RESEARCH ARTICLES

Student Perspectives on Pharmacy Curriculum and Instruction in Egyptian Schools

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Objectives. To determine student attitudes and opinions towards pharmacy education in Egyptian universities to provide information for designing delivery of a revised pharmacy curriculum.
Methods. Students were recruited from the pharmacy faculties at a government-sponsored university and a privately funded university. Data were gathered using a structured questionnaire and statistically analyzed. Responses from open questions were subjected to thematic analysis.
Results. Students spent widely differing amounts of time on non-classroom study, little of which was self-directed. This was reflected in the low frequency of use of library facilities and the preference of students for passively acquired information. Themes that emerged on how students would improve the curriculum were to increase the use of computers and the Internet; make the course more relevant to pharmacy practice and/or clinical pharmacy; improve and expand the practical components of the course; increase their own involvement in learning; and increase their understanding of subjects as well as their knowledge. For many of the questions, there was a significant different between the responses of students at the 2 universities.
Conclusions. Students relied on classroom teaching and devoted little time to self-directed study. However, students were aware of international developments in pharmacy education and practice and are receptive to change.

Keywords: pharmacy, education, curriculum development, computer-assisted learning, problem-based learning, student perspectives, Egypt

INTRODUCTION

Developments in Pharmacy Education

Traditionally, pharmacy education consisted of didactic, subject-orientated, and knowledge-based teaching.[1] However, significant changes in education and training have taken place in recent years. This reflects the evolution of pharmacy from a drug-centred to a patient-centred profession. Course development is led by individual higher education institutions, although in most countries it is advised by and monitored by government and/or professional bodies. The American Association of Colleges of Pharmacy (AACP) published a major report in 1993 on outcome goals to facilitate the transformation of curricula to enable practitioners to deliver pharmaceutical care.[2] The AACP initiatives were developed by the Centre for the Advancement of Pharmaceutical Education (CAPE), which has continued to consult and advise and whose latest revision of educational outcomes, based on pharmaceutical care, systems management, and public health, was published in 2004.[3] In 2000, the American College of Clinical Pharmacy (ACCP) published a white paper in which they reported that pharmacy education needed to place more emphasis on preparing students for problem solving, critical thinking, ethics, communication, and self-directed learning.[4]

In the United Kingdom, pharmacy degree courses underwent a radical change in 1997, with the move from a 3-year bachelor degree in pharmacy to a 4-year master of pharmacy (MPharm) degree. In addition to requiring accreditation for pharmacy degree courses through the Royal Pharmaceutical Society of Great Britain, UK schools of pharmacy have been required to follow the 2002 guidelines of the quality assurance agency for higher

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education.[5] These guidelines stipulate that the pharmacy degree establishes a basis of learning that continues throughout the pharmacist's career, including recognition and analysis of problems and planning of strategies for their solution. Questions have been raised as to whether this is being achieved.[6]

The Pharmacy Consortium for Computer Assisted Learning (PCCAL) was established in the UK in 1992 and was comprised of the 16 schools of pharmacy in UK universities.[7] The project was government funded by the Teaching and Learning Technology Programme (TLTP). The main objective of the consortium was to exploit the technological advantages of CAL so that teaching could be made more efficient and students would have increased access to learning resources.

Developments in pharmacy education are being implemented in many countries worldwide. This is often prompted by radical changes in healthcare delivery in respective countries, which itself may be a result of political change. This has been noted in curricular changes in a number of Eastern European countries.[8-10] This pattern is beginning to emerge in the Middle East, where efforts are being made to update pharmacy curricula and to introduce more appropriate methods of teaching and learning.

Pharmacy Education and Professional Practice in Egypt

Pharmacy education in Egypt is provided by 13 schools of pharmacy.[11] The majority of schools are government sponsored; however, a number of privately funded institutions have been established in recent years. Pharmaceutical education is for the most part firmly based on the pharmaceutical sciences, with little relationship to pharmacy practice. Furthermore, it is taught primarily by traditional methods of lectures and practical classes. The Ministry of Education in Egypt has proposed a strategic reform plan for all higher education in the country, known as the Higher Education Enhancement Programme (HEEP).[12] This is a wide-ranging strategy that includes proposals for improvement in teaching and learning methods.

Egyptian universities produce a higher number of pharmacy graduates than required to meet the national professional need. The majority of graduates enter the profession in the community sector, some obtain employment in Egypt's expanding pharmaceutical industry, and a small number work in hospitals. Pharmacists in community and hospital sectors primarily serve a pharmaceutical supply role. Clinical pharmacy is in an embryonic phase of development.

In a national conference on educational development, Egyptian universities were directed to create the conditions fundamental to improving the quality and efficiency of the higher education system.[13] It was determined that this could be achieved through legislative reform, institutional restructuring, and establishment of modern learning technology. As a result, the faculty of pharmacy at Suez Canal University (SCU) decided to review and develop their pharmacy curriculum and match international standards by applying more innovative methods to their teaching, with particular emphasis on student-centred learning methods such as computer-assisted learning (CAL) and problem-based learning (PBL).

Curriculum and Teaching Development at Suez Canal University

Having established the need for curriculum development, the faculty of pharmacy at SCU has collaborated with a number of faculties from European universities and has been successful in obtaining funding for curriculum development from The Joint European Project (Tempus; project reference: JEP-CD-30065).[14] The project is a 3-year study with the main objectives of curriculum development and application of modern teaching methods in pharmacy education. It is focusing on the application of existing CAL programs that have been developed by PCCAL.[7] Other teaching methods such as problem-based learning will also be incorporated into the course at SCU. The project involves academic exchanges between the partner institutions and the establishment of a CAL laboratory at SCU. The project is being evaluated both in terms of the impact of changes to the curriculum and the attitudes and perceptions of students. Results will be disseminated throughout Egypt, the Middle East, and beyond.

As a first stage in the project, it was resolved to undertake a baseline evaluation of student attitudes and opinions towards pharmacy education in Egyptian universities. This evaluation would serve to inform the project team on the approaches to adopt in designing a platform for the delivery of a revised curriculum. The results of this study form the basis of this paper.

The impetus for this project arose from a desire of the teaching staff within the Pharmacology Department of the Faculty of Pharmacy at SCU to undertake a radical review of the teaching and methods of curriculum delivery within their Department. A major objective for Tempus projects is to disseminate the results of such studies regionally, nationally, and internationally. This paper is the first stage in that dissemination process.

METHODS

Students were recruited from the pharmacy faculties at a government-sponsored university (Suez Canal University) and a privately funded university (Misr International University). At the time of the study, Suez Canal University had been using the same curriculum for at least

10 years, while Misr University had recently undertaken some degree of curriculum development through implementation of the credit hour system. Misr had also opened a new computer suite.

A structured questionnaire was developed to explore student opinion on a number of issues relating to their respective pharmacy degree courses. The questionnaire was designed to ascertain:

- Whether pharmacy had been the students' first choice as a career;
- How many hours per week they currently spent attending classes doing course-related homework, and pursuing self-directed learning related to the course;
- How often they used their library facilities;
- What methods they used as study aids; and
- What changes they would make if they had an opportunity to change their course.

(A copy of the questionnaire may be obtained from the corresponding author).

Data from the questionnaires were analysed through the software program *Statistical Package for the Social Sciences* (SPSS v.11). Responses from most of the questions were quantifiable. Results were subjected to frequency analysis, non-parametric Mann-Whitney test or cross-tabulation with chi-square analysis, as appropriate. Student responses to open-ended questions about how they would change the course were subjected to thematic analysis. The number of times each theme was cited by students was then recorded.

In both institutions, the degree programs operate on full-time 4-year curricula. The proposed curricula developments principally involve modules in year 3 of the respective courses and year 4 at SCU. The questionnaire was administered at the beginning of the lecture sessions to the following cohorts of students at the participating universities: Suez Canal University (SCU) (year 3) (n = 106); Suez Canal University (year 4, final year) (n = 120); Misr International University (MIU) (year 3) (n = 195). Comparisons could therefore be made between students at different universities and between students in different years of study. Completed questionnaires were retrieved at the time of administration, thereby ensuring a 100% return. Two comparative analyses were conducted: responses from year 3 students at SCU were compared with those of year 3 students at MIU; and responses from year 3 students at SCU were compared with those of year 4 students at SCU.

RESULTS

Analysis 1: Year 3 Students Compared

A total of 301 year 3 students completed questionnaires from the 2 universities. Numbers quoted against each table exclude missing cases, where students declined to answer a specific question.

For question 1, "When you were deciding on which degree course to study, was pharmacy your first choice?" 76.2% of students responded "yes." Cross-tabulation and chi-square analysis between students from the 2 universities showed no statistically significant difference in response ($p = 0.57$).

In questions 2-4, students were asked to indicate, on average, how many hours they spent per week on each of the activities specified: being taught by your teachers in lectures, practicals, tutorials etc; homework, completing course work (for example, writing practical reports, writing essays etc); your own learning related to your degree course (for example, reading text books, journals, internet searches etc). Results are presented in Table 1. The students at both universities were scheduled for about 20 hours of teaching per week and the majority indicated that was the number of hours of teaching they received.

With regard to homework, students spent a mean of 8.9 (±6.9) hours per week; however, the actual amount of time spent differed widely among students. Students spent little time per week (mean 6.3 hours) with the majority spending 5 hours or less (Figure 1) on self-directed learning.

Comparison was made of the hours stated by students at the 2 universities. Data were generally non-parametric; therefore, the Mann-Whitney test was applied to compare data. Results are shown in Table 2. There was a significant difference between MIU and SCU students with respect to reporting the number of hours taught per week. This may reflect different attitudes toward class attendance. MIU students also claimed to spend more time per week on homework. The difference with respect to students' own learning was marginal.

In response to question 5, "On average, how frequently do you visit your university library during term time?" half the students indicated they visited the library less than once a week (Table 3). This pattern of use was different between the 2 universities and cross tabulation and chi-square analysis showed that this difference was significant ($p < 0.001$). At SCU, the pattern of library use was much less frequent, with approximately 70% of students

Table 1. Time Spent by Pharmacy Students on Aspects of Learning (N = 284)

	Being Taught	Homework	Self-Directed Learning
Mean (±SD)	18.9 (7.9)	8.90 (6.9)	6.3 (6.0)
Median	21	8	5
Mode	21	10	0

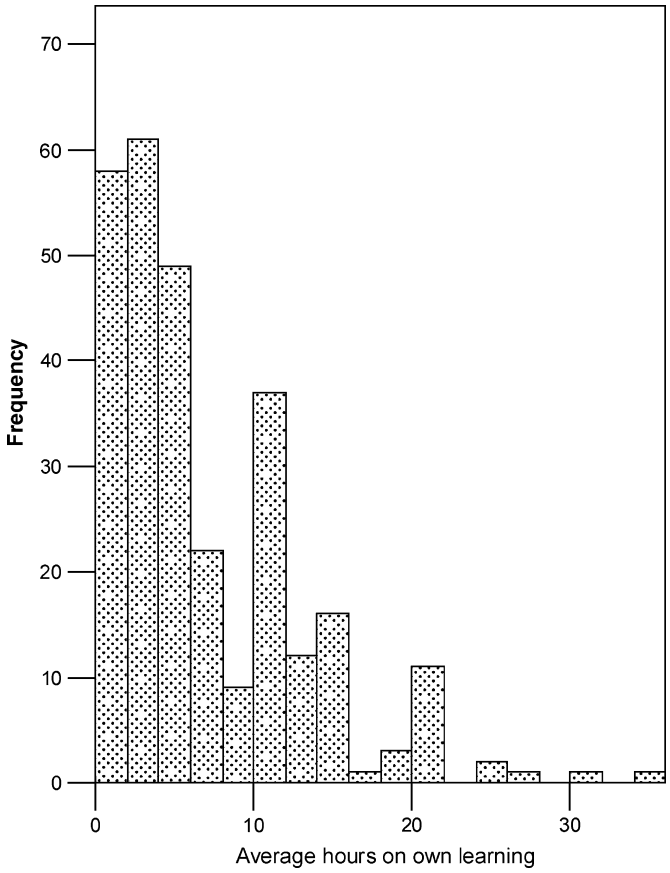

Figure 1. Average hours per week pharmacy students spent on self-directed learning related to the course.

using the library less than once a week. Higher percentages of MIU students used the library on a more frequent basis.

Question 6 asked, "Which of the following methods do you use regularly to help you to study for your degree?" The preferred methods for self-study are shown in Table 4. Lecture handouts and students' own notes were the most frequently used study tools. Students at SCU used Internet sites and lecture handouts more regularly than students at MIU. In question 7, students were invited to comment, on how they would change their degree course if they had the opportunity. They were specifically asked to consider the subjects taught and the teaching methods used in the course. They were also invited to provide other comments. A thematic analysis was performed on the responses received. The initial analysis identified 7 themes relating to subjects taught, 10 themes relating to teaching methods, and 10 themes categorized as general comments. These 27 themes were further grouped into 7 over-arching themes. These are presented in Table 5, with the number (and percentage) of students citing each theme and whether there was a significant difference between the number of times the students from the 2 universities cited the themes.

Table 2. Comparison of Time Pharmacy Students Spent on Aspects of Learning

Type of Hours	SCU Hours, n (SD)	MIU Hours, n (SD)	*P*
Teaching	15.8 (8.7)	20.6 (6.9)	<0.001
Homework	8.1 (8.1)	9.3 (6.1)	0.005
Own Learning	5.9 (6.7)	6.6 (5.6)	0.04

SCU = Suez Canal University; MIU = Misr International University

Table 3. Frequency of University Library Use (N = 292)

	Frequency (%) SCU + MIU	Frequency (%) SCU	Frequency (%) MIU
At least once a day	20 (6.8)	2 (2.0)	18 (9.3)
A few times a week	48 (16.4)	8 (8.1)	40 (20.7)
About once a week	77 (26.4)	18 (18.2)	59 (30.6)
Less than once a week	147 (50.4)	71 (71.7)	76 (39.4)
Total	292	99	193

Analysis 2: Year 3 Students at SCU Compared with Year 4 Students at SCU

Two hundred twenty-six students in years 3 and 4 at SCU completed questionnaires. Numbers quoted against Table 6 excludes missing data, where students declined to answer that specific question.

Analyses similar to those carried out in the first analysis were conducted. In all analyses, no statistical differences were found between the year 3 and year 4 students at SCU except with respect to the hours spent being taught, doing homework, and in self-directed study. Results are shown in Table 6. Year 4 students claimed to spend significantly more time per week being taught and doing homework, but spent as little time as year 3 students on self-directed learning.

DISCUSSION

Curriculum development within government-sponsored universities in Egypt, such as SCU, has been slow to evolve, due in part to the constraints imposed by institutional and national governance. The greater degree of freedom experienced by privately funded universities, such as MIU, has meant that curriculum change and teaching methods have already begun to be developed. It therefore seemed appropriate, for this baseline study, to compare attitudes and opinions of students within these different institutions.

A high percentage of students in both universities had chosen pharmacy as their preferred degree course. Students' subjective comments on the questionnaire

Table 4. Comparison Between SCU and MIU Students' Use of Learning Methods (n = 292)

Study Method	Frequency (%) SCU + MIU (n = 301)	Frequency (%) SCU (n = 106)	Frequency (%) MIU (n = 195)	Statistical Difference, SCU and MIU
Your own notes	189 (62.8)	73 (68.9)	116 (59.5)	NS
Text books	128 (42.4)	42 (39.6)	86 (44.1)	NS
Scientific journals	7 (2.3)	4 (3.7)	3 (1.5)	NS
Internet sites	64 (21.2)	36 (34.0)	28 (14.4)	SCU > MIU ($p < 0.001$)
Lecture handouts	175 (57.9)	73 (68.9)	102 (52.3)	SCU > MIU ($p < 0.001$)

NS = No statistically significant difference

suggested that the majority who had not chosen pharmacy as their first option had failed to obtain a university place on other degree courses such as medicine and dentistry. Almost all students, therefore, had career aspirations in health-related fields.

Students were asked to specify the average amount of time they spent being taught in the classroom, doing homework, and undertaking self-directed learning. Both institutions exposed students to around 20 hours of face-to-face teaching per week. This was reflected by the mean number of hours specified by students. However, a large number of students reported hours outside the norm, particularly at SCU, where absenteeism from classes was more prevalent. Perhaps this illustrates the difference in attitude between those whose tuition is paid for by the state and those who rely on personal funding.

Time spent on homework was extremely variable in both institutions. A more consistent pattern was seen for hours spent on students' own learning, which was not deemed to be a high priority by most students, with the majority spending less than 5 hours per week on self-directed learning. This attitude towards non-classroom study was reiterated by the low usage of library facilities by students. A number of issues can be identified from these data. Library usage was significantly higher at MIU; however, it is difficult to surmise whether this is indicative of variability in the quality of library provision or whether it reflects the move at MIU toward a more student-centered approach to learning. Students' preferred sources of information for self-directed learning were heavily biased toward lecture handouts and their own notes. This result concurs with the finding that learning strategies are influenced by instructional context.[15]

The project team was interested in learning how students see the future of pharmacy education. Therefore, students were invited to provide comments on how they envisaged improving the educational experience of pharmacy students both in terms of subjects taught and in the methods employed for teaching.

The majority of students responded to the challenge and a wide diversity of views was recorded. These views

Table 5. Pharmacy Students' Opinions on Course Improvement (N = 301)

Theme	Expressed by Students at SCU and MIU, No. (%)	Expressed by Students at SCU, No. (%) n = 106)	Expressed by Students at MIU, No. (%)	*P*
Modernise the curriculum to make it more relevant to modern science	31 (10.3)	17 (16.0)	14 (7.2)	SCU > MIU (p = 0.016)
Make the course more relevant to pharmacy practice and/or clinical pharmacy	93 (30.8)	52 (49.1)	41 (21.0)	SCU > MIU (p < 0.001)
Increase the level of student self-directed work and interaction with lecturers	57 (18.9)	21 (19.8)	36 (18.5)	NS
Increase the use of computers and the internet	105 (34.8)	36 (34.0)	69 (35.4)	NS
Make the course more practically orientated, upgrade the equipment and stop animal experiments	67 (22.2)	29 (27.4)	38 (19.5)	NS
Orientate the course to improve students' understanding of the subject as well as their knowledge	36 (11.9)	6 (5.6)	30 (15.4)	MIU > SCU (p = 0.013)
Improve students' level of interest in lectures by using more AV technology	14 (4.6)	8 (7.5)	6 (3.1)	NS

NS = No statistically significant difference; SCU = Suez Canal University; MIU = Misr International University

Table 6. Comparison of Hours Spent on Aspects of Learning By Year 3 and Year 4 Students at SCU (N = 214)

Type of Hours	Year 3 SCU Hours (SD)	Year 4 SCU Hours (SD)	*P*
Teaching	15.8 (8.7)	22.6 (10.2)	<0.001
Homework	8.1 (8.1)	10.6 (8.3)	0.004
Own Learning	5.9 (6.7)	4.7 (6.5)	NS

were categorized into themes. The number of times each theme was identified in students' responses and any differences between the number of times each theme was cited by students at each university was evaluated. It was not surprising to find that a need to increase the use of computers and the Internet was the main theme recorded equally by students at both universities. This reflects both the current trend toward increased use of Internet technology within the age group of respondents and that the students were aware that the main objectives of the Tempus project was to integrate CAL into the curriculum.

Modernization of the curriculum and making it more relevant to pharmacy practice and/or clinical pharmacy were 2 other themes that emerged. The relative lag in developing these changes at SCU compared with MIU was clear by the significantly higher citation rates of these themes at SCU. Students were aware of changes within the profession of pharmacy and were keen to see an acceleration in the rate of change within their own country.

Aspects of current teaching methods were still valued by some students, particularly the practical components, although resources for such teaching were perceived to be inadequate. However a few respondents commented adversely on the quality of equipment in some laboratories and on the use of whole animals in practicals. Curriculum development should be *evolutionary* not *revolutionary,* and newer teaching methods should be introduced alongside, rather than replace, effective traditional methods.[1,16]

Themes that the project team were particularly pleased to note related to students' desire to improve their understanding of the subjects taught rather than merely to increase their knowledge on the subjects. Linked with this was students' desire to interact more closely with their lecturers and to take more responsibility for their own learning. All these themes were in accord with newer teaching methods, particularly problem-based learning.[17] This suggests that students will be receptive to change.

The analysis of responses between year 3 and year 4 students at SCU showed virtually no difference in responses to any of the questions posed. This may indicate the static nature of the present curriculum and delivery of teaching, which is consistent throughout the course. One would expect students' pattern of learning strategy to change over the course of their degree, from a more passive to a more active approach to learning.[15] These learning strategies are influenced by tutors providing more student-led teaching methods as students progress through their course. This incremental approach can be facilitated through the use of case-based learning.[18]

Limitations to the Study

The authors were encouraged by the enthusiasm with which the students completed the questionnaire, particularly as evidenced by responses to the open-ended questions. The questionnaire was administered at a time when the project team were visiting the participating universities and the general aims of the project were known to the students. Some responses to the open questions may have been influenced by this.

Great care had be taken in designing the questionnaire; however, students in Egypt are not regularly exposed to evaluative questionnaires and their first language is not English. Consequently, some responses, particularly with respect to estimated hours of study, may have been somewhat exaggerated as evidenced by the large standard deviations.

The responses to the open questions were wide-ranging and thoughtful. It was not difficult to identify clear themes from the data. Interpretation of these themes was more difficult and the authors acknowledge that a number of alternative interpretations could be proposed.

CONCLUSION

Students spent little time on self-directed study, which was reflected in the low frequency of use of library facilities and the preference for passively acquired information. Student perceptions on how to improve their degree course included an increase in the use of computers and the internet, making the course more relevant to pharmacy practice, and increasing their own involvement in learning.

Students appeared to be aware of international developments in pharmacy education and practice. The students' perceptions provided useful input into the task of changing the curriculum and methods of delivery of the pharmacy program at SCU. Previous experiences have shown that all stakeholders need to be involved in order to bring about a successful improvement in educational programs.[19] The results of this study indicate that the stakeholders at SCU are receptive to change.

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