

## Introducing PSTC: Design, Conduct, and Evaluation process of a Pharmaceutical Strategy Training Course

Reyhaneh Chini<sup>1</sup>, Navid Ravan<sup>1</sup>, Amir Hossein Jajarmizadeh<sup>2</sup>, Sadra Nadimi Parashkouhi<sup>1</sup>, Sara Bagheri<sup>1</sup>, Kowsar Danesh<sup>1</sup>, Seyed Mehrdad Mostafavipour<sup>1</sup>, Mohammad Hadi Sajedi<sup>1</sup>, Ali Pourebtahaj<sup>1</sup>, Alireza Barzegar<sup>3</sup>, Mitra Amini<sup>4</sup>, Sajad Delavari<sup>5</sup>, Abdolali Mohagheghzadeh<sup>6\*</sup>

<sup>1</sup>Pharmaceutical Strategic Studies Center (PSSC), Shiraz University of Medical Sciences, Shiraz, Iran.

<sup>2</sup>Department of Health Economics and Management, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.

<sup>3</sup>Department of Pharmacognosy, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

<sup>4</sup>Clinical Education Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.

<sup>5</sup>Health Human Resources Research Center, School of Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.

<sup>6</sup>Department of Phytopharmaceuticals, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

### Abstract

Pharmacy students as future leaders of the pharmaceutical system must acquire different necessary skills through an interdisciplinary approach and pre-exposure to real challenges. To empower pharmacy students, a three-phase short-term elective course has been designed, conducted, and evaluated. The primary objectives of the course were outlined by needs assessment. The course was designed based on Harden's 10-steps course planning. The content of the curriculum and educational strategies were determined through nominal group technique. The Delphi method has been used to decide on the methods of delivering the content in the course. The education process was problem-based and based on active learning. In addition, working in small groups and role-play were also used. Finally, the efficacy of the course was quantitatively and qualitatively evaluated by the Kirkpatrick model and semi-structured interviews. Based on Kirkpatrick's assessment criteria participants' performance was statistically significant ( $p < 0.001$ ) compared to the control group. The qualitative evaluation also showed results in line with course objectives. Various courses with content similar to some degree to this course are held in different places. However, a small number of reports exist about their design, conduction, and evaluation process. Therefore, we tried to scientifically evaluate our course. Our study suggests that courses with interdisciplinary and leadership approach using active learning methods can be enjoyable for learners, in addition to qualifying participants for various pharmaceutical job opportunities such as non-clinical, academic, and governmental positions, accompanied by improvements in their level of judgment and performance.

**Keywords:** pharmacy education; leadership; Interdisciplinary Placement; systems thinking.

Please cite this article as: Reyhaneh Chini, Navid Ravan, Amir Hossein Jajarmizadeh, Sadra Nadimi Parashkouhi, Sara Bagheri, Kowsar Danesh, Seyed Mehrdad Mostafavipour, Mohammad Hadi Sajedi, Ali Pourebtahaj, Alireza Barzegar, Mitra Amini, Sajad Delavari, Abdolali Mohagheghzadeh. Introducing PSTC: Design, Conduct, and Evaluation process of a Pharmaceutical Strategy Training Course. Trends in Pharmaceutical Sciences. 2022;8(3):183-194. doi: 10.30476/TIPS.2022.95671.1151

### 1. Introduction

In postmodern society, it is felt increasing-

*Corresponding Author:* Abdolali Mohagheghzadeh, Department of Phytopharmaceuticals, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran  
Email: mohaghegh@sums.ac.ir

ly that each individual should shift from a working model relying solely on its specialized knowledge to a model not only based on technical understanding but also based on the knowledge that emerges in the light of interprofessional thinking (1). Ac-

According to the World Health Organization (WHO), “Interprofessional education occurs when two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes” (2). Interprofessional education aims to provide an educational environment that leads to acquiring knowledge, skills, and attitudes for learners that will have positive effects on their ability and behavior as part of multidisciplinary healthcare teams in the future (3). Interprofessional training teams help learners as future human resources of the health system to acquire the spirit of working in interprofessional teams and improve the quality of health services (4). The American Association of Colleges of Pharmacy (AACCP) recommends that to be accountable to the community’s health needs, pharmacy colleges should provide students with an opportunity to be in the field of education, research, and interprofessional work. This association introduces interprofessional education as one of the priorities of pharmacy education (5). Therefore, the official PharmD curriculum, co-curricular, and extracurricular courses should provide students with various knowledge and skills that are not covered in the conventional format of the curriculum.

Guideline 9.3 of the Accreditation Council for Pharmacy Education (ACPE) has set the PharmD program’s standard in the US. The guideline states that the school of pharmacy curriculum should nurture students as leaders and agents of change (6). Many studies have shown the importance of covering leadership and management topics in the PharmD curriculum and extracurricular courses (6-10). Systemic thinking is also critical in various branches of medical sciences. Fundamental knowledge of human beings from purely biological to sociological dimensions requires a framework of systems thinking (11,12). To fully meet the needs of pharmacy students for holding pharmaceutical careers, it is necessary to design extracurricular courses and conduct them in parallel with the country’s official pharmacy education program due to overload curriculum (13).

According to the latest executive action plan approved in 2016 in Iran, pharmacy education is a 5.5 years’ course, includes 211 course credits, and those completing the program are awarded a

PharmD (14). The most common pharmaceutical job opportunities worldwide include community pharmacy, hospital pharmacy, pharmaceutical industry, and related pharmaceutical administrations. The proportion of pharmacists per 10,000 population in Iran was 3 in 2020 (15). Of the total number of pharmacists working in the country, 78.86% are working in private community pharmacies, 6.31% are working in the Food and Drug Administration, and 2.78% are working in manufacturing companies. Out of a total of 211 credits, a total of 4 credits (1.9%) have been allocated to management and pharmaceutical economics, which focuses on acquiring managerial skills and economic knowledge of students, as part of the official curriculum of pharmacy education. Since 2016, a guideline has been approved by the Ministry of Health and Medical Education of Iran, which suggested designing and conducting pharmaceutical short-term professional course (15, 16).

Among the supplementary courses that have been experienced in the world and Iran for students of medical sciences and pharmacy are Master of Public Health (MPH) and Master of Business Administration (MBA). This design has been done for two primary purposes. First, it is desirable that pharmacy graduates have business competencies to enter management-related positions in pharmacy. Second, such programs allow obtaining dual MBA and PharmD degrees in less time and at a lower cost than if they wanted to obtain each of these degrees separately (17-19). One study found that students who completed these courses had higher incomes after graduation (20). In Iran, the “PharmMBA” course is held by private institutions. One private institution claims that this course’s purpose is to “increase the ability of managers in decision-making and policymaking of the system, and the categories related to pharmaceutical management” (21).

Dual MPH and pharmacy courses have been designed in different countries (22). Besides, there are many experiences of conducting Doctor of Medicine (MD)/MPH courses in different countries and Iran. MD/MPH graduates often look for non-clinical positions compared to conventional graduates. Dual degree graduates are more attracted to academic and governmental activities, obtain

more job opportunities, and they gain a broader point of view on the health system (23-28).

In today's world, leadership, strategic management, systematic thinking, time management, creativity, financial resource management, human resources management, academic writing, strategic thinking, negotiation technique, ethics and decision making, and futurology are the capabilities suggested for pharmacists (29,30). These capabilities are not met in the current PharmD curriculum as effectively as it is needed. In addition, not all pharmacy students need advanced managerial courses for their future roles; they need to be aware of the definition and necessity of approaches like systems and strategic thinking and to be able to use these approaches based on their own needs. To reduce these deficiencies and improve the skills of pharmacists, this study has discussed the design, conduct, and evaluation of the short-term elective course for pharmacy students during their PharmD education called Pharmaceutical Strategic Training Course (PSTC). We are going to answer three questions in this study:

1. What are the management and leadership topics that are not mentioned in Iran's Pharm.D. curriculum?
2. How can we present these topics to pharmacy students as a short-term elective course?
3. How effective the course has been?

## 2. Materials and methods

The present study is a mixed-method study designed and implemented in several separate steps according to the objectives (31). The steps of this study included designing, conducting, and evaluating PSTC for pharmacy students at our institution which are described below:

### 2.1. Course design

Harden's 10-steps course planning was used to design the course and curriculum planning. We first identified pharmacy students' management and leadership skills by searching PubMed and Google Scholar databases. The topics of management training and strategic planning in prestigious universities and higher education institutions in Iran and worldwide were examined (32). The results of this review study were discussed in two

2 h focused group discussion sessions (4 h in total) with the presence of experts (8 students and pharmacy graduates and 9 faculty members in the fields of pharmacognosy, pharmaceutical biotechnology, pharmacoeconomics, and pharmaceutical management, health policy, health care management, and medical education). In the first session, the training course's objectives in a face-to-face session with all mentioned people were determined through the Nominal Group Technique (NGT) (33,34). At the end of the second session, each member separately expressed each identified topic's importance in the questionnaire form.

### 2.2. Conducting the course

#### 2.2.1. Enrollment and registration

A complete introduction of the course objectives and conducting method was presented to all pharmacy students of SUMS through cyberspace and a 1.5 h face-to-face session. Some of them registered to participate in the course. Registrants' pre-evaluation test consisted of 3 descriptive questions to assess their initial attitudes towards the country's health and medicine system and their ability to analyze in this field. After that, they participated in a face-to-face interview. Interviews were videotaped to watch them again if we couldn't recall the details for making the right decision. Interviewees described their needs and motivations for participating in the course. Finally, the evaluators rated the interviewees' criteria based on the Likert scale. The evaluators' criteria were students' activity background, commitment to fulfill a mission, creativity, teamwork, perspectives on the future, and interest in the health system. Finally, 19 out of 24 students who participated in the interview were selected and remained constant during the whole course.

#### 2.2.2. Grouping the participants

At the beginning of the course, participants were stratified and randomly classified into 4 groups (Three 5-member groups and one 4-member group) so that the groups' composition was appropriate according to their semester.

#### 2.2.3. Duration

The course was held in the form of a 40 h

workshop over 5 days. These 5 days were scheduled in such a way over three weeks so that learners had enough time to do projects, conduct meetings with experts, get information from mentors and professors, and do their team works.

#### *2.2.4. Instructors and mentors*

Course instructors were from four specialties: pharmacy, health services management, pharmacoeconomics, management, and health policy. In each field, the instructors were selected based on their attitude toward flexibility and innovation in teaching methods, interdisciplinary approaches, and having enough free time to accompany participants throughout the course. The instructors had been informed about the general purpose of the course and the demographic characteristics of the participants during the virtual and face-to-face meetings. Each group was also connected to a graduate pharmacist as a mentor. The mentors have become acquainted with the project's goals and stages before the start of the course. The mentors were selected among those who had just completed their pharmacy studies and were familiar with the pharmaceutical system, pharmaceutical policymaking, and organization. Mentors guided their groups in carrying out their projects.

#### *2.2.5. The general picture of the course*

First, the instructors explained 3 trends that would affect the pharmaceutical system. Then, each group hypothetically became a representative of one organization. Groups had to assess their organization's current state using the internet and make a direct link to actual managers responsible in those organizations. The groups should evaluate the impact of trends and other factors on the organization's decision-making and present a strategic plan for the organization's future exposure to 3 trends as their final project. Designers of the course selected 4 Iranian organizations based on the criteria that the organizations must be involved, active, and influential in pharmaceutical decision-making. Also, the position of the organization should be capable of being influenced by facing these 3 trends. Based on these criteria, the 4 selected organizations were the Food and Drug Administration, the Parliamentary Health Com-

mission, The Supreme Council of Health Insurance, and the Iran Medical Council (Pharmacists Association).

As a final project and based on presented topics, groups reviewed and evaluated their status in their hypothetical organization. They explained the organization's position in the country's health and pharmaceutical system, analyzed the impact of the 3 trends on the organization with a systemic approach, and finally presented a strategic plan for their organization. Five people from outside the course employing in each selected organization have been invited as the jury team. The jury team developed a 5-point Likert scale evaluation form in 4 general sections: presentation, reasoning, technique, and comprehensiveness and constraint. The evaluation form consisted of 20 items in four sections (Appendix Table 5), weighted using the Delphi method. Based on the final evaluation, groups were scored and ranked.

#### *2.3. Measuring the effectiveness*

The effectiveness of the PSTC was assessed using the mixed method evaluations such as Kirk Patrick's 3-level method (reaction, learning, behavior) (35) and interviews. To evaluate the first level of Kirk Patrick, at the end of each day, the participants determined their level of satisfaction with the content and the way the topics were presented (Appendix Table 1). Immediately after the course, all participants answered a questionnaire consisting of 13 four-choice questions, designed by instructors with an average of 2 questions from each educational topic to evaluate the second level (Appendix Table 2). Their answers were compared with a control group consisting of 19 students who did not participate in the PSTC. Students in the control group were considered equal to the group participating in PSTC in number, semester, and gender. We also tried to select similar controls in attitude based on our judgment and asking their classmates. After 5 months from the end of the course, the participants' behavior with a self-reported questionnaire was measured and compared with the control group to assess the third level. Besides, to supplement the quantitative data, a qualitative approach through semi-structured interviews with open questions has been

used to better understand the students' experience (Appendix Table 3). A brief introduction had sent to the audience before the interview and the interview guide was created. Data saturation occurred after 9 interviews. All interviews were transcribed, and the inductive approach was conducted for the qualitative content analysis of the interviews (36). The interview included questions in 3 areas: conduction, education, and impact. Open-ended questions were also asked to encourage the participants to explain their experiences in detail. The average interview duration was 28 min., a minimum duration of 17 min., and a maximum of 45 min.

In addition to the students' point of view, a semi-structured interview was conducted with the instructors to complete the evaluation (Appendix Table 4). The interview questions were also organized into 3 areas: conduction, education, and impact. The average interview duration was 18 min., the minimum interview duration was 10 min., and the maximum was 28 min.

#### 2.4. Statistics

SPSS for Windows, (Version 16.0. Chicago, SPSS Inc; 2007) was used for evaluating the results of the second and third level of Kirk Patrick. Alpha-Cronbach was the statistical test used. P values less than 0.05 were considered statically significant.

### 3. Results

The study population was participants in PSTC. The population was 19 people. Of these, 8 were women, and 11 were men. The age range was 20 to 24 years, and the average age was 21.3. The results of the three stages of designing, conducting, and evaluating the pharmaceutical strategy training course are as follows.

#### 3.1. Design

Based on the needs assessment, the objectives of the PSTC were outlined, including the following:

##### 3.1.1. Objectives in the field of educational content

Familiarity with the components of the country's healthcare and pharmaceutical system, recognizing their challenges, recognizing the le-

vers of health system control, teaching the intellectual tools required for managing and policymaking in a unit of the health system, empowering students to have a systematic and comprehensive approach for resolving issues and challenges, strategic planning in the organization, students' familiarity with the interprofessional approach to the macro view of health and its challenges, familiarization of participants with influential organizations in the pharmaceutical system and their rules and working principles, familiarization of participants with the Iranian pharmaceutical decision-making system, and review of important health and medicine national documents.

##### 3.1.2. Methods of delivering the content in the course

Activity in the form of teamwork, promoting negotiation, logical thinking and reasoning, decision-making, problem-solving, providing an active learning atmosphere, providing an interprofessional learning environment, preparing for real professional situations by practicing in a simulated environment, being problem-based, and student-based were considered criteria (37).

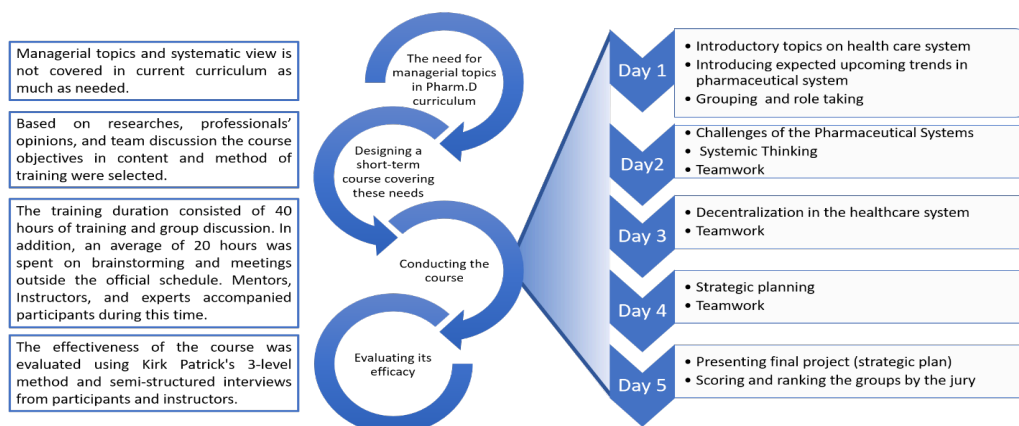
Then, according to the objectives considered by the Delphi method in 3 rounds, the content of the curriculum was determined as follows: Levers of control of the health system; Generalities of the Iranian Pharmaceutical system; Systemic thinking; Decentralization in management of Health Care; Current challenges of the pharmaceutical system; Strategic thinking; Decision-making; Problem-solving.

#### 3.2. Conduction

The course schedule was set to 5 days, which included weekends. Day 1: General healthcare and pharmaceutical system. Day 2: Challenges of the Pharmaceutical Systems, Systemic Thinking, teamwork. Day 3: Decentralization in the healthcare system, teamwork. Day 4: Strategic planning, teamwork. Day 5: Presentation of the groups and determining the selected group by the jury (Figure 1).

Active learning methods had to be used in the course. For the course to be student-centered, Participants should be able to determine part of the





**Figure 1.** Steps of design, conduction, and evaluation of Pharmaceutical Strategy Training Course.

course content actively. Also, they had to define a personalized path to advance their projects using creative thinking and brainstorming techniques. Participants needed to learn some of the content through personal searches and discussions. In order to achieve the course training objectives and improve education quality, actions such as working in small groups, playing roles, and defining selected trends were considered in the course conduction. Three selected trends were: population aging, digitalization in terms of its impact on human life and the country’s healthcare system, and the development of high-tech drugs. These 3 general trends determined the direction of the projects.

**3.3. Evaluation**

The results of the Kirk Patrick course evaluation are as follows:

**3.3.1. Level 1: reaction**

Participants’ opinions about the training program, the content of the training course, and its facilities in 5 days, on average, 64.5 of 100 were

determined (Table 1).

**3.3.2. Level 2: learning**

According to the results of second level of Kirk Patrick (learning), the average score of the participants in the field of generalities of the healthcare system, pharmaceutical system, and its challenges, systemic thinking, strategic thinking, decision-making, problem-solving, and decentralization in healthcare management compared to the control group who did not participate in the course was significant, t-test ( $P < 0.001$ ).

**3.3.3. Level 3: behavior**

The mean score of the participants in the evaluation period compared to the control group was significant ( $P < 0.001$ ).

Quantitative findings from the second and third level assessments are shown in Table 2.

The information obtained from the interview by the qualitative content analysis method with the inductive approach was classified into 3 general areas: conduction, education, and impact

**Table 1.** Evaluation results of the first level of Kirk Patrick (reaction) among participants of the Pharmaceutical Strategy Training Course.

	Number of Questions	Number of Respondents	The Average Score of 100
1st day	7	13	75.2
2nd day	7	13	75.2
3rd day	4	11	60.2
4th day	3	16	57.2
5th day	5	16	65.6
Average		64.5	

**Table 2.** Evaluation results of the second & third level of Kirk Patrick (learning and behavior) among participants of the Pharmaceutical Strategy Training Course and control group

Level		Number	Average Score (from 13)	Standard Deviation	P Value
2nd	Participant	19	9.00	3.13	<0.001
	Control	19	4.89	2.28	
3rd	Participant	19	40.53	13.36	<0.001
	Control	19	24.58	5.07	

(Table 3).

Part conduction could be considered as qualitative analysis for the first level of Kirk Patrick (reaction). Part education could be considered as qualitative analysis for the second level of Kirk Patrick (learning). Part impact could be considered as qualitative analysis for the third level of Kirk Patrick (behavior).

In the conduction section, the time and level of creativity and innovation of the course were evaluated. In general, students considered this experience special, they had never had a similar experience and topics and they were taught

differently. Participant No. 4 said: "Those who participate in this course are distinguished from others because they are taught things that are not addressed elsewhere. Or they have to spend a lot of time and money to learn the topic separately". Participants believed that if the duration of the course and volume of content were more than this, they would still participate in this course with interest. They also mentioned teamwork and hypothetical trends to carry out the final project as innovations of this course.

In the field of education, we tried to assess the content and method of education, the level

**Table 3.** Content analysis of semi-structured interviews with participants of the Pharmaceutical Strategy Training Course

Category	Sub Category
Conduction	Creativity and innovation
	Optimal conducting team
Education	Distinctive and special
	New content
	learning how to obtain such content
	MBA suitable for students without economic studies
	Need to continue and completion of the training
	An appropriate level of training to get started
	Fit the content to the needs of the participants
	Proper presentation
	Need to focus more on solutions
Impact	A better understanding of the performance of organizations
	A more complete and multi-dimensional view
	Teamwork experience
	Realizing the need for teamwork
	Applicability of educational materials
	Completion of the learning process during the final project
	Learn the principles of oral presentation in the final project
	Experience of systemic-thinking and its application in the final project
	Awareness of the three important trends governing the health system during the final project
	Motivation to transfer what has been learned
Changing attitudes toward daily news	

**Table 4.** Content analysis of semi-structured Interviews with instructors of the Pharmaceutical Strategy

Training Course.	
Category	Sub-category
Conduction	New participants
	Having a simple, efficient, and more concise format than pharm-MBA
	Distinction from conventional classes and courses
	The appropriateness of content volume in the course
Education	Offer internship opportunities
	Requires pre-course preparation
	The appropriate content for the participants
	Standard education through the use of experts in each field
Impact	Suggest suitable topics for future courses
	To attract participants
	Expand studies in common areas of pharmacy and management

of content difficulty, their relevance to the field of students, the proposed corrections, and the presentation of professors. In their responses, participants noted the novelty of the content and the adequacy of the content level. They also considered participating in this course as a suitable way to get acquainted with how to study in the field of taught subjects through related references and called for further study to provide solutions to the challenges raised.

In terms of impact, we measured the achievement of our goals. Most participants believed that the content of the course was effective in understanding their role and responsibilities as pharmacist members of the healthcare system in promoting community health. Students believed that after completing the training, their vision in identifying challenges became more open. They saw more key challenges and, among the existing challenges, they mostly pointed out managerial weaknesses. Students have been motivated to expand their knowledge in various fields more than before and apply the competencies learned in the PSTC. Interviewee no. 5 said: “I am looking to be able to apply a systemic vision in the hospital and the healthcare system. Try to do our work more process-oriented than person-centered, that is, when a person changes, not all of the organization’s decisions change from top to bottom”. Students in the interview believed that they now knew organizations and their performance better and could introduce each of the 4 organizations to others. Their view of health news and policies has be-

come more mature, as the no. 1 interviewee said: “I have become more consistent with health news and at the same time I am less affected by different atmospheres and analyzes. I can also examine the various aspects of the decisions and have a logical word to say”.

### 3.4. Instructor feedback

All instructors participated in a semi-structured interview. The data obtained from the interview by qualitative content analysis method with an inductive approach were classified into three general areas: conduction, education, and impact (Table 4).

In the field of education, instructors mentioned the need of providing prerequisites for some of the topics taught, the wide range of audience groups for PSTC educational content, and the standard education through the role of specialists in each field, and suggested additional topics for future training courses or supplementary levels for participants of PSTC.

The course was attractive to lecturers because pharmacy students were interested in learning management topics. She/he described this course as an excerpt from the PharmD/MBA. According to lecturer No. 1: In comparison to the MBA pharmacy courses, PSTC was useful and concise and didn’t confuse students with economic and financial information. It improved participants’ ability to analyze and find solutions. It differed from other classes in which it was possible to work in groups and allowed the students to



participate, as well as not having exams stressing on the memorization parts of taught topics. Most lecturers believed that the duration was sufficient. His proposed model for understanding the need for better learning materials was to provide internship opportunities in related organizations.

Lecturer No. 2 said: Students may not fully acquire a specialized skill by participating in this course. It is useful in creating interest in studying these topics and is an introduction to expand the study in the fields of medicine and management and participation in management Olympiads

#### 4. Discussion

Our primary focus during the course design was to improve students' managerial and leadership skills. We also tried to make schedules near students' desires, avoiding long theory sessions and perfectionism. In addition, we wanted the course content to be applicable to pharmacy students with different desired jobs. These were our perspectives when we tried to choose final topics among other considered topics. We wanted students to feel engaged, not just passive listeners. In addition, we wanted the course to be meaningful for the students, knowing why there are learning something. Therefore, we tried to conduct the course by introducing selected trends, group discussion, meeting with experts and authorities, etc.

PSTC differs from other domestic and foreign experiences in terms of form and content from various dimensions. Normally MBA and related programs are full-time courses, so students have to drop out of their field of study for a while. However, in PSTC, the training program was designed so that a series of skills can be acquired simultaneously with their routine university classes. Also, conventional MPH and MBA courses that run parallel to the curriculum PharmD or MD are held in Iran, and different countries are often fundamentally different from PSTC. First, the mentioned courses are held in a longer period of time. Secondly, they offer a good academic degree that could be a motivation for participants. Thirdly, they cover accounting or marketing skills that it was not our focus. PSTC goal was to improve rational, scientific, and systems thinking skills in general scale for future pharmacists. PSTC also

tried to make simulated situation to real world decision making process and a chance for participants to be instructed and evaluated by real world authorities. PSTC instructors from industrial, managerial, and academic positions collaborated as team teaching. Students had the chance to visit their instructors outside of the workshops, visit a regulatory position related to their group, and listen to their experiences and points of view. PSTC was the first short-term joint course between pharmacy and health services management held in SUMS. The course scenario was designed based on the simulation method in which participants in their organizational role could experience chances and challenges that each organ is facing, practice on analyzing problems and factors associated with them (complete the cause-and-effect diagram), make the best decision, and take action to prevent problems from recurring. Simulation helps to nurture student knowledge, skills, and behavior (38).

PSTC has influenced participants' motivation. Some of the participants asked to join the design team of the PSTC and decided to conduct similar courses as a routine for other students. The program has been also held in smaller scales for two times after the first program in the school of pharmacy by younger PSTC designers. This move reflects the good connection that participants have made with the training content, the way the course was conducted, and the expectations that have been formed in their minds from the PSTC have been well met. The experience of group work and realizing its importance has strengthened the spirit of student interaction with each other. The education content was applicable from the participants' point of view, reflecting the approval of this course to prepare qualified graduates in their field. The course participants have not taken any jobs yet, but we see that they are familiar with the whole concept of management. They also react actively toward pharmaceutical events, and try to analyze them rationally as much as they can. We cannot deny that those who participated in the course had previous interest in these subjects, but we think we may have enlightened their path just a little bit. Some topics like critical thinking, problem-solving, time and financial management, creativity, human resource management, academic writing,

and futurology couldn't take place as a focused lecture. Still, each group somehow tried to know and use these skills while developing their projects.

According to the findings of Kirk-Patrick, there is a reduction in the average score of students over days. This could be due to the changing level of cooperation of the students, changing professors and topics on each day of the course, and differences in students' desire for each topic.

Based on the evaluation results and feedback of course instructors, it can be said that PSTC has been able to achieve at least part of its goals, and positive changes have been made in participants' attitudes and behavior. But the effectiveness of courses with contents like this course is not something that can be easily measured in the short term and requires a lot of effort and time. However, by running similar courses continuously and monitoring graduates' performance at different short-term and long-term intervals, we can measure the effectiveness of the course more precisely and optimize the method of conduction for pharmacy students and upcoming future needs. Therefore, the method of this study can be used for designing similar courses in Iran and evaluating its efficacy in a long-run and larger perspective. In designing the form and content of such courses, it is necessary to pay attention to the country's higher education context, pharmacy curriculum gaps in Iran, local health needs, the current health condition in the country, and health economic approaches based on the political philosophy of the country's governance. Also, international standards and international experience should be considered.

A training course could be more effective if it considers all of the above strengths of this study include: members of the Delphi and NGT team, which includes experts and professors from the Schools of Pharmacy, Health Management, and Health Policy. This composition of the Delphi and NGT group could make comprehensive decisions as they could see different needs and dimensions due to their variety of specialties. None of the students participating in PSTC have graduated yet to analyze their career opportunities and

performance. However, a study at Columbia University states that MPH / MD graduates are more attracted to non-clinical, academic, and governmental activities than other students and face more job opportunities (39).

As a low-populated short-term course that had been conducted only once, we had many limitations, including small statistical population, short period of communication with participants, and the inability to measure long-term levels of learning. Also, according to the context of different countries, the content of pharmacy courses, different health systems, and different expectations from pharmacists in different countries, this study is not generalizable for all countries, and it is necessary to consider the relevant circumstances for each country.

## 5. Conclusion

In today's world, pharmacists must have different skills and abilities to be able to work as influential people in the health care system. Also, due to other activities that a pharmacist performs as a manager in the health care system, he must acquire various managerial abilities. These skills are not available in the official Iranian pharmacy curriculum. For this purpose, short-term optional courses such as systems thinking and strategic management using active learning methods can be used to cover these deficiencies. Subsequent courses should further enhance the interprofessional education environment and involve participants and instructors from different medical sciences and humanities disciplines.

It is suggested that these or similar courses be designed for countries that do not have this material in their official pharmacy curriculum with proper evaluation of its efficacy in long run. So that pharmacists can acquire interdisciplinary skills that are required for their effective work. National assessments of the needs in each country's health system and defining pharmacists' role considering their different potentials can also help in better design and conduction of such a courses.

## Conflict of Interest

None declared.

## References

1. Hean S, Craddock D, Hammick M, Hammick M. Theoretical insights into inter-professional education: AMEE Guide No. 62. *Med Teach*. 2012;34(2):e78-101. doi: 10.3109/0142159X.2012.650740. PMID: 22289015.
2. World Health Organization. Framework for action on interprofessional education and collaborative practice. 2010. Available from: [http://apps.who.int/iris/bitstream/handle/10665/70185/WHO\\_HRH\\_HP\\_N\\_10.3\\_eng.pdf;jsessionid=3B3C226F1EE27BAC7E5479BE847B9333](http://apps.who.int/iris/bitstream/handle/10665/70185/WHO_HRH_HP_N_10.3_eng.pdf;jsessionid=3B3C226F1EE27BAC7E5479BE847B9333).
3. Buring SM, Bhushan A, Broeseker A, Conway S, Duncan-Hewitt W, Hansen L, Westberg S. Interprofessional education: definitions, student competencies, and guidelines for implementation. *Am J Pharm Educ*. 2009 Jul 10;73(4):59. doi: 10.5688/aj730459. PMID: 19657492; PMCID: PMC2720355.
4. Hammick M, Olckers L, Campion-Smith C. Learning in interprofessional teams: AMEE Guide no 38. *Med Teach*. 2009 Jan;31(1):1-12. doi: 10.1080/01421590802585561. PMID: 19253148.
5. Kroboth P, Crismon L, Daniels C, et al. Getting to Solutions in Interprofessional Education: Report of the 2006-2007 Professional Affairs Committee. *Am J Pharm Educ*. 2007 Sep;71(Suppl). PMCID: PMC2690950.
6. Janke KK, Traynor AP, Boyle CJ. Competencies for student leadership development in doctor of pharmacy curricula to assist curriculum committees and leadership instructors. *Am J Pharm Educ*. 2013 Dec 16;77(10):222. doi: 10.5688/ajpe7710222. PMID: 24371346; PMCID: PMC3872941.
7. Tucci M, Tong K, Chia K, DiVall M. Curricular and Co-curricular Coverage of Leadership Competencies and the Influence of Extracurricular Engagement on Leadership Development. *Am J Pharm Educ*. 2019 Mar;83(2):6535. doi: 10.5688/ajpe6535. PMID: 30962641; PMCID: PMC6448516.
8. Friestrom ED, Hager DR, Rough S. Integrating health-system pharmacy leadership into the school of pharmacy curriculum: A professional imperative. *Am J Health Syst Pharm*. 2021 Mar 18;78(7):633-635. doi: 10.1093/ajhp/zxab002. PMID: 33585861.
9. Janke KK, Nelson MH, Bzowycy AS, Fuentes DG, Rosenberg E, DiCenzo R. Deliberate Integration of Student Leadership Development in Doctor of Pharmacy Programs. *Am J Pharm Educ*. 2016 Feb 25;80(1):2. doi: 10.5688/ajpe8012. PMID: 26941428; PMCID: PMC4776295.
10. Reed BN, Klutts AM, Mattingly TJ 2nd. A Systematic Review of Leadership Definitions, Competencies, and Assessment Methods in Pharmacy Education. *Am J Pharm Educ*. 2019 Nov;83(9):7520. doi: 10.5688/ajpe7520. PMID: 31871362; PMCID: PMC6920635.
11. Halpern H. Systemic thinking: a qualitative study of how GPs use this approach. *Educ Prim Care*. 2005;16:467-73.
12. West GB. The importance of quantitative systemic thinking in medicine. *Lancet*. 2012 Apr 21;379(9825):1551-9. doi: 10.1016/S0140-6736(12)60281-5. Epub 2012 Apr 18. PMID: 22516561.
13. Ratka A. Integration as a paramount educational strategy in academic pharmacy. *Am J Pharm Educ*. 2012 Mar 12;76(2):19. doi: 10.5688/ajpe76219. PMID: 22438591; PMCID: PMC3305928.
14. Islamic Republic of Iran, Ministry of Health and Medical Education, Deputy Ministry for Education. Pharmacy Degree: Doctor of Pharmacy (PharmD). Available from: [http://chac.saorg.ir/Ch.Ac-Site/pharmd\\_generalpharmacy.pdf](http://chac.saorg.ir/Ch.Ac-Site/pharmd_generalpharmacy.pdf).
15. World Health Organization. Personnel per 10 000 population-Pharmacists. Available from: <https://rho.emro.who.int/Indicator/TermID/74>
16. Islamic Republic of Iran, Ministry of Health and Medical Education, Deputy Ministry for Education. Approved educational programs for general pharmacy education. Available from: <http://hcmep.behdasht.gov.ir/index.aspx?siteid=369&pageid=40484>.
17. Islamic Republic of Iran, Ministry of Health and Medical Education, Deputy Ministry for Education. How to hold short-term professional training courses for general doctoral students in pharmacy. Available from: [http://epsnet.behdasht.gov.ir/uploads/Shivename\\_kootahModat.pdf](http://epsnet.behdasht.gov.ir/uploads/Shivename_kootahModat.pdf).
18. Jacobs DM, Daly CJ, Tierney SL, O'Brien E, Fiebelkorn KD. Attitudes and Perceptions of Dual PharmD/MBA Degree Program Students. *Am J Pharm Educ*. 2017 May;81(4):71. doi: 10.5688/ajpe81471. PMID: 28630512; PMCID:

PMC5468709.

19. Salmon K, Fan J. An update on characteristics of dual PharmD/MBA programs in the United States: 2016-2017. *Curr Pharm Teach Learn*. 2019 May;11(5):469-475. doi: 10.1016/j.cptl.2019.02.009.

20. Thai A, Draugalis J. Dual PharmD/MBA programs 2001-2002: a descriptive report. *Am J Pharm Educ*. 2002;66:372-6.

21. Bahar Business School. Faculty of Pharm MBA. Available from: <https://www.bahar.ac.ir/courses/mba/%D9%85%D8%AF%DB%8C%D8%B1%DB%8C%D8%AA-%D8%AF%D8%A7%D8%B1%D9%88%DB%8C%DB%8C>

22. Holtzman CW, Sifontis NM. Pharmacy students' perspectives on a PharmD/MPH dual degree program at a large metropolitan school of pharmacy. *Pharm Pract (Granada)*. 2014 Jan;12(1):359. doi: 10.4321/s1886-36552014000100003.

23. Chumney EC, Ragucci KR, Jones KJ. Impact of a dual PharmD/MBA degree on graduates' academic performance, career opportunities, and earning potential. *Am J Pharm Educ*. 2008 Apr 15;72(2):26. doi: 10.5688/aj720226.

24. Chauvin SW, Rodenhauser P, Bowdish BE, Shenoi S. Double duty: students' perceptions of Tulane's MD-MPH dual degree program. *Teach Learn Med*. 2000 Fall;12(4):221-30. doi: 10.1207/S15328015TLM1204\_11. PMID: 11273373.

25. Gortney JS, Seed S, Borja-Hart N, Young V, Woodard LJ, Nobles-Knight D, et al. The prevalence and characteristics of dual PharmD/MPH programs offered at US colleges and schools of pharmacy. *Am J Pharm Educ*. 2013 Aug 12;77(6):116. doi: 10.5688/ajpe776116.

26. Mesdaghinia A, Keshavarz H, Jazayeri A, Nejat S, Salehi A. The master of public health (MPH) program, at the school of public health Tehran University of Medical Sciences, Iran. *Iran J Public Health*. 2009;38:32-3.

27. Naughton CA, Friesner D, Scott D, Miller D, Albano C. Designing a master of public health degree within a department of pharmacy practice. *Am J Pharm Educ*. 2010 Dec 15;74(10):186. doi: 10.5688/aj7410186.

28. Rosenberg SN. A survey of physicians who studied public health during medical school. *Am J Prev Med*. 1998 Apr;14(3):184-8. doi: 10.1016/

s0749-3797(97)00065-2. PMID: 9569218.

29. Singleton JA, Nissen LM. Teaching Pharmacy students how to manage effectively in a highly competitive environment. *Pharm Edu* 2014;14:21-5.

30. Wilson JE, Smith MJ, George DL, Oliphant EA. An Advanced Pharmacy Practice Experience in Leadership Development. *Am J Pharm Educ*. 2021 Sep;85(8):8361. doi: 10.5688/ajpe8361. Epub 2021 Feb 24. PMID: 34615621; PMCID: PMC8500285.

31. Zenger WF, Zenger SK. Curriculum Planning: A Ten-Step Process. Palo Alto, CA, R&E Research Associates, 1982.

32. Cai W, Sankaran G. Promoting critical thinking through an interdisciplinary study abroad program. *J Int Stud*. 2015;5:38-49.

33. McMillan SS, King M, Tully MP. How to use the nominal group and Delphi techniques. *Int J Clin Pharm*. 2016 Jun;38(3):655-62. doi: 10.1007/s11096-016-0257-x. Epub 2016 Feb 5. PMID: 26846316; PMCID: PMC4909789.

34. Horton JN. Nominal group technique. A method of decision-making by committee. *Anaesthesia*. 1980 Aug;35(8):811-4. doi: 10.1111/j.1365-2044.1980.tb03924.x. PMID: 7446921.

35. Kirkpatrick D, Kirkpatrick J. Evaluating Training Programs: The Four Levels.3rd ed. Oakland, CA, Berrett-Koehler Publishers, 2006.

36. Zarshenas L, Sharif F, Molazem Z, Khayyer M, Zare N, Ebadi A. Professional socialization in nursing: A qualitative content analysis. *Iran J Nurs Midwifery Res*. 2014 Jul;19(4):432-8. PMID: 25183987; PMCID: PMC4145501.

37. Roehl A, Reddy SL, Shannon GJ. The flipped classroom: An opportunity to engage millennial students through active learning strategies. *Fam Consum Sci Res J*. 2013;105:44-9.

38. Seybert AL, Smithburger PL, Benedict NJ, Kobulinsky LR, Kane-Gill SL, Coons JC. Evidence for simulation in pharmacy education. *J Am Coll Clin Pharm*. 2019 ;2:686-92. <https://doi.org/10.1002/jac5.1167>

39. Columbia University, Mailman School of Public Health. Available from: <http://www.publichealth.columbia.edu/sites/default/files/pdf/accreditation-2017-web.pdf>