

## EDUCATING FOR SAFETY

# The Role of Hidden Curriculum in Teaching Pharmacy Students About Patient Safety

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**Objective.** To examine how hidden and informal curricula shaped pharmacy students' learning about patient safety.

**Methods.** A preliminary study exploring planned patient safety content in pharmacy curricula at 3 UK schools of pharmacy was conducted. In-depth case studies were then carried out at 2 schools of pharmacy to examine patient safety education as delivered.

**Results.** Informal learning from teaching practitioners was assigned high levels of credibility by the students, indicating the importance of role models in practice. Students felt that the hidden lessons received in the form of voluntary work experience compensated for limited practice exposure and elements of patient safety not adequately addressed in the formal curriculum, such as learning about safe systems, errors, and professionalism.

**Conclusions.** Patient safety is a multifaceted concept and the findings from this study highlight the importance of pharmacy students learning in a variety of settings to gain an appreciation of these different facets.

**Keywords:** patient safety, curriculum, pharmacy education

## INTRODUCTION

Education for health care professionals is often cited as key to the enhancement of patient safety.<sup>1</sup> In 2000, the Institute of Medicine published *To Err is Human*, which acknowledged that many medical errors were avoidable and that there was need for greater emphasis on formal patient safety education for health care professionals:

Clinical training and education is a key mechanism for cultural change. Colleges of medicine, nursing, pharmacy, health care administration and their related associations should build more instruction into their curriculum on patient safety and its relationship to quality improvement.<sup>1</sup>

Preventable adverse events could cost the National Health Service (NHS) in the United Kingdom around £1 billion (US\$1.6 billion) a year in terms of additional bed days.<sup>2</sup> In the United States, hospital deaths from preventable adverse events is the seventh leading cause of death and the national cost of preventable adverse events is esti-

mated to be between \$17 billion and \$29 billion.<sup>1</sup> Given the burden associated with preventable adverse drug events in health care, pharmacy education must be continually explored and developed in ways that enhance safety cultures and practice quality. Literature focused on patient safety learning within pharmacy education is limited. Previous studies of pharmacy education from the United States and United Kingdom, however, indicated issues with the extent, standardization, and effectiveness of instructions related to medication error and adverse drug event instruction.<sup>3-6</sup> This literature mainly focuses on explicit curriculum content and formal education related to patient safety in pharmacy. However, learning is not limited to formal content, environments, or mechanisms.<sup>7-10</sup>

## Formal and Informal Curricula

In relation to medical education, Hafferty defines 3 interrelated dimensions of education<sup>7</sup>: the *formal curriculum*, which is education as stated, intended, formally offered, and endorsed; the *informal curriculum*, which is unscripted, predominately ad hoc, includes the significance of role models, and is a highly interpersonal form of teaching and learning; and the *hidden curriculum*, which is described as a set of influences that function at the level of organizational structure and culture and include

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customs, rituals, commonly held “understandings,” and the “taken for granted” aspects of a profession. Both the informal and hidden curricula offer a fundamental distinction between what students are taught and what they learn.<sup>7</sup>

Aspects of the informal and hidden curricula have been described and studied in medical, nursing, and dental education. Lempp and Seale studied medical students’ views of teaching quality in one UK medical school, identifying aspects categorized as part of a hidden curriculum.<sup>11</sup> These included, the importance of positive role models and personal encouragement; the negative aspects of haphazard teaching by clinical staff members; a reinforcement of the importance of hierarchy through teaching by humiliation; and a need to be competitive rather than cooperative to get ahead in the profession. D’eon and colleagues provide commentary on the hidden curriculum in undergraduate medical education in Canada, arguing that the hidden curricula in medical schools undermines the formal teaching of professionalism by exposing students to poor role modelling and unresolved ethical dilemmas.<sup>12</sup>

In contrast to these negative accounts, Ozolins and colleagues found that medical students were aware of the informal and hidden aspects and valued them.<sup>13</sup> The students conceptualized the informal and hidden curricula as integral to learning about the profession, an area they felt could not be dealt with through the tangible, factual learning style of the formal curriculum. Another positive account of the hidden curriculum is presented by Masella in relation to dental education in the United States.<sup>14</sup> Although a perspective article and not empirically based, Masella associates the hidden curriculum with extracurricular learning and states that “effective out-of-class learning provides students with a broad perspective on intellectual and social environments associated with professional life.”<sup>14</sup>

While little has previously been published regarding the nature and role of informal or hidden curricula in pharmacy education, a commentary by Gardner<sup>15</sup> indicates growing recognition of the importance of embracing and examining these concepts. In her description of what she broadly terms the “hidden curriculum,” Gardner notes the influence of role models and highlights the power of learning drawn from the implicit messages in passing conversations, institutional policies, and educator silences.

This study examined how hidden and informal curricula shape learning about patient safety for pharmacy undergraduates at 2 UK schools of pharmacy. The study drew from data from a large national project funded by the UK Department of Health’s Patient Safety Research Programme that studied the formal and informal ways in which prequalification students from a range of UK health-care professions (medicine, nursing, pharmacy and phys-

iotherapy) learn about patient safety (keeping patients safe from errors, mishaps, and other adverse events).<sup>16,17</sup> This study only examined the pharmacy component of the project.

## METHODS

A 2-stage multi-method qualitative design was employed based upon Stewart’s concept of *knowledge contexts*, which conceptualized 3 contexts where knowledge is generated both formally and informally (including via the hidden curriculum):<sup>18</sup>

- (1) The *academic* (university or college), based upon written theories and principles, which are taught and then tested for in examinations;
- (2) The *organizational* (management or policy), which is based upon agreed agendas and policies; and
- (3) *Practice* (day-to-day working), which is based upon individual practitioners’ experience and knowledge, accepted ways of working, and ritual and tradition.

These knowledge contexts were used as a structural framework for the study (Figure 1).<sup>18</sup> The overall approach drew on *illuminative evaluation*, which focuses on exploring, describing, and interpreting, and holds that educational courses are transformed during delivery and implementation, and that the unofficial or informal social reality of a program needs investigating as well as stated objectives or outcomes.<sup>19</sup> This approach fits with the idea of knowledge contexts and informal and formal learning.<sup>8,9,20-23</sup>

Ethical approval was obtained from the local National Health Service Research Ethics Committee. Site-specific approval also was granted at each site and from relevant university committees. All participation was voluntary and informed consent was obtained from all participants using information sheets to explain the project and written consent forms. All data were collected during 2006-2008.

In stage 1 of the study, a convenience sample of 3 pharmacy courses based in 3 higher education institutions (referred to as sites B, C, and D) was used. The pharmacy courses varied according to: geographical location; range of traditional and innovative curricula; amount and nature of practice experience; and their situation in old and new universities (Table 1). In this stage, patient safety education as planned and intended in the formal curricula was explored and patient safety content in course curriculum documents and interviews with course directors or module leads were analyzed (n = 6).

For the second stage of the research design, which involved in-depth case studies, the findings from stage 1 informed selection of 2 sites.<sup>24</sup> Sites B and C were

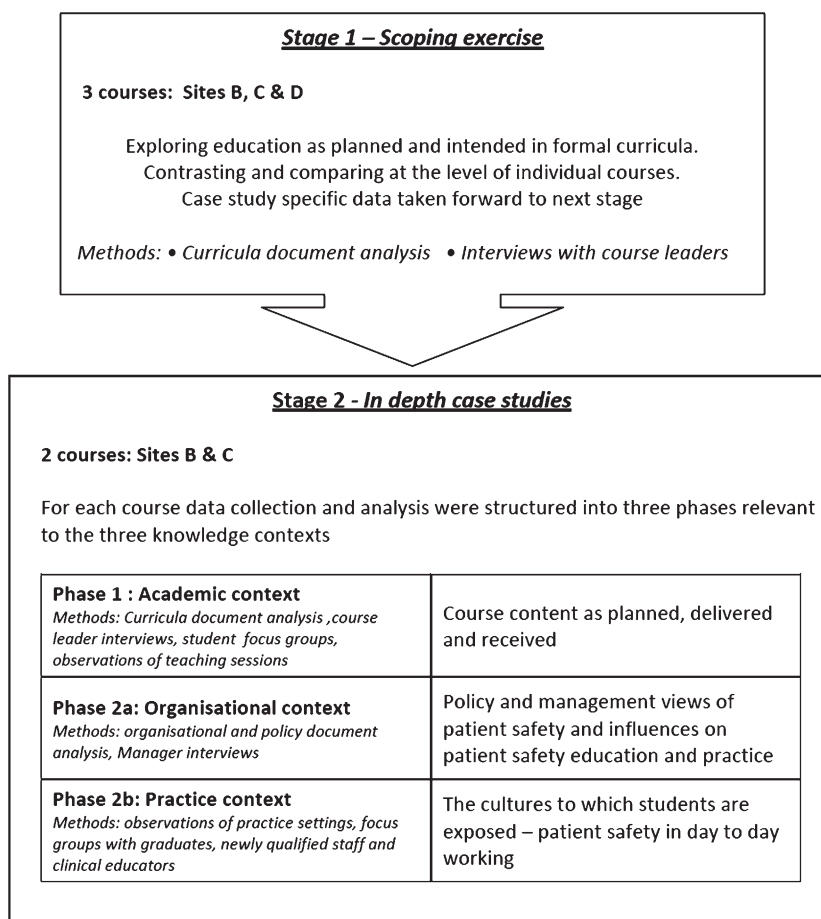


Figure 1. Stages of a study on the role of hidden curriculum in teaching pharmacy students about patient safety

selected for case study due to their differing histories and characteristics. Site C, an “old” university dating from the 1880s, provided clinical exposure for students through links with local hospitals, while site B, a “new” university (previously a technical college) established in the 1920s, provided comparatively less clinical exposure. The case studies involved researchers observing 6 teaching sessions (eg, lectures and seminars) and 4 formal clinical exposure sessions (eg, hospital-based clinical tutorials and hospital ward visits) across the 2 sites to examine patient safety education as delivered in practice settings. The course director interviews and analysis of curriculum documents from stage 1 informed the selection of the teaching and clinical exposure sessions observed.

Eleven focus groups also were undertaken at the 2 sites (5 focus groups at site B and 6 focus groups at site C), with a total of 44 participants (Table 2). Focus groups were conducted at both sites with second- and fourth-year students enrolled in the 4-year master of pharmacy (MPharm) degree program. Focus groups also were conducted at each site, with graduates of the degree program

who were undertaking their preregistration training year in either hospital or community settings. In order to register to practice as a pharmacist in the United Kingdom, graduates are required to undertake 1 year of preregistration training in employment. Additionally focus groups with clinical pharmacy educators were conducted at both sites and 1 focus group with newly qualified pharmacists was conducted at site C.

At each stage, data collection instruments were designed, discussed, piloted, and refined before use. For the interviews, semi-structured interview guides were pilot tested with people not involved in the study. When conducting the interviews, researchers used the interview guides but also allowed respondents to introduce issues they felt were important. Interviews and focus groups were audio recorded and transcribed. For the observations of teaching and clinical exposure sessions, researchers took brief notes during the observations and wrote up more in-depth notes immediately following the observation period. Vignettes for each teaching and clinical exposure session were produced from these notes as a way of condensing and aggregating descriptive data and

Table 1. Characteristics of Practice Sites and Courses Included in a Study of the Role of Hidden Curriculum in Teaching Pharmacy Students About Patient Safety

	Site B: School of Pharmacy Established 1920s	Site C: School of Pharmacy Established 1880s	Site D: School of Pharmacy Established 2000s
Main Teaching Approaches	Lectures Tutorials Laboratory classes University intranet Problem based learning (PBL) Seminars	Lectures Tutorials Practical classes Computer-based learning Enquiry-based learning Group work Portfolio based learning	Lectures Tutorials Practical classes Virtual learning PBL Workshops Interprofessional learning
Practice Experience	Year 1 & 2, half day visits to hospital and community pharmacy Year 4 half day visits to hospital and community pharmacy	Years 3 & 4, students attend fortnightly clinically-focussed PBL tutorials run within the hospital setting by clinical pharmacist tutors. Strong links to the local National Health Service, through three local teaching hospitals.	Year 1 & 2, eight practical visits (4 per year). Year 4, small group hospital placements, shadowing a GP, a clinical pharmacist and a pre-registration pharmacist.

researcher interpretations. Each site was assigned 1 research associate who conducted all interviews, focus groups, and observations at that site.

All data then were organized and coded using NVivo, version 7.0 (QSR International Pty Ltd, Doncaster, Australia). Frameworks to guide analysis and coding were developed with the wider project team and drafted, tried, discussed, and amended. These frameworks focused on understanding the ways in which patient safety content was (1) represented in the formal curricula, (2) delivered and translated into “teaching” practice both explicitly and implicitly, and (3) received and conceptualized by students. Initial findings were discussed, challenged, and dismissed or confirmed through discussion with the wider project group.

## RESULTS

### Patient Safety Education in the Formal Curriculum

The course documentation and the views of the course directors across 3 sites formed the first stage of the analysis of the formal curriculum, to examine patient safety education as planned and intended. Course/module leaders identified the following subjects as patient-safety related: dispensing, prescribing, medicines management, law, ethics, and communication. All 3 courses had at least 1 module with explicit patient safety content, either in terms of a module name or detailed in the intended learning outcomes. All interviewees pinpointed specific areas of the curricula where they felt that patient safety was explicit. However, several also suggested that patient safety was embedded implicitly throughout the curricula.

Common across the sites was the intention for students to learn the technical checking of prescriptions and dispensed medicines in the first 2 years of the degree program, followed by more complex critical decision-making about pharmaceutical care in the final 2 years. In these later years, patient safety learning was featured more heavily. The main methods for teaching and learning about patient safety were lectures, practical exercises, and role plays. Accuracy checking was “routinized” through continuous assessment of incorrect or poorly written prescriptions at all sites. Role play exercises involving discussions of prescribing errors with simulated prescribers and counselling simulated patients about drug therapy also were routinely employed.

Table 2. Focus Group Participants in a Study of the Role of Hidden Curriculum in Teaching Pharmacy Students About Patient Safety

Focus Group	Site B Participants, No.	Site C Participants, No.
Second-year MPharm students	6	5
Fourth (final)-year MPharm students	2	8
Preregistration students - hospital pharmacy	2	6
Preregistration students - community pharmacy	2	6
Newly qualified staff - hospital pharmacy	-	3
Clinical pharmacy educators	2	2

All sites featured hospital or community pharmacy exposure as part of the formal curricula, but this varied markedly in frequency and scope. Interviewees felt that exposure to practice was important to patient safety learning and should be increased in the curricula. They believed that being in the practice setting allowed students to hear and explore multiple perspectives rather than “just taking the lecturer’s word for it” and presented the students with more stimulus for asking questions. However, the availability of funding to support such initiatives was identified as a major issue.

Several patient safety topics were notably absent from the formal curricula at the sites, including understanding the epidemiology of adverse drug events and medication errors, learning from and reporting adverse incidents, root cause analysis and human factors, and building a safety culture. This perhaps indicates the “percolation” time needed for concepts such as patient safety to become visible in formal curricula documents.

### **Patient Safety Education in the Informal Curriculum**

At the 2 case study sites, elements of informal curricula were apparent within the formal university-based teaching and learning sessions observed by researchers. At both sites, several of the educators also were practicing pharmacists (referred to as teaching practitioners), who used examples from their practice experiences to illustrate patient safety issues. These interpersonal, unscripted illustrations presented opportunities for informal learning.

During these teaching sessions, some lecturers also tried to describe and convey the complexity of real-life pharmacy work, highlighting that students would encounter different situations once they were working in practice settings and that they would be required to make difficult decisions and use their own professional judgement on patient-safety-related issues.

In the focus groups, students described the personal anecdotes given by lecturers about real-life pharmacy practice as memorable instances of patient safety learning. The background of the lecturer was described as important and some indicated that they viewed those working in practice, in particular, as role models.

The researchers’ observations of students’ visits to the hospital also revealed the potential influence of role modeling. For example, students at one hospital site seemed to have adopted the use of alcohol gel rubs as standard procedure, while students at the other hospital site had not. Indeed, the pharmacist accompanying the students at the second site repeatedly failed to use the gel rubs when entering or exiting the wards, and this may have influenced the students’ behavior if this pharmacist’s breach in procedure was a regular occurrence.

### **Patient Safety Education in the Hidden Curriculum**

Many students apparently felt the need to supplement their formal learning with informal work experience. Pharmacy degrees in the United Kingdom generally offer limited learning in a clinical practice setting; therefore, the majority of practice experience is organized by the student independently and not directed by the higher education institution. Students who had voluntarily secured work experience in hospital or community pharmacy during university vacations or weekends indicated that these experiences were crucial for learning about patient safety. Through these experiences the students gained exposure to health care systems and organizations, customs and rituals, and “taken for granted” aspects of the profession; thus, these experiences could be described as part of a hidden curriculum.

Practice experiences appeared to cement existing university-based learning and also introduce new learning that students felt could not be addressed in an academic setting, such as learning about safe systems and processes. Students’ examples included learning about the importance of maintaining a tidy dispensary to ensure that the label of one item did not mistakenly adhere to another, and gaining an understanding of how a National Patient Safety Agency alert was implemented in an organizational setting.

Work experience also provided some understanding for the students into another important patient safety area: the causes of errors. In relation to community pharmacy work experience, some students had gained awareness about standard operating procedures, which they felt helped to highlight where and how errors could occur. Students also provided examples of how they had gained an awareness of human and organizational factors that could be a potential cause of error, such as workload, time pressures, and distractions. Similarly, having the opportunity to observe practicing pharmacists dealing with and rectifying prescribing mistakes was valued by students. These experiences offered the students insight into the causes of errors and the importance of communicating with the patient and asking the right questions, and also gave them an understanding of what professional responsibility entails.

In contrast to the above, students felt that witnessing poor practice also could contribute to patient safety learning. The opportunity to observe others in practice enabled reflection on how they would deal with such a situation themselves. Other students spoke about the insights they had gained from actually making an error themselves during work experience and how having this experience enabled reflection and learning from the incident. The human reality and possible consequences of situations

faced in practice may heighten the emotional involvement of students, perhaps rendering the informal learning more meaningful.<sup>25</sup>

## **DISCUSSION**

Patient safety content was evident in the formally stated curricula at all sites, although it was not always labeled as such. This lack of explicit labeling highlights the way in which the language of curricula documents remains fixed while the “curricula in action” continually evolves to reflect constantly changing scientific, social, and political contexts. Thus, the term and concept of patient safety has taken time to “percolate” through health care culture and policy before emerging in curricula documents. However, for students in this study, some of the most valuable and memorable learning experiences were contained within the more informal and “hidden” aspects of the curricula. Informal learning from teaching practitioners was assigned high levels of credibility by the students, indicating the importance of role models in practice. The “hidden” education, which took place in the form of voluntary work experiences, was an important factor, which was perceived to compensate for limited formal clinical exposure and under-addressed patient safety elements such as learning about safe systems and processes, errors, and professionalism.

Our findings resonate with some aspects of previous studies of the hidden curricula in healthcare education, particularly the importance of positive role models.<sup>11</sup> Similar to Ozolins and colleagues’ study of medical students in which students were found to conceptualize the hidden curriculum as integral to learning about the profession (an area which they perceived could not be dealt with through a formal curriculum), the students in our study conceptualized certain elements of patient safety learning as best received through practice experience — either first-hand via their voluntary work experience or second hand via the informal information offered by role models.<sup>13</sup>

Previous work suggests that formal placements vary across schools of pharmacy in the United Kingdom and that students would like these to be increased.<sup>26</sup> The majority of practice experience is voluntary, organized by students independently and not directed by the higher education institution. This extracurricular learning is by definition both informal in the sense that it is independent of the higher education institution, and hidden as the learning that takes place during these experiences is not known to the higher education institution and is not necessarily documented or assessed in the same way. Limited access to the practice context for the pharmacy students meant that students at both sites were not heavily exposed to day-to-day working or culture. Thus, students may

have limited opportunities for peripheral participation in communities of practice<sup>22,27</sup> and consequently the extent to which they interact with and learn the hidden curriculum from the cultural knowledge held by groups of pharmacists may be limited.<sup>20,27</sup>

On the whole, the findings support the need for greater and more sustained practice exposure throughout prequalification pharmacy education, to enable linkage between theory and practice, to enhance peripheral participation, and to supplement and enhance the university learning experience. We have no evidence, however, that greater practice exposure would lead to the formation of safer practitioners, although practical and applied methods clearly were viewed by students as more successful for learning about patient safety.

This paper draws on educational theory to organize the analysis into the categories of formal and informal curricula. Such categorization offers insights into informal learning, an area of patient safety that has received little attention in pharmacy education. A major strength of this study lies in the project design, using a range of different data sources to examine this topic. Observations were carried out during formal teaching sessions in the classroom and during hospital visits, which complimented the interviews and focus groups with students and educators. Although we acknowledge that observer presence may stimulate changes in the behavior of those observed, given that the study did not rely entirely on this method of data collection, this potential bias was felt to be acceptable. Indeed major alterations to behavior should have resulted in exemplary teaching and hospital sessions, while in fact it was during these observations that some of the informal learning in the formal curricula became apparent. In addition, insights into informal learning were gained from data relating to work experience and practice visits. Although the study highlights examples of patient safety learning during work experience, as given by focus group participants, these types of experiences were not observed as part of the study.

In order to understand further the types of patient safety learning that may occur during students’ work experience, future research should include observations of work experience placements. This design could then illuminate the day-to-day patient safety practice that students may be exposed to and the customs, rituals, and aspects of the profession that are taken for granted.

## **CONCLUSION**

Informal exposure to practice is an important but sometimes hidden factor shaping the patient safety education of undergraduate pharmacy students. As patient safety is a multifaceted concept, it is important for

pharmacy students to learn in a variety of settings to gain an appreciation of these different facets.

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## REFERENCES

1. Kohn L, Corrigan J, Donaldson M, eds. *To Err is Human – Building a Safer Health System*. Washington: National Academy Press; 2000:146.
2. Vincent C, Neale G, Woloshynowych M. Adverse events in British hospitals: preliminary retrospective record review. *Br Med J*. 2001;322(7285):517-519.
3. Green CF, Mottram DR, Rowe PH, Pirmohamed M. Attitudes and knowledge of hospital pharmacists to adverse drug reaction reporting. *Br J Clin Pharmacol*. 2001;51(1):81-86.
4. Cox AR, Marriott JF, Wilson KA, Ferner RE. Adverse drug reaction teaching in UK undergraduate medical and pharmacy programmes. *J Clin Pharm Ther*. 2004;29(1):31-35.
5. Johnson MS, Latif DA. Medication error instruction in Schools of Pharmacy Curricula: a descriptive study. *Am J Pharm Educ*. 2002;66(4):364-371.
6. Ashcroft DM, Morecroft C, Lowe J. Likelihood of reporting incidents in community pharmacy: pharmacy students' perspectives. *Int J Pharm Pract*. 2004;12(suppl):R54.
7. Hafferty FW. Beyond curriculum reform: confronting medicine's hidden curriculum. *Acad Med*. 1998;73(4):403-407.
8. Eraut M. *Developing Professional Knowledge and Competence*. London: Falmer Press; 2004.
9. Eraut M. Non-formal learning and tacit knowledge in professional work. *Br J Educ Psychol*. 2000;70(1):113-136.
10. Colley H, Hodkinson P, Malcom J. *Informality and Formality in Learning. A Report for the Learning and Skills Research Centre*. London: Learning and Skills Research Centre; 2003:65.
11. Lempp H, Searle C. The hidden curriculum in undergraduate medical education: qualitative study of medical students' perceptions of teaching. *Br Med J*. 2004;329(7469):770-773.
12. D'Eon M, Lear N, Turner M, Jones C. Perils of the hidden curriculum revisited. *Med Teach*. 2007;29(4):295-296.
13. Ozolins I, Hall H, Peterson R. The student voice: recognising the hidden and informal curriculum in medicine. *Med Teach*. 2008;30:606-611.
14. Masella RS. The hidden curriculum: value added in dental education. *J Dent Educ*. 2006;70(3):279-283.
15. Gardner S. Car keys, house keys, easter eggs, and curricula. *Am J Pharm Educ*. 2010;74(7):1.
16. Pearson PH, Steven A, Howe A, Sheikh A, Ashcroft D, Smith P. Learning about patient safety: organisational context and culture in the education of health care professionals. *J Health Serv Res Policy*. 2010;15(suppl1):4-10.
17. Pearson PH, Steven A. *On Behalf of Patient Safety Education Research Group. Report to the Patient Safety Research Programme. Patient Safety in Health Care Professional Educational Curricula: Examining the Learning Experience*. London: Department of Health; 2009.
18. Stewart J. *Asking for Senior Intervention: Conceptual Insights into the Judgement of Risk by Doctors* [PhD thesis] Newcastle: Newcastle University, 2006.
19. Parlett M, Hamilton D. Evaluation as illumination: a new approach to the study of innovatory programs. In Hamilton D, Jenkins D, MacDonald B, King C, Parlett M, eds. *Beyond the Numbers Game*. London: Macmillan; 1977.
20. Eraut M. Professional apprenticeship. *Learn Health Soc Care*. 2003;2(3):117-122.
21. Eraut M. Sharing practices, problems and possibilities. *Learn Health Soc Care*. 2004;3(4):171-178.
22. Eraut M. Learning contexts [Editorial]. *Learn Health Soc Care*. 2006;5(1):1-8.
23. Eraut M. Learning from other people in the workplace. *Oxford Rev Educ*. 2007;33(4):403-442.
24. Stake R. *The Art of Case Study Research*. Thousand Oaks, CA: Sage Publications; 1995.
25. Steven A, Dickinson C, Pearson P. Practice-based interprofessional education: looking into the black box. *J Interprof Care*. 2007;21(3):251-264.
26. Wilson K, Jesson J, Langley C, Clarke L, Hatfield K. *MPharm Programmes: Where Are We Now?* London: Royal Pharmaceutical Society of Great Britain; 2005.
27. Lave J, Wenger E. *situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press; 1991.