

RESEARCH ARTICLE

# A mixed-methods analysis of a collaborative online international pharmacy course

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## Abstract

**Background:** Participation in international experiences can promote personal and professional growth, but students in schools of pharmacy may face barriers in pursuing overseas experiences. **Objectives:** The objectives of this report are to describe the design, implementation, and student perceptions of an online course co-taught by two schools of pharmacy in different countries for students at both institutions. **Methods:** The course was established through an ongoing partnership between the universities and was focused on diabetes based on mutual interest and expertise. The course was offered in a three-hour period weekly using short lectures, small group discussions and projects. **Results:** Cross-cultural learning was emphasised by forming student groups with representation from both universities. In a post-course survey and reflection, students reported gaining new knowledge, perspectives, and transferable skills as a result of the international nature of the course. **Conclusion:** The online international course broadened students' views of pharmacists' roles and strengthened the partnership between the two universities.

## Introduction

Internationalisation of education in pharmacy has been a goal of universities and pharmacy organisations for many years (FIP, 2013; AACP, 2015). Most current international activities involve individualised curricular (advanced pharmacy practice experiences (APPEs)) and co-curricular (health outreach) experiential education (Alsharif *et al.*, 2016; Al-Dahir *et al.*, 2017; Childs-Kean *et al.*, 2019; Dornblaser *et al.*, 2016; Scott *et al.*, 2019; Steeb *et al.*, 2016). The benefits of these activities have been examined, with an international APPE found to have a positive effect on understanding of global health among pharmacy students (Steeb *et al.*, 2020), while a study abroad programme promoted personal growth and interactions with other cultures (Allard & Raimi-Abraham,

2019). However, despite the apparently high number of pharmacy students who wish to study abroad (Owen *et al.*, 2013), a review of pharmacy schools suggested that demand for global experiences does not outweigh supply (Steeb *et al.*, 2016).

Barriers to overseas visits have been identified at the levels of the individual student, university partnerships and pharmacy profession. Thus, students may cite barriers of cost, language, and safety (Allard & Raimi-Abraham, 2019; Owen *et al.*, 2013); university partnerships may not flourish due to a lack of reciprocity (lack of equivalence in perceived values) (Yarmoshuk *et al.*, 2020); and differences in professional terminology, credentialing and duties can

limit integration of curricular activities among countries (Bader, Bates, & Galbraith, 2020). Despite the challenges of establishing meaningful academic partnerships (Alsharif, 2017), there are major benefits to participating schools and such partnerships have the potential to have a major influence on global health (Uzman *et al.*, 2020).

The reluctance of pharmacy students to travel may be reduced by earlier didactic experiences that introduce students to global health concerns, and many such courses have been described (Bailey & DiPietro, 2016; Prescott *et al.*, 2017). There is also an emerging activity of direct collaborative teaching under the so-called Collaborative Online International Learning (COIL) framework (Rubin, 2017). The potential for expansion of this activity has been promoted by the increased familiarity with online teaching in most countries due to the COVID-19 pandemic (Burgess & Sievertsen, 2020; Stefanile, 2020; Zhang *et al.*, 2020; Kim *et al.*, 2021), but exposure of pharmacy students to the education and healthcare systems of other countries through didactic courses is rare. However, there are a few examples of international didactic courses in pharmacy co-taught by partner universities. The collaborative Doctor of Pharmacy programme between the University of Illinois Chicago and the University of Malta includes both synchronous and asynchronous content, and a survey of student perceptions indicated particularly positive feedback for the live lectures (Pham *et al.*, 2019). Peking University has held an international pharmacy education programme that includes online courses taught with Pharm.D. students from the United States (U.S.). A survey of students from Peking University indicated that these courses were perceived to be valuable for improved understanding of clinical practice, Pharm.D. education, and English language skills, but also challenging in terms of time differences and internet reliability (Yi *et al.*, 2020).

With this background, the University of Southern California School of Pharmacy (Los Angeles, CA, USA) (USC) and Nirma Institute of Pharmacy (Ahmedabad, India) (Nirma) made the decision to offer a joint didactic course with live lectures and international student group-based learning. From the USC perspective, a major goal was to expand international contacts beyond those established in other programmes (Kim *et al.*, 2021a). From the Nirma perspective, there was a particularly strong demand for an international experience among students. Both schools also recognised mutual benefits based on relative strengths and weaknesses, consistent with the need for reciprocity in the partnership (Yarmoshuk *et al.*, 2020). For both, the course creation presented an opportunity to establish a collaboration with tangible

outcomes for students and faculty alike. Here, the development and implementation of the course, and the impact on students and faculty at the partner universities are described.

## Methods

### Background

USC and Nirma began a partnership in November 2018, when a visit to Nirma by the Dean of USC resulted in the signing of a Memorandum of Understanding. The head of international relations of Nirma paid a return visit to USC in 2019, followed by subsequent visits by USC to Nirma, most recently in late January 2020. Initial collaborative activities under the nascent partnership included Nirma students taking part in an international summer programme at USC in 2019, and several Nirma alumni enrolling in USC graduate programmes.

An online course collaboration was a significant step in advancing the partnership. The project was initiated when Nirma raised the possibility of establishing a joint course in August 2020. Through email exchanges, a list of possible topics was drafted and questions regarding the timing of the course, credit versus non-credit options, cost, duration, division of labor, and how to attract students from both Nirma and USC were discussed at both institutions. A course outline was developed and refined into a course syllabus. Communication limitations due to the time difference and faculty schedules had to be overcome. Differences in academic culture and administrative (bureaucratic) requirements, such as course approvals and inflexible academic calendars, further complicated an ambitious timeline.

### Course design

Course design was challenging, given the need to find a broad topic of interest to students at both universities, to recruit faculty with appropriate expertise and interest, and to leverage the complementary strengths of the two universities. Diabetes was selected as a focus, due to the past experience at USC of teaching in this area internationally (Kim *et al.*, 2021a) and because of the contemporary interest in this disease in India, given the increasing number of cases (Anjana *et al.*, 2017) and the importance of diabetes in pharmacy education in India (Porselvi, 2021). An integrated multidisciplinary approach was selected to build upon the strength of the faculty expertise from both universities and to provide global perspectives on diabetes drug development and treat-

ment. Course coordinators were identified at each university and were responsible for identifying faculty to teach topics in their areas of expertise. Weekly course faculty meetings were scheduled to discuss planned content for the following week. Higher level USC students (mostly fourth year Pharm.D. students) were engaged to serve as course facilitators and teaching assistants.

### Student enrolment

The course design emphasised students working in small groups comprising about equal numbers of students from USC and Nirma. An online environment can support a large class size, but the demands on faculty for facilitating these groups limited enrolment to 40 students in total. At Nirma, the details of the course were shared with students and interested students were asked to submit their names. The number of interested students was more than the actual seats available; hence, the students were selected based on their strong academic performance and interests. The limitations of the course design restricted this number to 25 students. These students were mainly third and fourth year undergraduates in a Bachelor of Pharmacy (B.Pharm.) degree. At USC, the course was offered for elective credit in the Pharm.D. (second and third year Pharm.D. student classes) and Masters programmes. Recruitment of students was made more challenging by the already scheduled formal curriculum, but interest was high and 13 students ultimately enrolled in the course. Enrolled students were eligible to receive course credit from their respective universities. Student performance was assessed based on weekly assignments, group presentations, a final quiz bowl session, and completion of a final reflection.

### Mixed methods assessment of the effectiveness of the course

A post-course survey and a reflection were used to obtain student feedback. The survey included international components and also asked questions on general course content. Answers on a five-point Likert scale were given anonymously, but students were asked to identify their university. The survey was provided on the last day of class and students were given one week to respond. Data were collected through Qualtrics and were processed in Microsoft Excel. The reflection focused on the international aspects of the course. The narratives were analysed using qualitative coding and analysis (Miles, Huberman, & Saldaña, 2020). The qualitative information was used to validate the numerical data from the survey using triangulation (Noble & Heale, 2019). This study was

reviewed and deemed exempt by the institutional review board (UP-21-00222).

## Results

### Course contents and assessment

The course schedule is shown in Table I. The first three sessions of the course (Table I) were designed to cover material related to Project 1 and followed the general design of earlier international courses taught at USC (Kim *et al.*, 2021a). This approach provided a tested framework for incorporation of a discussion of diabetes as a disease of concern in India (Session 1) and a comparison of practice guidelines for pharmacotherapeutic management of diabetes in India and the United States (Session 3). The international aspects of these sessions were complemented by performance of Project 1 by six groups each comprising students from the two universities. Each group worked on one antidiabetes agent, and developed a presentation (Session 4) on the history of the drug, its physicochemical properties, pharmacokinetics, pharmacology, and its place in the therapeutic pathway (Kim *et al.*, 2021a). The content on drug-drug interaction (DDIs) (Session 5) is also well-established and served to support Project 2, which focused on interpretation of a case study on a DDI (Kim, Morningstar-Kywi, & Haworth, 2021). Group projects presented in Sessions 4 and 7 were assessed and scored by faculty using a shared rubric in a Google Sheet. Students were asked to perform an assessment of their team by scoring each team member on their teamwork and contribution of knowledge.

**Table I: Summary of the course schedule**

Session	Event	Presenters
1	Introduction: Goals of the course	Joint
2	T2DM Drugs - Mechanisms of Action	USC
3	T2DM Treatment Guidelines (U.S./India)	Joint
4	Project 1 Presentations: Discovery, Mechanism and Clinical Use	Joint
5	ADME and DDIs of T2DM Drugs: Science and Clinical Perspectives	USC
6	T2DM Roles for Pharmacists (U.S./India)	Joint
7	Project 2 Presentations: DDI Cases	Joint
8	Natural products for T2DM	Nirma
9	Regulatory and pharmaco-economic considerations	Joint
10	Future drug delivery and industrial application	Nirma
11	Quiz bowl Assessment: Student-generated questions	Joint

By building on a platform of well-established material, it was possible to devote the remaining sessions of the course to newer topics. This began with a comparison of the different roles of pharmacists and clinicians in diabetes care in the U.S. and India (Session 6). This was followed by a discussion of the use of natural products for treatment of diabetes, including phytoconstituents, a particular strength of Nirma (Session 8). The focus was then switched to regulatory considerations in the U.S. and India, including clinical trials and regulatory approval (Session 9). Finally, the course looked ahead to new developments in modified release dosage forms for anti-diabetes agents, including a discussion on insulin delivery technologies. This element of the course was also driven by the expertise of Nirma faculty in this area (Session 10).

Following each class session, each group was required to submit two multiple choice questions to assess the students learning of the material. These questions were submitted at the end of each week, reviewed by the course facilitators, and revised by the student groups as needed. For the final quiz bowl (Session 11), course faculty selected four questions from each group. This session was run using Kahoot to create a fun and competitive atmosphere. Students competed as a team with their group members. After each question, one student from the group who authored the question was required to explain the correct answer. The preparation of questions and answers and the live quiz bowl session were well-received by students (Table II). The groups performed well in the quiz bowl, with an average overall score of 89.6% (range 87.5-95.8%).

### International collaboration

At the conclusion of the course, students were required to write a reflection on their experience. Students entered their responses through a Qualtrics survey that provided three specific prompts (Table II). The responses were coded and analysed to identify five thematic categories that emerged from the data. The emergent themes are shown in Table II, with an example quote for each. Further quotes are shown on the University of Southern California (n.d.) website.

The most prominent theme (Theme 1, Table II) that emerged from the reflections, mentioned in 26 responses, was the overall learning experience. Students reported that they gained new knowledge and encountered new perspectives thanks to the course. They valued learning how drug development and clinical treatment for diabetes differ in India and the United States. 'Learning about the pharmacy world in India was surprisingly interesting,' commented one USC student. A Nirma student shared that 'the rewarding thing was the knowledge we gained from [USC] students about the newer developments in the field and we learned so much about the U.S. healthcare system and education.' Students generally reflected that the content complemented their learning in other classes and appreciated the more 'holistic' approach to studying a disease state, which extended beyond FDA-approved drugs to natural products commonly used in Indian practice. Fresh perspectives came from the opportunity to learn from faculty from the other country, as well as

**Table II: Themes and example quotes obtained from responses to a post-course reflection<sup>1</sup> using three prompts<sup>2,3,4</sup>**

Theme	Comments (n) <sup>5</sup>	Example quote
1. Learning Experience: new perspectives, new knowledge	26	'This course was different in that we were able to learn about another country's guidelines and policies. It is not often that we learn about another country, but I think that this is important to create culturally responsive healthcare professionals.'
2. Teamwork: overcoming communication, time difference challenges	24	'... it was little challenging to work with international colleagues and faculty in the starting but then time goes smoothly and after that it was easy to interact with the team members for assignments.'
3. Course Design: breakouts, facilitators	19	'It was a right blend of learning the concepts theoretically, project based learning, learning through quizzes and questions, regularly having a topic wise discussion in every breakout sessions and interacting and exchange of knowledge. Also the idea of splitting us all into the groups of mix bag students was really thoughtful. I mean it really helped us learn and collaborate in the best manner.'
4. Soft skills development	18	'Learning how to adapt and work in a new and foreign environment is a skill that will no doubt be useful. Though this was my first collaborative global learning experience, I doubt it will be my last, and hope to broaden my exposure in the future.'
5. Impact on future career	15	'I felt [doing the group presentations] prepared us for our futures as healthcare professionals and pharmacy experts.'

<sup>1</sup> The overall description of the task was as follows: Please briefly (500 words) reflect on your experience in this collaborative international learning course between Nirma and USC. For these questions, we would like you to think about your experience with this course in relation to developing the skills, values, and behaviours that will allow you to thrive in a more diverse, interconnected world in the future.

<sup>2</sup> What was different about this experience compared with your other classes?

<sup>3</sup> What was challenging and rewarding about this class because of its collaborative design?

<sup>4</sup> Why is global learning important to you and your professional development?

<sup>5</sup> Responses to the three prompts were obtained from 19 students (57 responses). These responses included 102 comments that were sorted into 5 themes.

through discussions with peers during breakout sessions and while working on group projects.

Group project work was not without challenges, however (Theme 2). The time difference in particular complicated communication. Students acknowledged these challenges explicitly in 24 responses and described how they were, for the most part, able to overcome them. As one student commented: 'At the beginning, we had some issues in communication, however, after the first weeks of the class, we eventually set up a system that began to work.' Solving this communication problem was an important and intentional learning outcome from the course design.

Students recognised the role of the course design in fostering global learning, mentioning it in 19 responses (Theme 3). Students most frequently referred to the benefits of group work and breakout discussions. Students also highlighted the role of facilitators (advanced USC students) in assisting groups. These two elements in combination proved central to the inter-cultural exchange built into the course design. As one student noted, 'In most other classes, Zoom breakout rooms are filled with silence as students work on the assignment by themselves or take an early break. The facilitator would help move discussions along and answer any questions that we may have had about the material.' Although the online platform became commonplace for students in the 2020-21 academic year, its use in this course fostered exchanges of ideas across the two universities.

The reflective essays showed that students gained what can be described as soft, or transferable skills (Jones, 2013) (Theme 4). These skills, referenced in 18 responses, fall into two general categories of self-efficacy (problem-solving, adaptability) and people skills (communication, teamwork, leadership). 'Learning how to adapt and work in a new and foreign environment,' '[being] able to adapt to changing circumstances,' and 'learning to be a better teammate in a virtual environment' are some examples of references students made to their development of transferable skills. Transferable skills are a factor in employability, a connection that many students made.

Students drew direct connections between the transferable skills they developed through the course and their future roles in the field of pharmacy (Theme 5). This impact on future career emerged as the fifth theme, referenced in 15 responses. One student commented that the course will help them to become 'culturally responsive healthcare professionals.' A second student reported that 'this experience will help me as a current intern pharmacist and future pharmacist to communicate better with [patients from] South Asia.' For some Nirma students,

their immediate career plans are to pursue further study in the U.S., and the course helped to inform their decision.

The reflective essays capture in their own voices how the students perceived this collaborative international learning experience. The student responses affirm the potential for global learning through course collaborations such as this one. The team-based design of the course and effective use of facilitators and breakout sessions contributed to an online learning environment that allowed students from the U.S. and India to build personal and professional connections. One student aptly summed up this sense of connection generated by the experience: 'We are all advocates for the pharmacy profession, and we can help our patients by learning from each other.'

### **Student feedback**

Responses to the post-course survey were obtained from 22 students (57.9%). The questions were divided into two categories, international impact and logistics (Table III) and knowledge acquired and assessment (Table IV). In the following section the survey answers are connected to the qualitative themes (Table II) described in the previous section.

In alignment with Theme 1, students appreciated the opportunity to learn from different international perspectives (Q1, Table III). This broadened their awareness about diabetes prevalence worldwide (Q1A) and exposed them to a variety of roles for pharmacists (Q1B - D). Most importantly and in alignment with Theme 5, the responses to Q1F indicated an enhanced interest in working or studying overseas. Students were likewise positive about their international team experience with respondents agreeing that it enhanced their learning (Q2A), was fun (Q2B), and helped them to learn about working in a team (Q2C). This suggests that the difficulties indicated in Theme 2 with regards to communication were overcome.

The next item asked students about the organisation and administrative aspects of the course (Q3, Table III). The students were satisfied with the organisation of the course (Q3A) and felt that the virtual classroom sessions were engaging (Q3B). Students found the online learning system (Q3C) and virtual classroom (Q3D) supported their learning. These findings were consistent with comments in Theme 3. There was some concern over the timing of the sessions, with 18.2% disagreeing or strongly disagreeing that their needs were met by the timing of the live sessions: early morning at USC and late evening at Nirma (Q3E). This challenge also emerged in comments around Theme 2.

**Table III: Post-course survey of international impact and logistics**

Question area	Question part	SA	A	N	D	SD
Q1. Learning from two different international perspectives (India and the United States)	A. Broadened my awareness about diabetes prevalence worldwide	12	8	1	0	1
	B. Helped me to identify differences and similarities in pharmacist roles in different countries	13	8	0	0	1
	C. Exposed me to new or different roles for pharmacy graduates	12	8	1	0	1
	D. Exposed me to differences in regulatory pathways	11	10	0	0	1
	E. Enhanced my engagement with the material	9	10	2	1	0
	F. Enhanced my interest in pursuing educational or work opportunities in another country	15	3	3	0	1
Q2. Working in teams with students from the other university during class and on group projects	A. Enhanced my learning	12	10	0	0	0
	B. Was fun	14	6	1	1	0
	C. Helped me learn about working in teams with colleagues	15	5	2	0	0
Q3. Please indicate your agreement with the following statements	A. The course was well organized	16	6	0	0	0
	B. Virtual classroom sessions were engaging	16	6	0	0	0
	C. Blackboard, the online learning system, supported my learning	19	2	1	0	0
	D. Zoom, the virtual classroom, supported my learning	18	2	1	0	0
	E. The timing of the sessions (evening in India, morning in the U.S.) was acceptable for my learning needs	8	7	3	2	2

SA: Strongly Agree; A: Agree; N: Neither Agree Nor Disagree; D: Disagree; SD: Strongly Disagree

**Table IV: Post-course survey of knowledge acquired and assessment**

Question area <sup>1</sup>	Question part	SA	A	N	D	SD
Q4. <sup>a</sup> Facilitation of knowledge and interest in the topic areas	A. Knowledge of the basic science supported my ability to make decisions about the medical treatment of patients	14	8	0	0	0
	B. Knowledge of the clinical application facilitated my interest in the science-based sessions	14	8	0	0	0
	C. Knowing a drug's mechanism of action helped me to determine when it should be selected for treatment	12	10	0	0	0
	D. Knowledge of natural products enhanced my interest in alternative and complementary medicine	13	6	2	1	0
	E. Knowledge of the regulatory process increased my interest in medical product development	12	9	1	0	0
	F. Knowledge of industry practices increased my understanding of medical product development challenges that impact marketing of products	14	8	0	0	0
Q5. Course Assignments	A. The assignments were appropriately challenging	12	8	1	1	0
	B. I had sufficient time to work on the assignments	18	3	0	1	0
	C. The instructions provided were clear	18	3	0	1	0
Q6. Assignments: Group Project 1 – Pharmacology and Clinical Use of Drugs	A. Preparing PowerPoint slides with my team facilitated my learning	14	6	2	0	0
	B. Preparing PowerPoint slides with my team was intellectually stimulating	14	5	3	0	0
Q7. Assignments: Group Project 2 – Drug-Drug Interaction	A. Interpreting the assigned case report increased my ability to analyse drug-drug interactions	15	5	0	1	0
	B. Use of algorithms and drug information resources increased my ability to analyse drug-drug interactions	14	6	1	0	0
	C. Creating our group presentation increased my confidence in preparing a professional presentation	14	6	0	0	0
	D. Examining the physicochemical and pharmacokinetic properties of drugs helped me to analyse the clinical relevance of drug-drug interactions	13	9	0	0	0
Q8. Assignments – Questions and answers / Final 'Quiz Bowl'	A. Preparing multiple-choice questions and answers for each class session enhanced my learning	13	6	2	0	0
	B. Preparing multiple-choice questions and answers for each class session helped me to assess my understanding	10	11	0	0	0
	C. The final 'Quiz Bowl' session helped me to assess my understanding of the material	14	6	1	0	0
	D. The final 'Quiz Bowl' session was fun	19	2	0	0	0

<sup>1</sup> Question numbering continues from Table III

SA: Strongly Agree; A: Agree; N: Neither Agree Nor Disagree; D: Disagree; SD: Strongly Disagree

Students' perceptions of knowledge acquisition and assessments are shown in Table IV. Students agreed that integration of content areas facilitated their interest and knowledge in other areas (Q4A - F). The final four sets of questions (Q5 - Q8, Table IV) addressed the course assignments. The course featured a mix of student levels, with the USC students being in doctoral study and the Nirma students in their third and fourth years of undergraduate studies. Despite differences in academic level, most students agreed or strongly agreed the course assignments were appropriately challenging (Q5A), felt they had sufficient time to work on assignments (Q5B), and that the instructions were clear (Q5C). Both group projects were well received by the students (Q6 and Q7). Student learning of the material was also assessed through weekly assignments and the final quiz bowl session. The weekly assignments involved submitting multiple-choice questions and answers for the content covered in each class session. Both the preparation of the questions and the final quiz bowl session were perceived as helpful for students in learning and self-assessment of their understanding of the material (Q8A-C). Students unanimously agreed that the quiz bowl competition using Kahoot was fun (100%, Q8D). These findings do not directly align to any one theme, but the students' experience in completing these assignments created the opportunity for soft skills development (collaboration, communication, teamwork) indicated in Theme 4.

## Discussion

The course described here may be the first example of internationalisation of pharmacy education through a didactic course taught jointly and synchronously by faculty at two universities. As such, the experience in delivering this course will be useful for other universities considering similar approaches. A number of factors were identified that may be important in establishment of such courses. These include strong foundational interactions between the two universities, complementary strengths, students with motivation for international interactions, regular meetings among faculty during the course, scheduling flexibility, and basing the course on at least some previously taught material. The general course design is applicable to any subject area, but establishing a focus on a disease state is an effective way to initiate the course. This can then lead to recruitment of expert faculty who can unite around this central theme.

The complementarity of the areas of expertise at Nirma and USC provided a strong basis for the course. From the

USC perspective, the strong emphasis on pharmaceutical industry applications, including products such as insulin delivery devices, was attractive, given the increasing interest (Egley & Kaakeh, 2018) and potential employment opportunities (Saavedra O'Connor, & Fugh-Berman, 2017; Ahmad *et al.*, 2014) for Pharm.D. graduates in the industrial sector. The opportunity for USC students to learn about use of natural products and the system of Ayurvedic medicine (Pandey *et al.*, 2013) was also unique.

From the perspective of Nirma students, the main interest was exposure to clinical pharmacy practice in the U.S., which is a key need in Indian pharmacy education (Rajan *et al.*, 2020). Comparison of the healthcare systems in the two countries ultimately became a particularly interesting part of the course. Greater innovation (More & Patel, 2019) and more diverse content (Pol *et al.*, 2017; Sahu *et al.*, 2016) have also been proposed as needs in pharmacy education in India, and thus, general exposure to USC teaching methods and content was of interest to Nirma faculty. Interestingly, as an unintended consequence, the course design created interactions within USC that had not previously occurred, including better integration of regulatory, clinical, and basic sciences.

The time difference between Nirma and USC (13.5 hours) presented a unique challenge in delivery of a live course. One unanticipated problem with student collaboration was the relatively small time window available for direct meetings between Nirma and USC students on other days. However, in future offerings of the course, several 'break' weeks will be included in which the specified course time can be used only for student group meetings. Other than this limitation, the student groups seemed to function well and the group presentations indicated a strong collaborative element between Nirma and USC students.

## Conclusion

Affordable travel and digital communication technology have led to rapid globalisation in the last decade, resulting in changes in lifestyle and culture. This has led to introduction of new diseases and new patterns of existing diseases that have strong international components. Thus, corresponding internationalisation of pharmacy education is required to address these changes. The best practices of an educational institute should be shared to develop maximum scope in new areas of pharmacy, regardless of geographical separation. These factors necessitate effective collaborations among pharmacy schools worldwide. Universities are the oldest organisations in the world and international collaboration is essential for their



survival in a rapidly changing world. The success of the collaborative course described here has led to the planning and delivery of larger online international courses in pharmacy at USC. The developing understanding of how such courses are best implemented is providing a platform for future expansion of international collaboration in pharmacy education.

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## Conflicts of Interest

The authors declare no conflicts of interest.

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