

INSTRUCTIONAL DESIGN AND ASSESSMENT

A Pharmacy Business Management Simulation Exercise as a Practical Application of Business Management Material and Principles

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Objective. To implement a pharmacy business management simulation exercise as a practical application of business management material and principles and assess students' perceived value.

Design. As part of a pharmacy management and administration course, students made various calculations and management decisions in the global categories of hours of operation, inventory, pricing, and personnel. The students entered the data into simulation software and a realistic community pharmacy marketplace was modeled. Course topics included accounting, economics, finance, human resources, management, marketing, and leadership.

Assessment. An 18-item posttest survey was administered. Students' slightly to moderately agreed the pharmacy simulation program enhanced their knowledge and understanding, particularly of inventory management, cash flow statements, balance sheets, and income statements. Overall attitudes toward the pharmacy simulation program were also slightly positive and students also slightly agreed the pharmacy simulation program enhanced their learning of pharmacy business management. Inventory management was the only area in which students felt they had at least "some" exposure to the assessed business management topics during IPPEs/internship, while all other areas of experience ranged from "not at all" to "a little."

Conclusion. The pharmacy simulation program is an effective active-learning exercise and enhanced students' knowledge and understanding of the business management topics covered.

Keywords: business, management, simulation, students

INTRODUCTION

Healthcare professions exist to treat illness and promote healthy living, with pharmacies and pharmacists being just one example. While the primary goal is to improve patient health outcomes and quality of life, pharmacies are still businesses and must be run efficiently in order to maintain a customer base, offer clinical services, succeed, and continually grow. Recognizing this, both the Accreditation Council for Pharmacy Education (ACPE) and the American Association of Colleges of Pharmacy (AACP) have highlighted the importance of teaching pharmacy students necessary business principles. ACPE's accreditation standards and AACP's Center for the Advancement of Pharmaceutical Education outcomes outline that topics such as leadership, management, entrepreneurial skills, general management principles,

and personnel management be part of pharmacy curricula and competencies.^{1,2}

As the job market for new pharmacy graduates becomes more and more competitive,^{3,4} an area where students and graduates can distinguish themselves is through leadership in managing both the clinical and administrative facets of a pharmacy. Many students have expressed a desire for a greater focus on managerial topics while some graduates have expressed regret for not having paid as much attention in the management/administration class as they should have. One study showed that after taking a course in which their managerial skills were evaluated, students became aware of the need to have management training as well as the desirability of these skills among employers.⁵⁻⁷ Another study found the positive effects that business management lecture material had on students' self-perceived knowledge and understanding, and more importantly the significantly low levels of business management knowledge and understanding students had if these topics were not covered in the classroom.⁸ While business management topics are important and need attention within the curriculum, how these topics are taught

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is still scattered among accounting, economics, finance, management, marketing, and leadership material⁹ and, more often than not, tailored to the course coordinator's and/or instructors' specific area of expertise and/or interest.

Simulations used in pharmacy education include programmable mannequins used for students to practice clinical skills, standardized patients for students to hone their counseling and communication skills, pharmacology simulations for students to strengthen their drug therapeutic knowledge, and event simulation for pharmacies to determine more efficient ways to operate.¹⁰⁻¹⁴ These simulation technologies have primarily focused on patient care in pharmacy; no literature has described or evaluated the pros and cons of a pharmacy business management simulation. This type of simulation is aimed at teaching students the fundamentals of business analysis and decision making, where the gap between knowledge and application can be bridged by allowing students to make managerial decisions in a virtual reality setting with no real-life risk.¹⁵

Professors and technology personnel at Ohio Northern University (ONU) developed a pharmacy business management simulation program in 2009 via a grant from Apotex, Inc, a generic pharmaceutical manufacturer. The simulation program was an update to an older, MS-DOS-based pharmacy business simulation program. The expanded simulation program provides a Windows-based user interface allowing students to easily enter their financial decisions and access the financial statements necessary to analyze their current and projected business situation. Students do various calculations and make management decisions in the global categories of hours of operation, inventory, pricing, and personnel. The objective of this research was to implement and assess students' perceived value of the pharmacy business management simulation as a practical application of business management curricular material and principles.

DESIGN

The study was conducted at 2 schools: ONU College of Pharmacy and the Philadelphia College of Osteopathic Medicine (PCOM) – Georgia Campus School of Pharmacy, which is a candidate-accredited organization in Suwanee, GA, and served as the off-campus beta-test site for the program. The simulation exercise was conducted both in and outside of class over a multiple-week period with students at each school completing 6 decisions (each decision represented a 3-month period or 1 quarter of the year). Prior to the simulation exercise, lectures on business management (focusing on accounting, financial statements, and financial statement analysis) and the specifics of the pharmacy simulation program and its calculations and interface were delivered to the students. The remainder of each

course also reinforced various concepts covered in the simulation, such as inventory and personnel management. At ONU, 14 lecture hours were dedicated to the financial management section within the pharmacy administration course prior to the simulation. The pharmacy administration course itself was taught during the third year. At PCOM, 10 lecture hours were dedicated to the financial management section within the pharmacy administration course, which was taught during the first year.

Given the large class size at both institutions and limitations of the software at the time, students were assigned to groups of 4 to 5 for the simulation exercise. Each group's first business decisions (the data entered into the simulation software) were based on the starting financial data provided; all subsequent decisions were based on financial statements generated by the pharmacy simulation program. Further, the first decision covered the components described below for a 3-month (or quarterly) period. Thus, all decisions made after the initial data were entered were made by the students through analyzing their pharmacy's financial statements and performance from the previous quarter and then deciding how they wanted to operate in the upcoming quarter.

Each group had to make business decisions based on calculations from their pharmacy's balance sheet, income statement, cash flow statement, prescription volume, and nonprescription drug sales. These business decisions included drug pricing (cash prescription and nonprescription margins and dispensing fee; Figure 1). Within Figure 1, the students' were shown their store type under "Pharmacy Location." Three store types that mirrored current pharmacy practice were included in the software program: medical center (small, independent pharmacy within a medical complex); healthcare center (typical chain pharmacy); and shopping center (mass merchandising store with pharmacy as well, such as WalMart, Target, or Kroger). Students were told to consider how their store type would affect the hours they setup as well as the cash prices they charged their customers. Further decisions included hours of operation; inventory management (monetary ordering amount of both prescription and nonprescription drugs for the set period); and personnel time and benefits management (entering full-time equivalent hours, payroll dollars per hour, and whether benefits were offered). After decisions were made, students accessed the software's history tab to view their financial statements and conduct the subsequent analyses for the next decision set (Figure 2).

EVALUATION AND ASSESSMENT

Once the simulation exercise was complete, an 18-item questionnaire was administered to students at both

schools. The questionnaire used a 7-point, Likert-type scale (1=strongly disagree to 7=strongly agree) on which students rated how well the simulation program enhanced their knowledge and understanding of business management principles. In addition, the questionnaire (via the same 7-point, Likert-type scale) assessed student thoughts on the prior didactic logistics (eg, number of lecture hours prior to the simulation exercise); group dynamics; and the place of the business management course and the pharmacy simulation program in the curriculum. Next, a 5-item, Likert-type scale (1=not at all to 5=very much) was used to assess the amount of exposure the students had to these topics as a pharmacy intern or in their introductory pharmacy practice experiences (IPPEs). Also included on the questionnaire was a 3-item, semantic differential scale to assess students' overall attitude toward using the pharmacy simulation program in the pharmacy administration course. Questions about age, gender, and

desired pharmacy practice career path also were asked, and space for additional comments about the simulation program was provided. Descriptive statistics and tests were used to evaluate the students' perception of the simulation program's value.

One hundred seventeen of 159 (73.6%) ONU students and 75 of 90 (83.3%) PCOM students completed a survey instrument. A majority of the students were 25 years old or less (n=159, 82.8%) and female (n=118, 61.5%). Further, the desired career path that was most frequently chosen was community pharmacy (n=70, 36.5%); "do not know" was the second most frequent response to this item (n=44, 22.9%). Additional demographics for the students are summarized in Table 1. The primary scales (knowledge and understanding; overall attitudes; and introductory pharmacy practice experiences (IPPE)/intern exposure) all showed good reliability data (coefficient alpha range of 0.923 to 0.952).

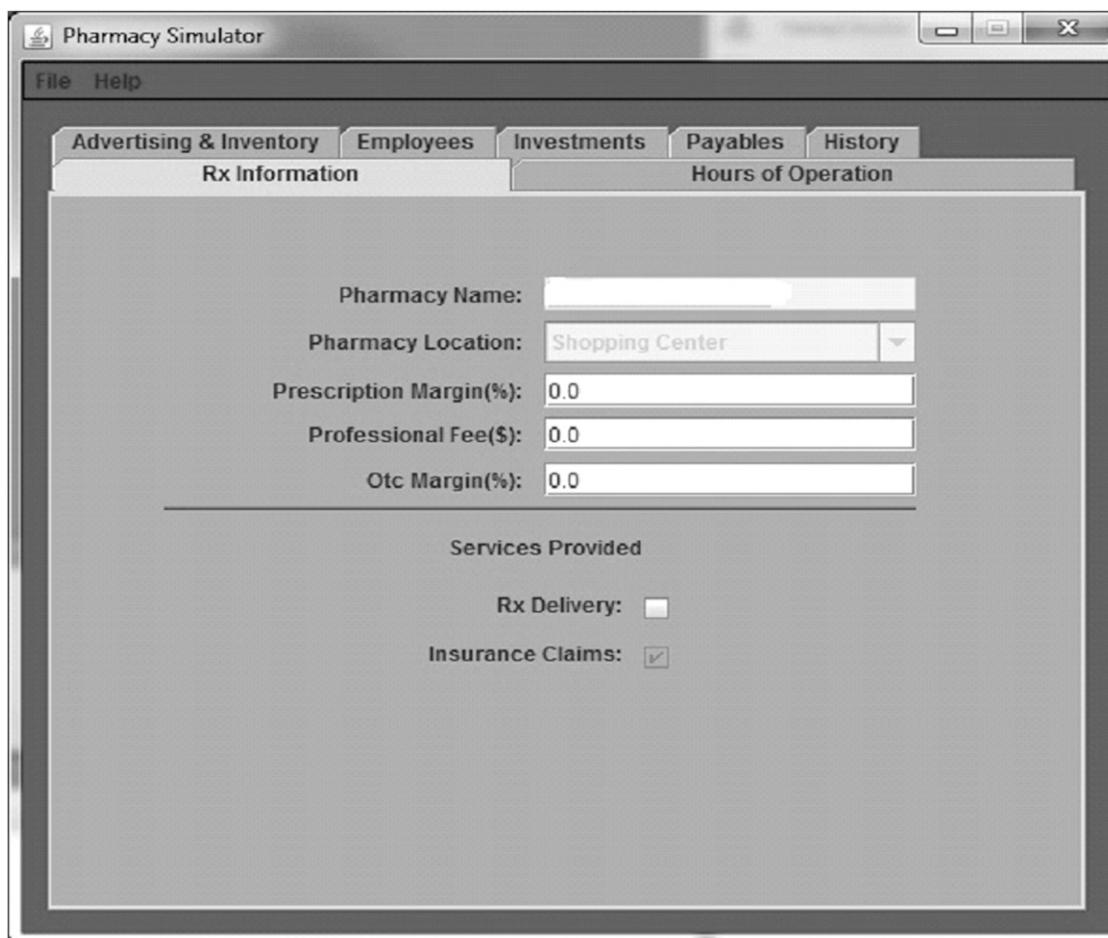


Figure 1. This is the initial and primary screen the students see when accessing the simulation program. Here, they input their prescription margin (for cash prescriptions), professional (or dispensing) fee, and their over-the-counter (OTC) product margin after completing the necessary calculations from the prior period's data. They also select whether their pharmacy will offer prescription delivery.

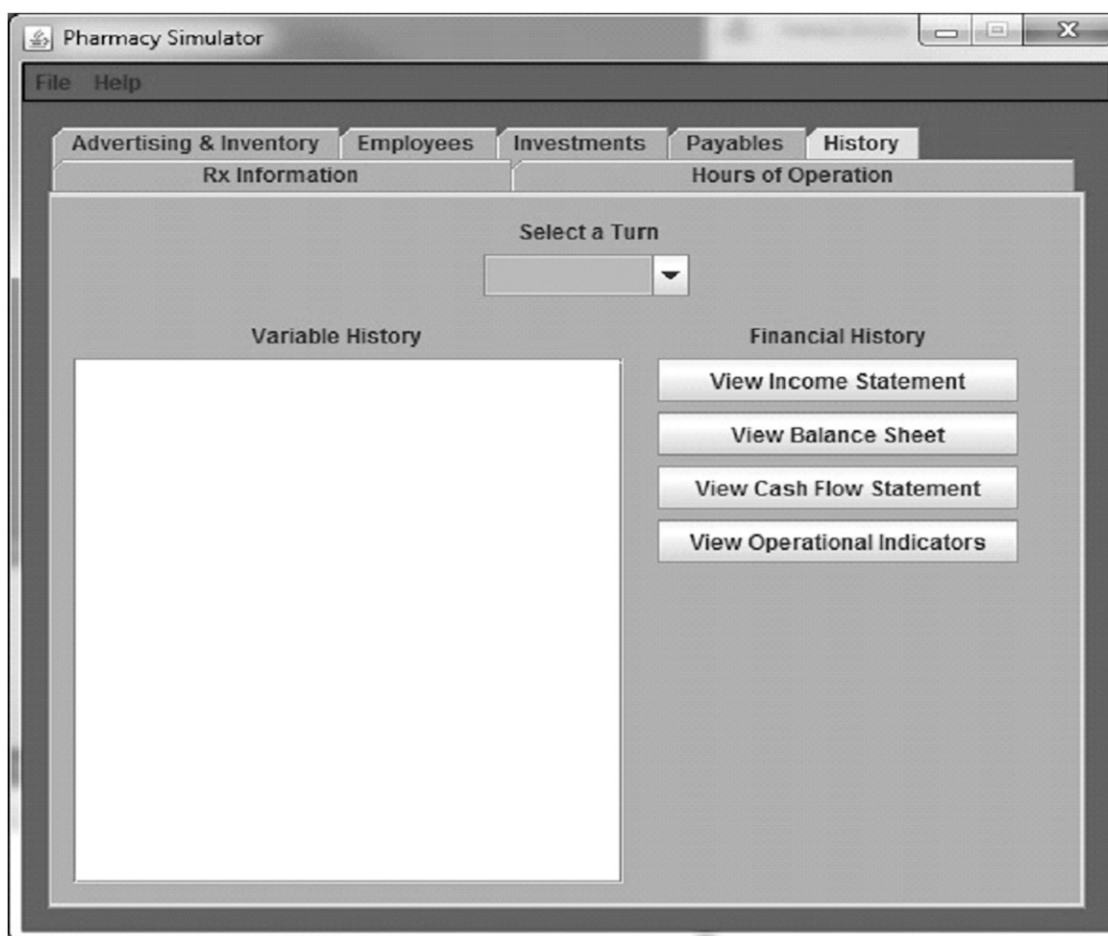


Figure 2. In the History tab, students access the necessary data from the financial statements above as well as the “Operational Indicators” statement, which includes prescription volume and payroll specifics, among other items.

Survey scores indicated that students slightly to moderately agreed that the pharmacy simulation program enhanced their knowledge and understanding, particularly of inventory management (5.3 ± 1.3), cash flow statements (5.4 ± 1.4), balance sheets (5.4 ± 1.4), and

income statements (5.4 ± 1.4). The remaining areas covered and measured showed a slight agreement that the simulation exercise had increased their knowledge and understanding (financial ratio analysis, 4.6 ± 1.4 ; personnel management, 5.0 ± 1.6). Mean attitude score (composite mean of the 3 items) toward the pharmacy simulation program also was slightly positive (4.8 ± 1.6) and students slightly agreed that the pharmacy simulation program enhanced their learning of pharmacy business management (5.0 ± 1.4).

Table 1. Demographics of Pharmacy Students

Demographic	Value
Respondents, No. (response rate, %)	192/249 (77)
Gender	
Male	74 (38.5)
Female	118 (61.5)
Age	
18-25 years (n=159)	82.8
26-34 years (n=27)	14.1
35+ years (n=6)	3.1
Current desired career path, No. (%)	
Retail/independent	70 (36.5)
Don't know	44 (22.9)
Hospital	40 (20.8)
Other (eg, academia, industry)	38 (19.8)

The amount of corresponding lecture material and group dynamics also were assessed. Survey scores indicated that students slightly agreed that the lecture material presented prior to the simulation exercise was sufficient for understanding the pharmacy simulation program (4.9 ± 1.6), and also neutral that additional lecture material should be presented prior to the simulation exercise (4.1 ± 1.2). Of those students who slightly, moderately, or strongly agreed that there needed to be additional lecture material to understand the simulation (n=113), 79.6% (n=90) felt an additional 1 to 2 lecture hours were needed.

In terms of the group dynamics, student scores were slightly to moderately positive, feeling that working with their peers enhanced their knowledge and understanding (4.9 ± 1.5) and they enjoyed the group experience (5.4 ± 1.5).

From a curricular standpoint, survey scores indicated that students slightly to moderately agreed that the business management topics were a necessary part of the curriculum (5.6 ± 1.4), but only slightly agreed that the pharmacy simulation practical experience was a necessary part of the curriculum (4.9 ± 1.6). Next, students were asked to rate their level of exposure to the business management topics assessed above during their IPPEs and/or working as an intern based on a 5-point Likert-type scale (1=not at all to 5=very much). Inventory management was the only area in which students felt they had at least “some” exposure (2.9 ± 1.1). All other areas assessed (personnel management, payroll/benefits management, drug pricing, hours of operation management, financial ratio analysis, balance sheet, income statement, and cash flow statement) ranged from “not at all” to “a little” (1.6 ± 1.0 to 2.4 ± 1.2).

In comparing the responses between the 2 schools, PCOM students reported a higher perceived knowledge and understanding of personnel, payroll/benefits, and hours of operation management ($p < 0.001$), as well as for financial ratio analysis and overall attitudes toward the pharmacy simulation program ($p < 0.001$). The PCOM students also had significantly higher opinions of the pharmacy simulation program’s value as a practical application tool and that both the business management material and pharmacy simulation program were a necessity in the curriculum (all comparisons $p < 0.001$). The only other comparison of significance was those students who already desired a career path in retail/community pharmacy ($n = 70$) had significantly greater self-perceived knowledge and understanding in the areas of inventory and payroll management and the income statement, balance sheet, and cash flow statement (all 5 p values < 0.002). No other demographic or comparison differences were found between the 2 schools.

DISCUSSION

First- and third-year pharmacy students felt the pharmacy simulation exercise added value to the business management lecture material. In the increasing push in academia toward active learning, the pharmacy simulation program provided a practical application-based experience to enhance students’ knowledge and learning of these difficult topics. Many students have stated the topics covered within the business management portion of the curriculum were “foreign” to them given the heavy science-based focus of these subjects. While

business management lecture material improves students’ self-perceived knowledge of the topics,⁸ the pharmacy simulation program provided students a tangible and active-learning application of these “foreign” topics, which they are, more often than not, seeing for the first time since their undergraduate studies.

Of concern, students reported having only a limited exposure to these topics (outside of inventory management) during their IPPEs and intern experience, confirming just how little business management is covered during IPPEs and work experience prior to the fourth-year APPEs. As exclusion of business management topics from the curriculum leads to pharmacy graduates with significantly low business management knowledge,⁸ and these results suggest the deficit would not be met during IPPEs and the intern experience. Combining these results with students’ slight to moderate agreement that these business management topics should be a required part of the curriculum is quite concerning. Moving forward, pharmacy students’ apparent lack of connection between pharmacy and business could pose a threat for the profession. While billing and reimbursement for medication therapy management (MTM) is continually increasing, the lack of business acumen and focus within pharmacy education could be a possible explanation for why it has taken so long for MTM to become a core focus of the profession.

Further, given the dynamics of the course at the 2 institutions (ONU has its course in the third year, right before APPEs, while PCOM offers its course in the first year), we expected that the ONU students, who were further along in the program, would have had a higher level of exposure to business management topics, but this was not seen. Given these data, as well as other external factors, PCOM has instituted a fifth required APPE specific to community pharmacy management.

In comparing the 2 institutions, results showed PCOM students perceived they had greater knowledge and understanding in the following topic areas: personnel time management, payroll/benefits management, drug pricing, hours of operation management, and financial ratio analysis. Further, PCOM students also placed significantly more value on the practical experience, felt the business management material and the simulation program were more of a necessity in the curriculum, and overall had more positive attitudes toward the pharmacy simulation program. The increased value of the experience at PCOM vs ONU was more than likely the result of technical difficulties experienced with the simulation program at ONU. The course coordinator had to restart the entire exercise because of a technical issue with the server as students lost their initial sets of data. Testimonials from those students within the open-ended comments section at the end of the survey

instrument suggested the simulation program would have been good if it had worked correctly.

Limitations of this study primarily revolve around the dynamic of the 2 classes surveyed. A more similar class size and students in the same year may have responded differently. Further, ONU uses a modular curricular system in which the pharmacy administration course was the only ongoing course at the time, while PCOM's course was 1 of 4 active courses the students were taking at the time of the survey. This, as well as the time allotment for these topics within each course, did not allow for separating out the lecture-based and simulation components. Thus, while the questionnaire focused the students' attention on the simulation, learning enhancement could have been gained from the lecture material. The technical difficulties encountered at ONU during the simulation period impaired those students' experience and perhaps hindered the results as well.

SUMMARY

A pharmacy simulation program appears to be an effective means of enhancing student learning of business management topics. While pharmacy management and administration courses traditionally cover these topics to some extent, the pharmacy simulation program adds an active-learning component and forces students to think critically about how they want to use their business decision-making power as a pharmacist. Most concerning is the lack of focus on these topics during experiential education or internships prior to APPEs, as well as a disconnect among the students regarding the necessity of knowing these topics. Additionally, this could possibly lead to a graduating pharmacy student who has had little exposure to or experience with business management and, thus, is not as strong a candidate in an increasingly competitive pharmacist job market.

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