

COMMENTARY

Integration of a virtual pharmacy simulation platform in remote learning: Experiences and early lessons of UP College of Pharmacy

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ABSTRACT

The COVID-19 pandemic created the urgent need to use online and virtual platforms to facilitate development of skills and competencies as part of remote learning of students. MyDispense®, a learning management system developed by Monash University in Australia, is a practice-based online tool utilized by the University of the Philippines College of Pharmacy to teach dispensing skills in Dispensing and Incompatibilities courses (Phar 154 and Pharm 133). This commentary describes how MyDispense® was used as an online retail pharmacy simulation through the SEIPS (Systems Engineering Initiative for Patient Safety) model, with discussion on how the person, tasks, organization, tools and technology, and virtual environment work within the teaching and learning process in dispensing. The application of MyDispense® as a learning platform both in remote and traditional teaching can be further explored to maximize its features and utility.

Keywords: MyDispense®, remote learning, simulation, dispensing, virtual pharmacy, online platform

Introduction

Due to the COVID-19 pandemic, academic institutions have adopted a digital approach to teaching, accelerating the integration and application of technology in instructional design. MyDispense®, a free, customizable web-based pharmacy simulation program developed by the Monash University in Australia, was utilized in July 2020 by the University of the Philippines College of Pharmacy. Since then, it has been used to teach the laboratory component of the dispensing and incompatibilities courses (Phar 154 and Pharm 133). The web application enables a complete and interactive dispensing experience, from the initial conversation with the patient to the prescriber professional advice when dispensing medicines to patients. It provides a safe environment where students may make mistakes without the risk of serious consequences that come with practicing in the real world [1].

Transitioning to a remote learning setup required an abrupt change in the dynamic work environment of the implemented courses in the College, which could affect the expected outcomes of the work system. In this commentary, a modified Systems Engineering Initiative for Patient Safety (SEIPS) model (Figure 1) was used to characterize the flow and exchanges in

the inputs and outputs of MyDispense® integration in the remote learning for dispensing and incompatibilities courses from the new work system, processes, and outcomes [2].

Person

The first of the two main types of actors are the direct implementers who are the course instructors and students. Instructors from the Department of Pharmacy are responsible for the preparation of activity guides, worksheets, and materials, conceptualization of cases, and assessment. Students enrolled in the dispensing and incompatibilities course are a mix from Phar 154 (2008 curriculum BS Pharmacy and BS Industrial Pharmacy) and Pharm 133 (2018 curriculum BS Pharmacy and BS Pharmaceutical Sciences). The indirect implementers include the College administration that facilitates approval of curricular revisions and use of software; the Information Management Service (IMS) that provides a secure domain for student use; and Monash University that provides access to the intellectual property and manages support for technical problems and periodic updates to the system.

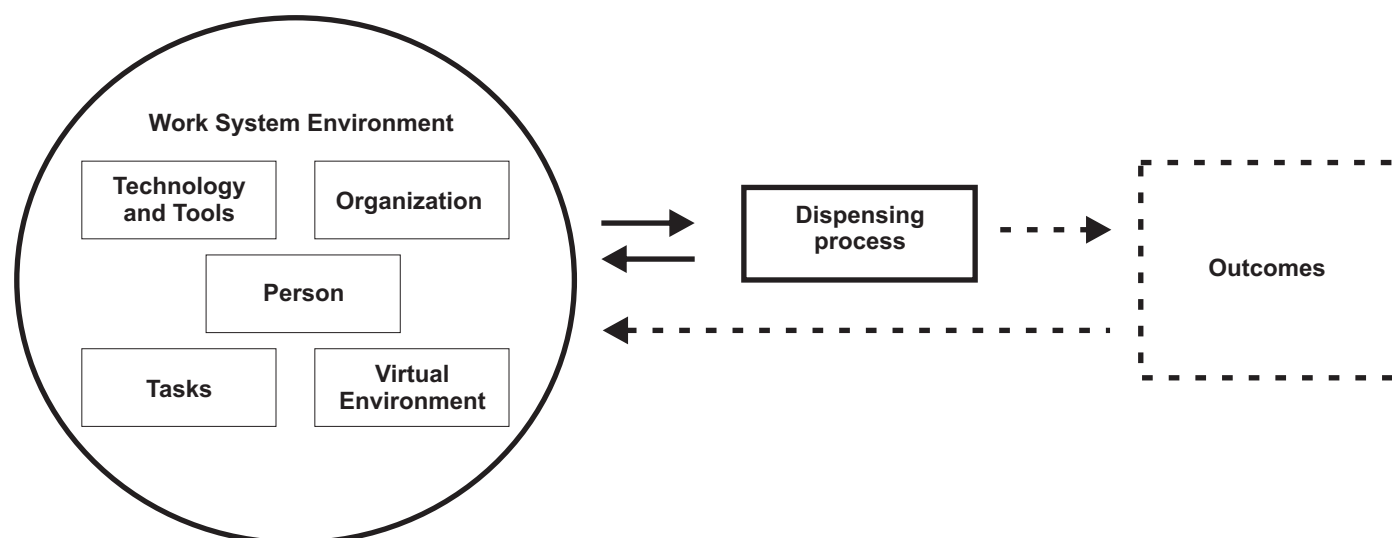


Figure 1. *Modified SEIPS model*

Organization and Tasks

Facilitated by the IMS, the domain name of mydispense.upm.edu.ph was registered and linked which allowed installation and access of the platform to the University. The use of the platform is currently limited to courses focusing on dispensing knowledge and skills.

Faculty members who use the platform are assigned with administrator roles. The teaching team for a subject creates a new Unit every semester and instructors assigned to a topic create customized activities by developing patient case scenarios and feedback information. All members of the teaching team provide comments and suggestions during the faculty weekly meetings. Activities developed are grouped into three broad categories: medication counseling for common conditions; dispensing prescription drugs; and dispensing dangerous drugs.

Students are provided with an orientation at the start of the semester about the platform and instructed to create their accounts to answer available sample cases. The teaching team monitors the accounts of students and manages the availability of tutorials. Instructor feedback is provided immediately after completion of the exercises. Any concerns on the platform and requests for customizations beyond the administrator role are coordinated with the MyDispense® support team at the Monash University.

Tools and Technology

The system requirements to run the platform are straightforward. Computer, laptop, tablet, or cellphone with

internet connectivity can be used for access. However, this requirement presents a challenge for students with poor internet connection, especially during times of natural calamities. During such situations, extension of deadlines on activities for the affected students was given. Although Mozilla Firefox is the recommended web browser, there were no reports nor complaints received from students accessing the domain in other browsers. Prior knowledge and experience in the use of other learning management systems such as Canvas and Virtual Learning Environment (VLE) were beneficial.

Virtual Environment

The virtual environment can be divided into two (Figure 2). The administrator view is where the instructor will be able to create Units, make Tutorials, Assessments, and Exercises, and modify medications, prescribers, and patients in its database. Students are enrolled in Units where Tutorials and Assessments may be accessed. Multiple exercises can be added in a Tutorial/Assessment. An Exercise contains a case that simulates the retail pharmacy interaction where students perform the dispensing process from receiving, validating, and interpreting prescriptions; preparing and labeling items for use; to recording and issuing medicines to the patient with clear instructions and advice. Only one prescription can be integrated in an Exercise. Medications database contains all the drugs available in the platform while Prescribers and Patients databases the potential physicians and clients for each exercise. Customizations done to better reflect the Philippine setting are summarized in Table 1.

Creating an Exercise in MyDispense® is a series of steps. The instructor provides information like exercise name,

Table 1. Customizations Introduced in MyDispense® by UP College of Pharmacy Teaching Team

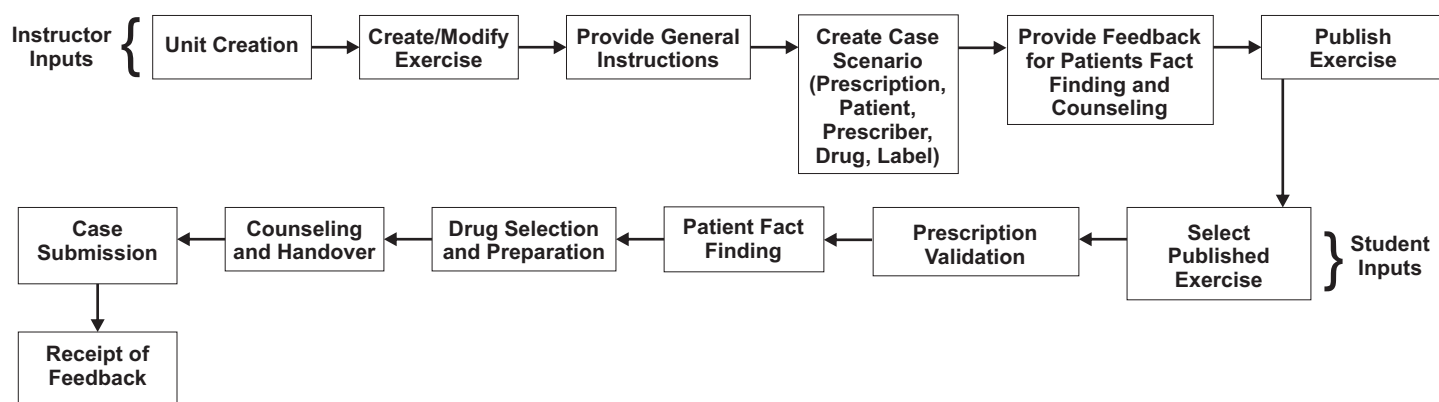
Default Setting	Modifications
Database contains drugs available in Australia.	Medicines registered in the Philippines were added. Uploaded images of the drugs were edited to fit the parameters set by MyDispense®. Drugs that are not available in the Philippines were removed from the database.
Addresses of patients and prescribers are only in Australia.	Australian addresses were changed to local addresses.
Brand name is written before the generic name in the prescription.	Generic name is written before the brand name to comply with RA 6675 or the Generics Act of 1988.
Fact Finding statements are descriptive and in English.	Fact Finding statements are interrogative and in Filipino or English, depending on the context of the case.

description, instruction, and chooses the type of prescription. Prescriber and patient characteristics are also determined. Medicines are selected along with the quantity, brand, directions for use, and ancillary labels. Patient Fact Finding includes answers to possible pharmacist's questions such as age, alcohol consumption, allergies, pregnancy, smoking status, and symptoms. This will be read as replies when students ask their patients questions. Each question has a feedback feature. The Patient Questions section enables the patient to ask customizable questions to the pharmacist that the student may reply to in English or Filipino in a manner appropriate for best patient comprehension. Finally, in Counseling and Handover, the instructor may list the important counseling points of the case.

The student view allows the selection of the specific Exercise in the chosen enrolled Unit. From the dashboard, students are transferred to the dispensary screen showing the patient, the prescription, references, the computer with dispensary software, benchtop basket, and a telephone. When the patient is clicked, a dialogue box containing Fact Finding, Patient Questions, Counseling, and Attachment will open. In

Fact Finding, the students may select appropriate questions to ask the patient. In Patient Question, the student may ask if the patient has a query that needs answering. The students can select the prescribed medicine/s from the prescription shelves, fridge, or safe for dangerous drugs in the pharmacy back room. Medicines are arranged in alphabetical order based on their brand names and accessed through the navigation bar. Selected drugs can be added to the patient cart.

The labels for the medicines in the cart are made on the computer. Here, students input the prescriber, patient, and drug information including its directions for use. The benchtop simulates a barcode machine to verify the correctness of the medicines and attach the drug labels and appropriate ancillary labels. Students are asked to provide counseling notes simulating a direct patient interaction. The final decision point for students is to hand over or not dispense the medicines; after this, they receive detailed feedback on all parts of the exercise.

**Figure 2.** Teacher-Focused and Student-Focused Steps in Completing a MyDispense® Exercise

Future Directions

The early experiences of the UP College of Pharmacy with MyDispense® were encouraging and increased the confidence of both students and faculty in the use of online platforms for teaching and learning.

Its usefulness and acceptance as an alternative platform were supported by the results of the Student Evaluation of Teaching (SET). When asked to rate the teaching team on the use of engaging and helpful activities, the first batch of students who used the platform gave a rating of 4.549 (out of a perfect score of 5). Answers to the question "What does your teacher do [in class] that you find very helpful/effective?" include "use of MyDispense® platform" and "study guide, pre-lab and post-lab guide, utilization of MyDispense, and other academic materials". However, a more systematic assessment and evaluation of the learning outcomes must be done in the immediate future.

The use of MyDispense® and other online platforms should be reviewed for use in other pharmacy courses. To maximize the benefits of the platform, further customizations are required (*e.g.*, removal of information fields relating to foreign insurance schemes that are not applicable in the local setting; appearances of the patients to look like Filipino patients, *etc.*). As the University prepares to adopt other platforms for optimal remote and blended learning, capacity building, online infrastructure improvement, and quality assurance systems are all priorities.

Conclusion

Overall, the MyDispense® virtual pharmacy was able to simulate how an actual retail pharmacy in the Philippines looks like. This was a very useful teaching tool especially during the pandemic when face-to-face classes were not feasible. However, as the patient-pharmacist interaction is only limited to the predetermined non-verbal questions in the platform, some skills and competencies are not addressed (*e.g.*, probing skills, tailored communication, *etc.*), which signals the necessity for complementation with other teaching-learning methodologies. The application of MyDispense® as a learning platform both in remote and traditional teaching can be further explored to maximize its features and utility.

Acknowledgment

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Competing Interests

The authors have no competing interests to declare.

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