

INSTRUCTIONAL DESIGN AND ASSESSMENT

The Pharmville Community: A Curriculum Resource Platform Integrating Context and Theory

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Objective. To develop and implement a resource platform consisting of a fictional community of people to augment learning in an undergraduate pharmacy program and to refine patient contact skills.

Design. Pharmville, a virtual community comprised of 29 fictional characters in 7 families, was developed that included high-quality video vignettes, photographs, drug structures, documented health profiles, and medical and social histories representative of an Australian metropolitan suburb. Over the next 4 years, Pharmville resources and themes were incorporated into the bachelor of pharmacy (BPharm) degree program orientation, and implemented in lectures and tutorials, assessments, independent study resources, and in a variety of contact activities throughout the curriculum.

Assessment. A 2010 comprehensive evaluation found that 21 of the 29 Pharmville characters had been incorporated into teaching materials in about 40% of instructional units in the first 3 years of the BPharm program, that all of the types of resources available were being used, and that use was almost equal between pharmacy practice and science units. A student evaluation of Pharmville showed a positive response to its use, with students able to identify with various characters within the community.

Conclusion. Pharmville is an instructional resource that links professionalism and academic study, and provides context for student learning.

Keywords: contextualization, teaching, pedagogy, electronic resource, simulation, curriculum

INTRODUCTION

Practicing pharmacists regularly engage with people in their communities, and to function effectively in the workplace, graduates must integrate theoretical content from the degree subdisciplines and apply them in the context of their practice communities. Becoming a professional is a gradual process of acquiring the cognitive competencies of the disciplinary domains as well as the relevant cultural and social competencies that define professional relationships and practice.¹ Krathwohl and colleagues² argue that support for affective learning positively influences the quality of cognitive learning by creating motivation.

If students were to acquire understanding of the composition, nature, and norms of practice communities only after graduation, application of professional context to their studies would be at best hypothetical. Furthermore, student experiences acquired during experiential clinical and community practice experiences are inconsistent

between individual students and provide only one context for learning during the pharmacy program. Unless such experiences are provided continually throughout the program, they cannot be relied on as the only mechanism for providing context for learning.

While pharmacy students are conceptually prepared at university for their professional practice, their life experiences are drawn from diverse communities—local and international.¹ To augment learning authenticity, and to refine patient contact skills in professional health care education, many institutions and programs provide a human element by incorporating simulated or virtual patients into the curriculum, often with positive outcomes.^{3,4} Generally such programs use 1 or a few individuals, sometimes connected by a family relationship.^{5,6} There are examples of extended virtual communities and family case studies in nursing education^{7,8}; however, the use of individual virtual patients predominates in medical education. In pharmacy education, use of virtual families and communities is generally seen only in electronic patient information databases. In all of the above applications of simulated patients and patient information, the resources embed elements of curriculum as case studies or scenarios. The approach adopted at Monash University is unique in that

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a substantial cross section of a fictional community is provided for students and academics to facilitate understanding of the communities within which pharmacists work and to provide a realistic practice context.

The Pharmville community was developed commencing in 2008 as a resource platform for the program curriculum. Pharmville includes video vignettes, images of drug structures, photographs of Pharmville people and their documented health profiles, and medical and social histories representative of the diverse conditions of an Australian metropolitan suburb. Multimedia case-history simulation programs have been used with pharmacy students,⁹ but nothing as complex and rich as that available in Pharmville.

During a Monash University bachelor of pharmacy (BPharm) program review in 2007-2008, evidence emerged that some students undervalued the need for sciences in the curriculum and had difficulty integrating knowledge between disciplines in the curriculum. Furthermore, feedback from student placement preceptors indicated the need for more application of coursework theory to people. The BPharm review panel agreed that subsequent curriculum developments required integration and strengthening of theory to provide context. This need for bridging the basic sciences in the medicine field with clinical knowledge has been previously described by Voelker,¹⁰ and the positive relationship between affective domain learning and professionalism in pharmacy students by Brown and colleagues, who observed that “professional behavior results from one’s values, beliefs, feelings and interpersonal skills.”¹¹

In developing a response, the Pharmville development team selected an educational approach based in “situated learning,” professional enculturation, and authentic activity suitable for the Monash student population.¹² Faculty members would be able to use the Pharmville suite of resources flexibly as context for science and professional practice concepts to explicitly link theory with its application to people, families, and communities. The quality and nature of the resources would emulate realistic environments and situations to reinforce the authenticity of learning experiences.

DESIGN

In 2008, work commenced on developing the curriculum platform, Pharmville, to address the established need for context and integration of curricular content. Pharmville was designed to represent a community within which student pharmacists could identify themselves in the role of a responsible health care practitioner and as a member of a community of people with whom they could develop a professional and emotional connection.

Pharmville was developed as a suite of resources and information that had flexibility to be configured and selectively applied by teachers to learning activities according to the needs of each unit (a semester-long course of study). The multidisciplinary team assembled to address the many aspects of the project included academic pharmacists and support staff members with skills in curriculum design, writing, management, information technology, and multimedia.

Academic staff members designed the community composition, ensuring that the range of therapeutic areas taught across the curriculum was represented in the disease states expressed within the Pharmville community. As of May 2012, the Pharmville community comprised 29 fictional individuals (27 of whom comprise 7 families, numbering between 1 and 7 individuals) representing a broad range of age groups, ethnicities, cultures, medical conditions, and socioeconomic backgrounds typical of an Australian suburb. Role models are important for student learning¹³; thus, 2 health care professionals were included in the Pharmville population – a community pharmacist, who describes and models appropriate professional practices and community interaction, and a maternal and child health nurse – as well as numerous references to interactions with other health care professionals. Most community members are present in the videos in a reflective narrative style, telling “their” stories. These stories are also available for use as short, discrete scenes that represent Pharmville themes. A suite of additional information and images, such as graphics of molecules, medicines in their packaging, and personal profiles is accessible to staff members on the university’s intranet for downloading. The biographical, social, and medical profiles for Pharmville patients are authentic and comprehensive, representing the breadth of therapeutic areas in the pharmacy curriculum. A strong emphasis was placed on realism, to heighten the authenticity of the characters and their conditions. This was achieved through use of actors and actual domestic settings, and inclusion of rich and complex visual and informational detail.

Storytelling, usually in the form of case studies, is used in health professions education as a diagnostic aid to enrich students’ therapeutic understanding and to allow them to develop therapeutic listening skills set in a background of social norms and cultural conventions.^{14,15} Stylistically evocative of popular soap operas, the video narratives capture characters relating their health histories and attitudes, and revealing social attributes. The videos for Pharmville were scripted to depict the multilayered lives of people, where such attitudes and attributes are embedded in family culture, personal responsibilities, and experiences. Pointed references to popular culture

were also included to engage students. The style of narrative used was such that it would place few constraints on how academics could combine resources or further develop the narratives for their own teaching purposes. One teacher could combine a narrative video, health profile, and photographs of an elderly Pharmville resident in a case study of health and aging, whereas another teacher, using a different combination of resources, could extend the same character's profile in class by assigning students to investigate other hypothetical disease states and pose questions about the amended patient scenario.

Carefully designed cues were embedded in the resources as references to wider topics, such as adherence issues introduced by an individual admitting that he had forgotten to take his medicine, or another talking about traditional Chinese medicines to facilitate student discussion of complementary and alternative medicines. These background details not only invite users to explore topics pertinent to professional practice, but add realistic complexity to the Pharmville characters and their relationships.

In striving for concept authenticity, particularly for an audience immersed in visual media, high production standards were applied. Videos and photographs were produced by a media production company, and most of the Pharmville character roles were played by professional actors. The complexity of information needed to represent the community and support teaching in a multi-contextual manner required a range of media: photographs, video, text profiles, and graphics.

In 2008, the first video, images, and profiles of 7 characters were developed and launched to faculty members and students, with new characters added each year. The resources include 4 videos, edited into short scenes for teaching, hundreds of individual and family photographs, graphics of molecules of each drug taken by the characters, and comprehensive text profiles for each character. These are accessible to students and staff members through computer systems and the Web.

Electronic organization of resources allowed users to navigate to relevant information by individual, family, age, health state, medicines taken, and themes addressed, and to select media of a type suited to the intended use. All files were provided in formats compatible with teaching and learning technologies supported by the faculty and the university generally. To support the concept of students identifying as a responsible health care provider within the community, a logo was designed with text stating "Pharmville – MyHealthCareCommunity," the graphic elements of which depict both community and service elements (<http://www.monash.edu.au/pharm/current/pharmville/>).

Expected Outcomes and Learning Objectives

Pharmville was designed as a resource platform, not a teaching program or unit of learning. The objectives of Pharmville were classified into those that relate to the curriculum and those that relate to students. Pharmville resources were designed to embed and support the development of attitudinal learning objectives common to all areas of the curriculum, particularly those objectives related to the affective domain, such as acquiring, organizing, and internalizing the values of the profession.² Pharmville resources and themes were made available for teachers to position activities, concepts, and skills within an identifiable professional context. Consequently, use of Pharmville in teaching was anticipated to result in students identifying themselves with the strategies, values, responsibilities, and frameworks of the profession, to better imagine themselves as pharmacists and, instead of thinking as a student, to learn to apply a health care professional's attitude to the roles and responsibilities of problem solving. It was believed that, when used appropriately in teaching, Pharmville resources would develop an appreciation of the relationship between the curriculum's science and practice aspects, with students able to recognize that their learning was ultimately applied to real people within a social and community context.

Given that "activity, concept, and culture are interdependent. . . Learning must involve all three,"¹² Pharmville was intended to provide an authentic cultural dimension to the practical and conceptual components of learning activities. While the presence of such a consistent framework would contribute to the professional enculturation of students, it was also important for consistency at the program level, as many academics have professional backgrounds other than pharmacy or health care, including the disciplines of chemistry, pharmacology, and pharmaceuticals.

Educational Environment

Pharmacy students at the university reflected a wide range of ages, languages, and cultural backgrounds with at least 25 different languages spoken at home and fewer than 40% of students speaking only English. Staff members at both the Australian and Malaysian campuses used Pharmville at all 4 undergraduate year levels and in most of the 32 units. The curriculum placed strong emphasis on exploring what it means to be a health care professional and nurturing development of clinical and patient-care skills. The program was structured into 4 thematically related streams – enabling sciences, pharmacy practice, drug delivery, and integrated therapeutics – and Pharmville was used substantially in each.

Pedagogy

Effective use of Pharmville depended on the pedagogical design applied by faculty members. The range of media and the accessibility of resources would provide opportunities for unlimited approaches. Resources could be used as simple or detailed examples to establish interest and motivation, as stimulus for student enquiry and active-learning approaches, and for a range of assessment activities.

The Pharmville resources were modular, comprehensively detailed, internally coherent, and professionally relevant, and suitable for use with all levels of the undergraduate and postgraduate curriculum. They were designed to support both teaching and learning, and to engage students by making explicit links between students' learning and their chosen professional goals. Teachers could embed resources as cases into unit learning activities or provide contexts for learning. In this way, a single Pharmville resource could be used in different ways in different units or learning activities. To address the limitless scope of possible scenarios, teachers were encouraged to start with a preexisting Pharmville character, then extend the information or scenario to suit the particular learning needs. For example, "What if [a character] developed renal failure/was allergic to penicillin/lived in a remote rural area?"

Pharmville could be integrated into learning outcomes. In tightly integrated activities, engagement with the characters and their information was essential to successfully achieving the intended learning outcomes. Moderate integration involved meaningful, though not necessarily detailed, reference to the characters, and loose or incidental integration made reference to conditions or people without their status as Pharmville community members being of any direct relevance. Motivation for students to engage with Pharmville resources was inherent in the design of the learning materials used. Students also could independently browse the resources at their leisure if they needed further clarification or context.

To stimulate initial curiosity in the Pharmville community, in the weeks prior to the 2009 orientation, all first-year students were sent a postcard from the Pharmville community congratulating them on their acceptance into the pharmacy program. The postcard included a note from the Pharmville community pharmacist acknowledging her eagerness to introduce them to their health care community. In the first week of the semester, commencing students were brought together to watch the videos and answer Pharmville-related questions to begin building awareness and understanding that their future professional responsibilities would require them to care for real people with real and complex needs. This activity was

intended to make students aware of the relationship between pharmacists and their communities, as well as allow them to familiarize themselves with the Pharmville characters and their social context and medical problems, and assist students with identifying them when they appeared as examples throughout the program.

In second-year communication studies, students used combinations of the videos, images and profiles as cases for major assessments. The students independently analyzed their chosen character's communication style and reflected on and described the communication and management techniques that would be necessary to effectively deliver health care to such a patient in practice. Other second-year units used teacher-selected Pharmville characters as cases for analysis in communication and counseling tutorials. Also in the second-year, integrated cardiovascular therapeutics unit, photographs, and medical conditions of selected Pharmville characters were the basis of tutorial problems that taught understanding of disease states and how pharmacological agents work. Similarly, second- and third-year pharmaceutics units used Pharmville resources as cases and examples to provide human contexts to abstract concepts. The characters were used as clinical examples in many of the therapeutics units in later years of the curriculum.

Furthermore, Pharmville characters were integrated into learning resources including videos that taught the chemical relationships between similar medicines and in a Web-based module, STEP UP.¹⁶ The STEP UP module provided context for students' cardiovascular coursework by giving examples of community members who needed assistance in this area from their pharmacist. It also modeled best-practice community pharmacist behavior in change management. Filmed in an actual community pharmacy, the STEP UP module is a series of video vignettes showing the Pharmville community pharmacist engaging in advanced practice activities, where she provides smoking cessation counseling and blood pressure management to 3 of the Pharmville characters. The pharmacist's management of these health promotion services is embedded in a dual framework for behavioral change structured on using the widely adopted 5A's approach, with explicit motivational interviewing techniques also woven throughout.¹⁷ Students worked independently through the self-directed modules and used library-based blood pressure monitors to practice their technical skills prior to objective structured clinical examinations to assess competency.

There was never an intention for faculty members to use Pharmville in every lecture or unit of the curriculum, but only where it could establish or enhance context or community connection or provide relevant teaching examples. The

design team believed that overexposure to the resources could desensitize students to Pharmville’s effectiveness; therefore, use by teachers and students would be monitored.

EVALUATION AND ASSESSMENT

The original Pharmville resources were launched to pharmacy faculty members in late 2008. By the end of 2010, half of all first- and second-year units and one-quarter of third- and fourth-year units made some use of Pharmville resources. Just as pharmacists develop familiarity with the regular members of their communities over time, likewise, through associations with Pharmville characters over time, students become familiar with their characters’ lifestyles, conditions, medicines, and scenarios, allowing the program to be used more efficiently in teaching. Evaluation of students’ experience with Pharmville confirmed the development of this familiarity over years 1 to 4, and that students in earlier years regarded Pharmville as their “pharmacy community.”

Student Feedback Questionnaire. Changes in student perceptions were evaluated in 2010 and 2011 using the university’s student feedback questionnaire. Direct unit comparison is difficult because unit content in the first and second year has since been reorganized; however, agreement that units were “useful to future careers” and “resources supported studies” showed an average increase of 5.6% and 9.1%, respectively, from 2007 to 2009 in units incorporating Pharmville resources, compared to changes of -2.2% and 0.5% in other units over that same period. As these questions were removed from the questionnaire in 2008, later data is not available.

Student Focus Group. In 2010, a videotaped student focus group, representative of each BPharm year, provided feedback specifically on students’ perceptions of Pharmville resources. Feedback on the Pharmville orientation postcard sent to students at the time of acceptance revealed that, while some found it “intriguing,” many felt it was overshadowed by the excitement of receiving the offer of admission. Nevertheless, students in the focus group reported establishing a connection with Pharmville during the orientation activity in which students were “introduced” to the virtual families via the videos. Students also felt Pharmville was effective in creating context and that the characters were believable.

Comprehensive Evaluation of Implementation of Pharmville. In November 2010, a systematic and comprehensive evaluation was undertaken of staff and student use of Pharmville and its management. Preliminary findings showed that 21 of the characters had been individually incorporated into teaching materials in about 40% of units in the first through third years of the BPharm program, that all forms of resources (photos, videos, molecule

images, profiles) were used, and that academics had even created some extra resource forms (audio extracts). The character profile information, often accompanied by a portrait, was the resource type most frequently used, representing 40% of all applications. Use was almost equal between pharmacy practice and science units.

Student Observation During Introduction to Pharmville. As part of the continuing evaluation to assess student acceptance and engagement of Pharmville, 240 first-year students were critically observed by the learning development coordinator when initially shown the videos and introduced to the characters. Body language and subsequent participation in activities clearly demonstrated that students were substantially engaged by the people and scenarios, and responded to the “reality” of the vignettes.

Student Assessment of STEP UP Program. Evaluation of student response to the hypertension module of the STEP UP program was undertaken in mid-2010. STEP UP relies exclusively on Pharmville characters to create awareness of the role of the community pharmacist in managing and counseling a range of patients, and as the patients for the scenarios. The evaluation included questions exploring both cognitive and attitudinal objectives of the program. The data from the STEP UP evaluation in Table 1 below, indicates that, with the use of Pharmville resources, STEP UP achieved its objectives of providing context and integrating disciplinary knowledge into professional practice.

National Professional Organizations. Feedback sought between 2008 and 2010 from members of the national professional body, the Pharmacy Society of Australia, and the Bachelor of Pharmacy Course Advisory Group overwhelmingly endorsed the Pharmville concept as a means of improving professionalism, and acknowledged

Table 1. Step-Up Evaluation Items Related to Application of Pharmville Resources (Year 2 students)

Item	Strongly Agree/ Agree, % (n=34)
I have a greater understanding of the roles of community pharmacists in managing hypertension.	92
I have a greater understanding of the principles of blood pressure management and how different patients should be managed differently.	93
I am more enthusiastic about practicing patient counseling during future supervised placements.	70

its value. In 2012, the Australian Pharmacy Council program accreditation Site Evaluation Team also endorsed the use of Pharmville to provide context within the curriculum.

DISCUSSION

The Pharmville design was principally based on Australian curriculum needs, and so reflected the social and health states of a Western community. However, as the same BPharm is also taught at the Monash Sunway campus, Malaysia, to support and provide relevance for this different student population Chinese–Malaysian migrants “Chan Kang Hong” and “Mei Park” were designed to live alongside other residents of Anglo, Italian, and Greek heritage. This cultural mix is also common to many other societies.

The challenges of creating an environment in which students can satisfy the academic and professional demands of a professionally accredited degree include creating opportunities for engagement within authentic professional contexts that support cognitive and social development. Experiential placements are usually undertaken in the later years of the degree,¹⁸ and while these experiences expose students to professional practice environments, educators rely on reflection and recall for students to establish meaningful links between knowledge and skills learned in the classroom and those applied in the professional setting. Large class sizes make provision of experiential interactions in actual settings impractical. Because teaching staff members are not present during practice experiences and practice settings vary, such placements are personal experiences and not the ideal platform for teaching basic concepts, particularly those that students are required to learn early in the program. While clearly a simulation, the use of the realistic and detailed representations of Pharmville people contributed to students perceptions of the authenticity of the process and activities.

In the BPharm program, the development of professional skills and attributes, including acquiring vocabulary, communication skills, and strategies; ethics; and interprofessional competencies commences in the first semester. The early part of the BPharm program also includes substantial study in foundational sciences, with pharmaceuticals, pharmacokinetics, and therapeutics increasingly integrated into each year as the student progresses. Pharmville resources allow academics to bridge the gap between theory and application by providing authentic but accessible cases typical of those encountered by pharmacists in Australian urban communities. Consequently, first-year students are able to appreciate the reasons a pharmacist needs to know the scientific concepts they are learning, and how those concepts are applied.

With exposure to the pharmacist role model and the complex realistic cases of Pharmville, pharmacy students are able to progressively define and construct their professional identity, and their work, both in the classroom and in experiential settings, takes on greater meaning.¹⁹ When integrated into learning resources, the diversity of Pharmville people supports exploration of diversity issues affecting the student cohort and the professional community. The complexity, interrelationships, and breadth of Pharmville contributes to its authenticity, and to it being perceived as relevant to learning by most students. Nevertheless, even with characters representing a broad range of ages, illnesses, ethnicities, and life styles, situations will continue to emerge to which the resources, as initially developed, are not immediately applicable.

The variety of media and content neutrality of the Pharmville resources is intentional, allowing flexibility in use according to the needs and creativity of the teacher. Messages, information, and themes recur in a number of media formats, allowing parallel use for comparison, and the capacity to engage students with different learning preferences.

The Pharmville resources have formed the foundation of additional educational projects. In 2009, STEP UP,¹⁶ the self-directed Web-based learning module using Pharmville characters was developed. This module has since found application to pharmacy graduates undertaking the compulsory internship studies prior to registration. In 2011, MyDispense, a virtual community pharmacy environment incorporating dispensing software based on commercial programs, was developed by the faculty to teach prescription dispensing. The 27 Pharmville patient characters form the core of the 300-plus MyDispense patient database, and the associated first-year tutorials open and close with a problem-based learning scenario designed around different Pharmville characters.

Evaluations have found a correlation between the degree of integration of Pharmville resources with the learning outcomes of an activity, and the authenticity ascribed by students to their interaction with the characters. In an example of strong integration, the incorporation of the community and pharmacist characters into the self-directed STEP UP module and in communications assessment is recognized by students as establishing a clear connection between theory and the real world. In contrast, examples of loose integration, usually manifested as passive or incidental references, are not generally acknowledged by students as helpful in establishing an authentic context. The distinguishing characteristic is the intention of the teacher to make substantial links from the concepts to professional context. Thus, the effectiveness of Pharmville as a teaching resource depends on integration rather than frequency of exposure.

In first-year organic chemistry and biochemistry units from 2009 onwards, where students had previously expressed difficulty understanding the relevance of content, Pharmville information and images of people and drugs were integrated into lectures to explicitly link the chemistry of drugs to people who use them. This represents a substantial change in attitude reported in a review of the program in 2009,²⁰ which identified disengagement of science staff with Pharmville because of perceived irrelevance of the program to their disciplines.

As a dynamic and “living” community, Pharmville continues to be developed, supported, and deployed in pharmacy teaching today. Developments are informed by formal evaluations and managed by a team of academics and support staff members. Teaching academics are supportive of Pharmville; however, acknowledged barriers to use include the long time between reviews of teaching resources (usually occurring no more than once per year), lack of awareness of the resources and their location, and capacity to design and implement Pharmville activities. These barriers are actively monitored and addressed through support, communication, and management strategies, particularly through dissemination of evaluations and teaching exemplars, and sharing responsibility for use and development. As part of the continuing work of embedding the platform into teaching, examples of effective use of Pharmville have been identified, and will be shared with staff in 2012. The team continues its work on improving and expanding Pharmville uses in teaching. In the course of the cyclic quality processes that identified a need for action, perceptions of professionals interacting with students exposed to Pharmville will be sought.

SUMMARY

The Monash University Pharmacy team has created a dynamic, flexible, and original educational resource that links professionalism and academic study, and provides context for student learning. Pharmville presents a unique model of contextual resources for health care professional education that can be used to integrate theory into practice.

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