

**SHORT COMMUNICATION**

# How to help first-year pharmacy students to gain the big picture

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**Abstract**

Many first-year students arrive at college unprepared. To improve their professional awareness and give the big picture of whole M. Pharm. program to first-year pharmacy students, a professional development course was introduced to 150 students in 2012. Students' responses between pre-test and post-test were compared to assess the influence of the professional development course. The results showed the professional development courses had a positive impact on first-year students. Thus, a new teaching method has successfully developed to improve first-year pharmacy students' attitudes toward the role of the pharmacists and learning motivation in M. Pharm. program. This inter-disciplinary course also provides a model to other pharmacy programs in the UK and the world.

**Introduction**

The General Pharmaceutical Council (GPhC) in Great Britain is the regulatory body for pharmacists, which aims to keep the standards of pharmacy service for the protection, promotion and maintenance of the public health. In 2011, General Pharmaceutical Council released an important document for pharmacy education "*GPhC Standards for the initial education and training of pharmacists*". In this document, a pharmacist should effectively carry out the national/local health policy, identify the therapeutic methods and medicines, safely and effectively deliver the pharmacy service with

professional performance to patients and the public (GPhC, 2011, Stonier, 2003). In order to make sure of new pharmacists with safe and effective work capability, the Standards set a series of criteria for the pharmacy education and training. In Great Britain, if a student wants to be a pharmacist, usually he or she should attend a 4-year M. Pharm. program, and then attend 52 weeks of preregistration time. After the training, he or she should pass the registration examination (GPhC, 2011). Therefore, the indicative syllabus of M. Pharm. program should

include different aspects as follows (GPhC, 2011):

1. Mechanism of medicines: therapeutics, pharmaceutical analysis, medicinal chemistry, cell and molecular biology, microbiology and immunology, pharmacology (including pharmacokinetics and pharmacodynamics), pharmaceuticals and drug delivery;
2. Human body: physiology and pathology, diagnosis and epidemiology, sociology and psychology;
3. Healthcare systems: healthcare and clinical management, evidence-based practice, related regulation and law;
4. Generic and transferable skills: oral and written communication, numerical capability, critical thinking, decision-making, record and reflection, problem-solving, IT skills, research methodology, professionalism, attitudes and values.

From above discussion, it is clear that professional development courses are important to the essential core and transferable skills of a pharmacist.

Beginning from 1895, Aston University has a long-established Pharmacy program with high-quality teaching over 100-years, which has a track record of successive full accreditations by the General Pharmaceutical Council, UK. Current M. Pharm. program in Aston is designed to help pharmacy students to develop their capability of meeting the role of pharmacists in all branches of the pharmacy profession. In order to meet the updated standards of General Pharmaceutical Council and further improve the pharmacy education, the curriculum of M. Pharm. program in Aston is revised in accordance with the requirements of General Pharmaceutical Council, Royal Pharmaceutical

Society and quality assurance for Higher Education Qualification.

Currently, the M. Pharm. program can be mainly divided into five subjects: pharmaceuticals, medicinal chemistry, physiology and biology and pharmacology, pharmacy practice and professional development. A series of professional development modules were designed for the professional development of pharmacy students, including PH1408 Professional development: Effective Learning, Career Management and IT for first-year students, PH2507 Professional Workplace and Scientific Communication Skills for second-year students, PH3608 Personal and professional development: preparing for your project and your pre-registration for third-year students, and PH4704 Essential Skills: Research Project and Research Proposal for final-year students.

PH1408 Professional development: Effective Learning, Career Management and IT, was the initiation of a 10-credit module for the first-year pharmacy students. The aims of the module is to introduce the effective learning skills from lectures, practical classes and tutorials, career management awareness, to develop employability skills, to learn and reflect upon the essential skills for a pharmacist, to provide the training of IT skills, and to introduce Continuing Professional Development (CPD) and reflective practice. The module contains lectures of effective learning at undergraduate level and the introduction to the concept of employability and the skills and competencies required for a career in pharmacy, workshops with a particular focus on writing an application form and to evaluate those application forms submitted by peers, computer lab for IT skills (Word, Excel and PowerPoint).[4] As part of the

assessment for this module, each student will be expected to complete a portfolio of practice including IT tests, the completion of an application form, peer-review of application forms, staff marks for participation in the application form exercise, and continual professional development (CPD) and reflective practice with the reflections upon situations in the students first year of the course.

During my teaching in 2011/12 academic year, I found that some first-year students arrived at college unprepared. During the interview in the tutor-tutee meeting, some first-year students told me that they didn't do well in some courses, and they were not interested in these courses. The reasons also included the boring course content and lack of the clear purpose of the module. In the first-year student questionnaire of 2011-12, some students comments "Give us more information and advice on CPD, how to produce a good cycle". Many students are unclear to the whole M. Pharm. program and the expectation and requirement of the future job (e.g. academic skills and generic skills). Once they join the university, they are given too many lectures, lab practices and seminars, without the understanding of the meaning and necessity of these courses. Many students are difficult to overcome the big gaps between high school and the university at the first year, and they are lost in too much details and cannot catch the big picture of the whole program until the final year. In the book *<The first year at university: teaching students in transition>*, Bill Johnston stated that successful transition of first-year students results in the big difference between a good degree and a weak one. Freshman experience of every undergraduate is a major part of his or her college life, and all universities should pay more attention to the first-year students.

Thus, it is very necessary to give the freshmen a brief introduction of the whole program, the expectation of the future job and essential skills. Then students will gain a clear big picture about the full four-year study and do their own plan what they need to do.

However, there are a few researches in the area until now. Rahman (2003) studied the influence of a shadowing course on the attitudes of first-year pharmacy students toward the pharmacy profession in a pre- and post- assessment study. The results indicated that shadowing course can effectively improve the professional attitudes of first-year pharmacy students. Krause JE (2005) introduced two pharmacy practice courses PHPR 312 (Introduction to Pharmacy and Pharmaceutical Care and PHRM 301 (Integrated Laboratory I) in a first-professional year Pharm. D. curriculum of School of Pharmacy and Pharmaceutical Sciences, Purdue University. The students' feedback showed that these two courses really help these first-professional year students.

In this study, we aim to develop a new teaching method to help the first-year M. Pharm. students to gain the big picture of the whole program, the requirements of the future job (pharmacist) and develop their personal plan for four-year study. This article describes and assesses the school's endeavor to implement an inter-disciplinary, active learning, professional development course in the first year of M. Pharm. program in 2012.

## Materials and methods

**Assessment:** The questionnaire was designed and assessed before the wide use. The first section on the questionnaire focused on demographic information, such as students' age, sex, race, marital status, past work experience in pharmacy and family

background. The second section focused on the courses' objectives and competencies, which are asked to rate their agreement on a scale from 'very clearly', 'clearly', 'a little' to 'unknown'. The series of questions includes role and duties of the pharmacist, the essentially academic and generic skills, the structure of M. Pharm., the different subject in the M. Pharm. (e.g. pharmaceuticals, medicinal chemistry, pharmacology and pharmacy practice), and next four-year plan.

The questionnaire was distributed to all students registered in M. Pharm. In the fall of 2012, 151 students were registered in M. Pharm. and attended the module PH1408. Before the first-year students attend this class, each student was given a pre-test survey consisting of demographic information and opinion questions. The student number was used for the survey to identify the students. After two months' study, students were required to finish the post-test containing opinion questions. The interviews were also conducted with about 10 students for the feedback of this process.

**Lecturer and direct learning:** In the first lecture of our module PH1408 Professional development, we gave five sessions of brief introduction to the students, including the introduction of pharmacy, M. Pharm. program and pharmacists, pharmaceuticals, medicinal chemistry, biology, physiology and pharmacology, and pharmacy practice.

In the e-Education platform 'Blackboard' in Aston, the students were given the direct-learning materials and reading lists, including M. Pharm. program specification, the required skills of pharmacists, new drug discovery and development, introduction of pharmacy practice. Some useful links from the Internet are also

provided to students, such as the websites of General Pharmaceutical Council, Royal Pharmaceutical Society, NHS career and the introduction course to Pharmacy in the College of Pharmacy, Ohio State University.

**Questions:** The students were required to answer three questions after the learning:

1. What are the requirements of a pharmacist (e.g. academic and generic skills)? Why do they need these skills?
2. What are the main subjects in M. Pharm. program of Aston? How do the subjects relate to your future job (pharmacist)?
3. How do you prepare your next four-year study?

All the answers were required to embed into the tutor-tutee form (Continuing professional development (CPD) form).

**Ethical Issues:** This research was approved by Centre for Learning Innovation and Professional Practice (CLIPP) Ethics Committee at Aston University. The study involved students taught by the researcher. The study did not involve research participants whom may be classified as 'vulnerable' and sensitive topics. All studies were carried out under the students' knowledge or consent, and the participants were informed about their right to withdraw from the study at any time. The students were fully informed regarding the purpose of the research and procedures to be used. All data and other material are securely stored and keep confidential at all times.

## Results and discussion

In our survey, 140 students responded to the pre-test, and 130 students responded to the post-test. Overall response rate was 88%. Completed

questionnaires were coded and analysed using Microsoft Excel 2010. The individual background and characteristics of the participants are provided in Table 1. From Table 1, it is clearly shown that 81% of first-year students is less than 20-year-old and 18% of students is between 20 and 30. Male and female is nearly equal. Most students are unmarried because of their young age. It is interesting that over 70% students originated from Asia and less than 10% white students, which may reflect the change of people population in Birmingham, U.K. Although 86% of

students has no previous work experience in pharmacy, over 60% of students' family and/or friend works in the pharmacy. This may indicate the influence of personal background on career choice. In addition, most students want to be the pharmacist after their graduation, and a few students prefer pharmaceutical scientists and other jobs. About the reason to be a pharmacist, 70% students want to be a pharmacist because of their personal interest, while the rest students are attracted for high salary of a pharmacist job.

**Table 1** Students' background (N=140)

Variables	Number	Percentage
Age		
< 20 years old	114	81%
20 - 30 years old	25	18%
30 - 40 years old	1	1%
> 40 years old	0	0
Gender		
Male	68	49%
Female	72	51%
Ethnic background		
White	13	9%
Black	13	9%
Asian	102	73%
Mixed	4	3%
Other	8	6%
Marital status		
Single	138	99%
Married	2	1%
Have you been employed in Pharmacy before		
Yes	20	14%
No	120	86%
Is there a pharmacist in your family or in your friends?		
Family	32	23%
Friends	29	21%
Both	27	19%
None	52	37%
What is your career aims in the future?		
Pharmacist	129	92%
Pharmaceutics scientist	5	4%
Other	6	4%
Why do you want to be a pharmacist?		
It is a good job with high salary.	36	26%
My personal interest	98	70%
My parents want me to be a pharmacist.	2	1%
Easy to learn	0	0
Other	4	3%

**Table 2** Course objectives and competencies evaluation

Questions	Test	Very clearly	Clearly	A little	Unknown
How clearly do you know the role and duties of a pharmacist?	Pre- Post-	9 (6%) 14(11%)	92 (66%) 97(75%)	38(27%) 19(15%)	1(1%) 0
How clearly do you know the essential skills (both academic and generic) to be a pharmacist?	Pre- Post-	13(9%) 7(5%)	69(49%) 97(75%)	54(39%) 26(20%)	4(3%) 0
How clearly do you know the main contents and structure of M. Pharm. program?	Pre- Post-	5(4%) 1(1%)	50(36%) 89(68%)	81(58%) 39(30%)	4(3%) 1(1%)
How clearly do you know pharmaceuticals-related modules in M. Pharm. program?	Pre- Post-	1(1%) 1(1%)	22(16%) 66(51%)	99(71%) 59(45%)	18(13%) 4(3%)
How clearly do you know medicinal chemistry-related modules in M. Pharm. program?	Pre- Post-	0(0%) 1(1%)	19(14%) 68(52%)	96(69%) 56(43%)	25(18%) 5(4%)
How clearly do you know physiology/biology/pharmacology and their related modules in M. Pharm. program?	Pre- Post-	4(3%) 6(5%)	48(34%) 86(66%)	82(59%) 37(28%)	6(4%) 1(1%)
How clearly do you know pharmacy practice and the pharmacy practice-related modules in M. Pharm. program?	Pre- Post-	2(1%) 5(4%)	25(18%) 90(69%)	102(73%) 35(27%)	11(8%) 0
Do you have any plan in your next four-year study?	Pre- Post-	11(8%) 6(5%)	107(76%) 111(85%)	15(11%) 6(5%)	7(5%) 7(5%)

First year at college is critical for students and faculty because students form the first impression of their academic life at university.(Johnston, 2010) If the students can accurately and realistically understand the courses and expectations, they usually are positive to progress towards the university life. On the other hand, if they are lost in the first year and have negative feeling, they are highly possible to underperform and even drop-out. In usual, there are academic, social, cultural and financial changes in the first year. Students face the cultural adaptation and social integration at college. More importantly, they encounter academic difficulties, which is greatly different from high school. In high school, teachers directly give nearly all answers to students and parents also take care of their studies. It is very obvious that students' goal in high school is to enter a prestigious

university. However, once many students enter college, they are totally lost in massive information, work and activities. They need to independently learn and study without the supervision of parents. Moreover, many students have no idea of future work and how it relates to current courses. Thus, they are lacked of motivation and show under-performance. Even they start to understand in the third or fourth year, the time passes, and they have little chance to compensate the past time. In the book <Teaching first-year college students>, Erickson et al.(2006) suggest that faculty should provide advising services to freshmen in the college. During the conversation between faculty and students, the faculty will help students to identify and clarify their educational goals, discuss the essential knowledge and skills to achieve goals, help students to assess their own readiness and then

develop their academic plans for college study. Of course, learning is an on-going process and it is impossible to reach progress once for first-year students. However, the instruction course will greatly help the transition of freshmen. In the same time, it is not easy to achieve good practice and no magic drug fits all cases. The pedagogical forms may be various between different institutions and disciplines. However, the key to enhance first year in practice is that the transition should be treated as a key priority of teaching.

Pharmacy schools need to assess both students' learning process and outcomes. PH1408 Professional Development is an active learning course to help students to understand the importance of a pharmacist, which significantly influence the students' behavior in the future job. All assignments provide students the learning skills, IT skills, academic writing, time management, career management, reflection, critical thinking and use of online resources. All these really benefit the transition of freshmen. However, previous survey and interviews showed that some students were lacked of understanding between career goal and courses, and the self-motivation. So it is important to polish our module to further improve students' learning experiences.

Table 2 shows the responses for the pre-test and post-test. Overall, the responses indicated that the professional development courses had a positive influence on students' professional development. All the post-test scores were higher than the pre-test scores, but to varying degrees. After our course, the students had clearer understanding about the role and duties of a pharmacist than that before the study. The results toward a pharmacist's role

and the duties of the pharmacist clearly showed improvement as a result of the exposure provided by the professional development module. Moreover, about 70% students know the structure of M. Pharm., while only 40% students understood it in the beginning. However, there is no perceived change in the question about the future plan. The reason could be the high plan rate in the pre-test (84%), which shows many students had a clear plan at the beginning of study. Nevertheless, nearly all statements in the post-assessment have a higher score than those in the pre-test, which shows that the professional development course further improved the understanding of job duties and learning attitude of students.

In our teaching, we integrate the career goal (pharmacist), the pharmacist's duties and necessary skills and the M. Pharm. syllabus to help them set up their own plans for next four years. A solid coordination among the multi-disciplinary faculties in Pharmacy School let the students view pharmacy education from the various perspectives of subjects. The survey results showed that our teaching had a significant improvement of students' understanding to their career management and motivation. In addition, online resources help students to familiarize the self-learning skills and active learning. A solid coordination among the faculty from various pharmacy subjects let students understand pharmacy from different experiences and perspectives of faculty members. Furthermore, it also helps student view that the skills to be a pharmacist are not single area, but the integrated duties. During the interview between tutor-tutee meetings in this academic year, first-year students also commented that the teaching activities significantly changed their understanding and

motivation. Now it is clear to them about the relationship between career aim and courses. Our studies provide a good example to improve the transition of first-year students in the pharmacy program. The research may also benefit the other pharmacy programs in UK and world. It may also be a good example for other disciplinary teachings at university.

However, there still are several limitations of current study. For example, there is an only one-hour lecture for the program introduction, and it may be not long enough for complicated pharmacy curriculum. There are still relatively high proportions of students who know a little or unknown in the structure of M. Pharm. program (31%), pharmaceuticals (48%), medicinal chemistry (47%), biology and pharmacology (39%), pharmacy practice (27%). We may need more time and learning resources for the introduction to first-year students. In addition, although current pharmacy courses mainly focus on pharmacist training, the career goals of about 8% of students are not pharmacist, but pharmaceutical scientist or other jobs. We may need more diverse courses to those with different career goals. Another limitation of current studies is that still 10% students have no clear plan for next four-year study after our teaching. One possible reason is that they were absent from our lecture and online learning. How to enhance the active learning of all students is still quite challenging to the faculty. We should take proper approaches to solve the above problems in the future.

Thus, in the next academic year, we will increase one more hour for the introduction and give more on-line learning resources in the Blackboard. One small assignment will be required for students to answer all three given

questions. This will let all students involved throughout the learning process. In addition, we plan to give various guidance and learning materials to those with different career aims. They will also get the individual advice from the career consultant in the Aston Career Centre and their personal tutor in the tutor-tutee meeting. This will help the minority student to develop their own career aim and improve their learning process.

## Conclusions

The results indicate the improved students' understanding toward the pharmacists and M. Pharm. contents. It will help students to enhance their learning motivation and attitudes from the beginning of university. The pedagogical research can be used in the curriculum design and development in other pharmacy programs.

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