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(7).

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 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.

Table II. Significance *(P*< 0.05) comparisons of assessment surveys[a]

Question	1997 Pre-post	1998 Pre-post	1997-1998 Pre-pre	1997-1998 Post-post
1. Understanding of techniques for improving learning skills	0.0001	0.0125	0.0003[a]	0.5092
2. Understanding of time management for improving learning skills	0.0002	0.0611	0.0001[a]	0.0258[a]
3. Ability to use Internet for researching health-related questions	0.0001	0.0076	0.0001[a]	0.0377[a]
4. Ability to effectively prepare for attending a lecture class	1.0000	0.1716	0.0943	0.7741
5. Ability to effectively prepare for a test	0.8424	0.0251	0.0154[a]	0.7305
6. Ability to learn new information from taking an examination	0.2227	0.4696	0.1583	0.4696
7. Adequacy of current study skills	0.8508	0.6942	0.2331	0.5476
8. Comfort level with computers	0.0045	0.4308	0.0023[a]	0.2825
9. Motivation to learn more about the use of computers	0.8625	1.0000	0.7547	0.6295
10. Motivation to learn more about learning skills and time management	0.3289	0.4696	0.4574	0.0160[a]

[a]Significantly higher scores for 1998 compared to 1997.

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

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

[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.

With regards to the assessment instrument, the coefficient alpha was 0.63 for the pre-test and 0.77 for the post-test items. 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 principles after attending the new orientation sessions. The students felt they had improved their understanding in both of these areas for both years, although the pre- and post-test differences were not quite statistically significant for 1998 (P=0.0611)(see Table II). Similarly, they felt their ability to use the Internet for researching health-related questions was enhanced by attending the sessions. The ability of the students to prepare for a lecture class did not change substantially between the pre- and post-surveys. However, when asked about their understanding of the second pharmacology lecture after attending the learning skills session, the students felt their understanding was moderately to highly improved (see Table III). With one exception (*i.e.*, ability to prepare for a test, 1998 data, P=0.0251, Table II), there were no significant differences between the pre-and post-surveys for questions related to test taking, specifically examination preparation and ability to learn new information from an examination. Similarly, with one exception (*i.e.*, comfort level with computers, 1997 data, P=0.0045, Table II), there were no significant differences for pre- and post-survey responses concerning adequacy of study skills and comfort level with computers. The students were moderately to highly motivated to learn more about the use of computers and effective learning strategies, and this did not change significantly as a result of the orientation sessions.

As can be seen in Table II, when comparing the students' pre-test responses between 1997 and 1998, there were isolated (but significant differences) for some of the questions reflecting differences in baseline skills for the two classes. Isolated, but significant, differences were also noted for students' post-test responses between the two years. All of these differences were due to higher scores by students in the 1998 class.

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 concerning 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 informative 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 valuable). 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 sessions were of value).

CONCLUSIONS

This investigation was designed 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. Overall, the sessions that were added to the orientation program were thought to be useful 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 preparing 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 IV. Students' evaluation of the orientation sessions (1997 only)[a]

	Percent responses				
Session	**Very valuable**	**Valuable**	**Neutral**	**Somewhat valuable**	**Not valuable**
Preparation for a lecture	66	21	9	2	2
Time management workshop	64	28	4	4	0
Learning from a test	39	28	26	7	0
Internet resources	39	37	20	4	0

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

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.

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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?