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Modernising the Pharmacy Curriculum

David Guile and Farah Ahamed

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Innovations in Professional Education and Training: a new approach for Pharmacists

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Abstract

Today's professionals need to have the capacity for continuous learning in order to meet the demands of the dynamic settings in which they work, and the regulatory requirements related to professional practice. This report presents a new approach to professional formation designed to enable professionals to meet the challenges of both their initial entry to work and their continuing professional development as they progress through their careers. The ideas will have relevance across the professions and for the higher education institutions and professional bodies responsible for curriculum design and the development of new approaches to teaching and learning.

The trigger for this report was the publication of the White Paper, **Pharmacy in England: building on strengths, delivering the future**, *in April 2008. The White Paper issued an ambitious challenge to the higher education sector and employers: how could pharmacy education and training be developed and reformed to produce pharmacist registrants with an enhanced range of capabilities, who were fully equipped from day one to deliver the high quality, safe and cost effective services to patients and the public?*

In recognition of his expertise in professional education and training and the work he is leading within the LLAKES Strand 2 team on innovative pedagogy in city-regions, Dr David Guile was invited to contribute to the work of Modernising Pharmacy Careers (MPC), the body responsible for advising on the development of the pre- and post-registration education and training of pharmacists and pharmacy technicians. Following a number of presentations by Dr Guile at meetings organised by the MPC, as well as an invitation from the General Pharmaceutical Council to present the report to its members, the MPC accepted all the recommendations in the report. Professor Anthony Smith, (The School of Pharmacy, University of London) and Mr Rob Darracott (Company Chemists' Association), Joint Chairs of the MPC, working collaboratively with other colleagues, then prepared a fully costed proposal to modernise the undergraduate pharmacy curriculum along the lines proposed in the report for Medical Education England (MEE). The MEE Board endorsed the MPC proposals for reform of pharmacist undergraduate and pre-registration education and training in March, 2011. The MEE Board is currently in the process of advising the Secretary of State (SofS) for Health of their decision, and requesting that he offers his full support to their costed proposal.

Background and Acknowledgements

In order to respond to the challenge of the 2008 White Paper, *Pharmacy in England: building on strengths, delivering the future*, Professor Anthony Smith, (The School of Pharmacy, University of London) and Mr Rob Darracott (Company Chemists' Association) on behalf of the Undergraduate and Pre-registration Review Team (the Review Team) established by the Modernising Pharmacy Careers Programme Board (MPCPB) in September 2009, approached David Guile and LLAKES to assist the Review Team to re-think the design of the undergraduate pharmacy curriculum.

The Review Team had been asked by the MPCPB to: a) identify the strengths and weaknesses in the current education and training of pharmacists, in higher education and the workplace; and b) suggest approaches for delivering more effective teaching, learning and assessment in the programme of initial formation for pharmacists, that support them to make more effective transitions into employment. This entailed identifying ways to: (i) strengthen current curriculum outcomes; (ii) increase pharmacists' capability to engage with the demands of practice at the point of recruitment; and (iii) inculcate a commitment to their own and others' lifelong learning.

Dr Guile was invited to contribute his expertise as a result of Professor Smith and Mr Darracott recognizing that the work the LLAKES Strand 2 team was undertaking on innovative pedagogy in city-regions could assist pharmacy to support "community wellbeing" (i.e. to help patients and customers to take greater responsibility for managing their health) and, in the process, enhance social cohesion and economic competitiveness.

The Review Team commissioned Dr Guile to devise and undertake a research programme to help them to accomplish the above objectives. The ensuing report and its recommendations were presented to and unanimously endorsed by the Review Team, the MPCPB, and Medical Education England (MEE). The final MPC Review Report, which is based on the principles identified in Dr Guile's evaluation, has recently been submitted by MEE as independent advice the Secretary of State, Department of Health.

LLAKES would like to acknowledge the MPC's agreement that this report be published as a LLAKES Research Paper in order that the ideas can be shared with a wider audience. LLAKES also acknowledges the contribution of Farah Ahamed to the research carried out as part of the project.

1. The pharmacy curriculum: the last decade

1.1. Background

Pharmacy is a regulated profession, and the Royal Pharmaceutical Society of Great Britain (RPSGB) is the professional body for pharmacists and the regulatory body for pharmacists and pharmacy technicians in England, Scotland and Wales. Prior to 1997, the RPSGB set standards for undergraduate pharmacy degrees in Great Britain which were designed in accordance with the principle of a "3+1" model (3-year degree course and a separate 1-year pre-registration year). Consequently, up to 1997, the typical undergraduate curriculum at most universities was designed as a subject based curriculum which included three years of science based learning (e.g. pharmaceutical chemistry, pharmaceutics, pharmacognosy pharmacology, and practice/dispensing). This was followed by one year of pre-registration training ('the pre-reg year') that comprised of practical training on a work placement. Since 1997, in line with European Directive requirements, the degree was extended to four years and the 1-year pre-registration year retained. All undergraduate pharmacy programmes in Great Britain were then obliged to re-structure their programmes and the degree awarded changed from a Bachelors to a Master's of Pharmacy (MPharm). Pharmacy graduates then proceed to the one-year pre-registration (pre-reg) training that leads to registration with the RPSGB.

In 2010, the General Pharmaceutical Council (GPhC) will replace the RPSGB as the regulator for pharmacy with powers to register and regulate pharmacists, pharmacy technicians and pharmacy premises. The GPhC will thus set standards for education and training that will regulate provision of both pharmacy degrees and pre-registration training to ensure newly registered pharmacists are competent practitioners. At the same time, a new professional leadership body for pharmacy, based on the RPSGB, will be established to provide leadership and support for pharmacists.

1.2. Pressures on the pharmacy curriculum: 1980s onwards

Over the past two decades, universities in general and schools of pharmacy in particular have been subject to increasing pressure to initiate curriculum reforms to secure greater cost-effectiveness in the design and delivery of pharmacy degrees, as well as to expand the number of students studying pharmacy.

A number of factors have given impetus to the need for increased cost-effectiveness of delivery. They can be summarised as follows. One cluster of factors includes the expansion of pharmacy in higher education, which was the result of the popularity of pharmacy as a subject and the need to maintain and even expand student numbers at a time when other science subjects were providing less popular, and striking the right balance between the development of pharmacy students to work in the pharmaceutical industry and in the growing patient-facing sector.

Another cluster includes the ever-increasing knowledge base of pharmacy degrees, the shift in the burden of disease to chronic long term conditions, advances in science and technology underpinning the development and use of medicines, and the changing expectations of patients as regards the quality of service they are offered. This is in part a result of the increasing ‘marketisation’ of the UK’s public sector (Le Grand, 2006) and in part, easy access to healthcare information via the internet, with the result that there has been a growing tendency on behalf of patients to claim to ‘know’ their medical condition and the pharmaceutical remedy they require.

Finally, a specific pressure has been that HEFCE’s Research Assessment Exercise (RAE) has spurred a number of universities to develop a more research-orientated focus in the last 20 years. This is because the RAE is, on the one hand, an important source of finance for universities and schools of pharmacy, and, on the other hand, generates important ‘reputational’ issues about the relative position of universities and schools of pharmacy to potential students.

1.3. Response to the changing societal context from the profession of pharmacy and its stakeholders (The RPSGB, employers, and the higher education sector)

a) *The RPSGB and PIANA*

In the mid-1990s, the RPSGB became convinced that the profession needed a vision of its future to meet both pharmacists' aspirations and the expectations of the public in relation to medicines and healthcare generally. The process of discussing the future helped stimulate thinking in the profession and brought it together as they realised that it would be much easier to influence government if it could be convinced that the profession had a coherent view of the future. This was a tricky challenge, because the RPSGB appreciated that there was a widely held view that the pharmacy profession had an 'image' problem. Many non-pharmacists thought of the profession as being somewhat locked in the past, trying to preserve its privileges against competition; more purveyors of products than a profession committed to the health agenda and condoning inconsistent performance amongst its registrants.

Hence, a vision of the future needed to be formulated which was outward-looking and open to change, in order to redress the unfortunate image of the profession. "Pharmacy in a New Age" (PIANA) was thus launched at the British Pharmaceutical Conference in September 1995 (and continued until early in 1999). The topical issues were reflected in the headlines in *The Pharmaceutical Journal* at the time – a mixture of the past and the perennial: "Market testing of hospital pharmacy" (5 August 1995); "Resale Price Maintenance on medicines to be reviewed" (28 October 1995); "The new NHS structure in England" (23 March 1996); "Managed care on health authorities' agenda" (29 June 1996); "A prescribing role for hospital pharmacists" (31 August 1996) amongst others.

PIANA made some major contributions to shaping the policy context:

- It raised the profile of the profession, and helped show policy makers and lay people its under-utilised potential
- It helped convince the government that the pharmacy profession wanted to make a contribution to the broader agenda
- It provided politicians with some practical solutions to the problems facing them

- It managed to address lasting issues and avoid the short-term vagaries of politics as it was launched under a Conservative government and embraced by a Labour one.

The wider PIANA change programme was followed up by the RPSGB in 2005/06 with a reform policy for pharmacy education – the Fit for the Future programme has led to: the publication of a set of Principles of Pharmacy Education & Training; investment in an education R&R+D programme; development and implementation of a Pharmacy Student Code of Conduct (and student fitness to practice (FtP) machinery); and a new programme of standards development to reflect new clinical and public health aspects of practice and services.

b) Response from employers

About the same time, employers of pharmacists began to urge schools of pharmacy to supplement the pharmaceutical science base of degrees with broader forms of skill formation, for example, leadership and entrepreneurial skills, so that students were better prepared to make the transition into the patient-facing (i.e. hospital, community, and primary care) contexts of practice. During this time, pressure has developed to maintain a strong science base to support both clinical/community practice and careers in industry and academia. It was felt that students not only needed to be en-culturated more effectively into the profession to enable them to make the transition from university to the workplace, but also that students' expectations at university needed to be better managed and modulated. Finally, it was emphasised that students ought to be informed and provided with clarification, from the outset of their university training, about what was expected of them in their current and future roles as pharmacists in the 21st Century.

c) Response from the higher education sector

The above developments led the schools of pharmacy to reflect on the knowledge and skills of their graduates and consequently:

i) Established schools of pharmacy gradually revised the typical ‘front-loaded’ (Winch and Clarke, 2004) programmes of formation, based on an extended period of academic study prior to exposure to pharmaceutical practice in a one year period immediately prior to registration. The University of Bradford developed its 5-year ‘sandwich option’ where students undertook 6 months training in each of semester 2 of year 3 and semester 1 of year 5 to include an integrated science base curriculum. This allowed students to be exposed to the practice of pharmacy much earlier in their training. Many schools developed clinical training, adding in a limited number of visits to practice or, in a few cases, short clinical placements in the final year of the degree programme. The role of teacher practitioners was developed relying on goodwill of employers to support both arrangements locally. There was no national funding strategy to allow development of clinical teaching at this time.

ii) Newly established schools of pharmacy have recently emerged with different curriculum models (e.g. Universities of East Anglia & Hertfordshire). The University of Hertfordshire engaged students in their year 3 with compulsory subjects: Medicine and professional practice, Patient assessment, Drug discovery and development, Pharmaceutical analysis, production and quality control, as well as training in Business management, Inter-professional working in health and social care, Law, ethics and professionalism, and Research methods. The University of East Anglia introduced practice visits in year 1 of its curriculum and extended assessments of professionalism early in the degree.

A broad analysis of the various mission statements of different schools of pharmacy provides an insight to their vision and ambitions for their students. They hoped to prepare their students to function as modern pharmacists*:* “as a scholar, scientist, as a practitioner and as a professional”. This meant that students had to be prepared for clinical practice after graduation, based on knowledge and mastery of both scientific and practical skills, and it also meant that universities had to provide reliable assessment of the quality of practice of their students.

1.4. Problems with the responses

One legacy of the marketisation of higher education via the publication of rankings for research and learning and teaching from, respectively, the RAE and from the Quality Assurance Agency (QAA), has been that students use university websites to glean information about rankings and grade boundaries when making a choice of university. Paradoxically, the process of using ratings distorts the process of making choices. Based on feedback from students from different universities, a broad comparison between them revealed that, through their experience, and interactions with their colleagues at other universities, they perceived that each university had its own area of expertise: for example, Nottingham was strong on industry links, Bradford offered a sandwich programme, Brighton focused on clinical based teaching etc. However, university websites rarely marketed their pharmacy programmes to highlight a particular angle or focus and it was apparent that there was considerable diversity as regards the key purpose of the pharmacy curriculum. As a consequence, students explained that they did not always find it easy to discern the key differences between schools of pharmacy and often realised in hindsight that their interests may have been better suited to another pharmacy programme.

Another legacy of the diversity of approaches in curriculum design and focus and lack of clear information about these is that the learning experience varied tremendously across the universities: some schools assessed students purely through the use of written examinations while others assessed 50% by course work, some used problem-based learning, some had vivas, some had research projects, some had an undergraduate level dissertation and so on. The workload varied from school to school and the dissertation was generally 30% of the workload. Because grades, especially, from Year 4, affected the final grade, students acknowledged the ‘backwash’ of assessment (Brown, 2001) on their mode of study.

The backwash of assessment is a well-documented problem in all courses in higher education: students ‘read-off’ what has been learned in order to secure high grades and thus concentrate only on those areas of the curriculum. In the case of pharmacy students, they explained that the backwash of assessment in the Year 4 undermined their interest in

practice-based learning because they geared their focus to academic study rather than preparation for practice.

Furthermore, it was evident from the students' comments that there is also wide variation in the training programmes delivered in different pre-registration placement arrangements. Placements can range from six months of splits between industry and hospital or community practice or community, to just hospital, to hospital and primary care, to community pharmacy, and finally to hospital and academic work and/or industry. Moreover, the balance of experience in clinical and technical areas also varies considerably. In most cases students recognized that: (i) schools of pharmacy were not necessarily responsible for this variation. Nevertheless, students were inclined to assume that schools had sanctioned this variation and therefore expected the pattern of training of be made more explicit on websites and in other relevant material about degrees; and, (ii) they did not fully think about their placements for the pre-reg period until their final year at university (year 4). Thus, the current arrangement of expecting them to choose their pre-reg focus in Year 3 did not assist them to plan their careers strategically based on the fullest knowledge of careers in research or patient-facing practice. This finding is also confirmed in research amongst students published in 2006 and 2007 by the Pharmacy Practice Research Trust (Willis et al, 2006 and Wilson et al 2007)

Consequently, it is clear that while students appreciated that 'professionalism' in pharmacy varies according to whether they were entering academic, industrial, or patient-facing contexts, they also felt that their preparation for entering these different professional contexts were not necessarily met. Specifically, they commented that they often realised after they had graduated from the MPharm and entered the work place that they were not able to deal competently with issues arising from the practice of pharmacy. They made it clear that they were not claiming that they lacked the knowledge or training, but that they lacked the confidence of being able to put it into practice what they had learnt in the classroom. They believed that this was the case for many reasons: because of the way that they have been taught, the lack of practical experience and the limited or lack of interactions with the wider medical profession as well as face to face patient contact throughout their training at university.

1.5. Current context: Modernising Pharmacy Careers – the Pharmacy White Paper

The 2008 White Paper, *Pharmacy in England: building on strengths, delivering the future*, which preceded the last of the Darzi Next Stage Review papers (*A High Quality Workforce*) was a formal response to the pressures on the pharmacy profession during the previous decade. The White Paper recognised that in order to develop consistent and coherent high quality practice a number of aspects of education, training, career development and workforce planning needed to be addressed, and made specific recommendations as to how the profession's infrastructure ought to be modernised. More particularly, areas for consideration included post-registration education that supported continuous professional development within a coherent nationally recognised framework and called on the profession to rise to the challenge of modernising the profession. The key elements for pharmacy pre-registration education are set out in Chapter 7 of the White Paper. They stress in particular that there should be:

- meaningful clinical context and experience throughout the undergraduate programme and determine whether this can be maximised by integrating the degree course with the pre-registration year
- an appropriate funding framework in place to support academia and clinical practice in delivering the new programme
- sufficient capacity in the academic workforce and an appropriate infrastructure in clinical practice to provide high-quality education

The mechanism established for taking this agenda forward was through the MPCPB, which was to be established as a sub-committee of Medical Education England, as outlined in *A High Quality Workforce*.

1.5.1. Responses to the White Paper

Our consultations identified the gaps outlined below. The gaps were based on a thematic analysis of interviews undertaken with employers, students and key stakeholders in the higher education sector (please see Annexe A for a list of interviewees):

i) Employers felt that:

- there was a basic lack of numeracy and literacy skills amongst new graduates which was alarming
- the following were also lacking in pre-registration trainees: communication skills, confidence building, administrative/time management skills, nurturing habits of the 'reflective practitioner', commercial practice skills, and ethical decision making;
- students did not have a clear understanding of their current and future roles as pharmacist
- there was a lack of pharmacy-led research

ii) Students emphasised that:

- although the subjects of law, ethics, communication skills were included in their pharmacy curricula they did not find it easy to relate this theoretical knowledge to practice settings
- they did not feel that they had been supported effectively to work with other health care professionals, and doctors in particular
- they were not able to link their academic training together because the different subjects were taught in 'silos' and without cross- referencing in either teaching or assessment
- while many believed that the pharmacy profession was exciting, they also acknowledged that 60% of the day to day work tended to be fairly mundane and they were keen to develop their interest by becoming involved with university/industry research and/or research into patient-focused practice
- the support that they could expect to receive during summer and pre-reg placements was unpredictable and varied tremendously.

iii) Academics in schools of pharmacy acknowledged that:

- the idea of 'professionalism' in pharmacy needed to be explored and understood better

- there was no clear understanding about the aspirations of those going into pharmacy and students generally did not have a mid-to long-term view of where they wanted to be in the next ten years and it was up to the universities to prepare them for this.

1.6. Main messages emerging from the consultation process

- a holistic 5-year period of formation with an integrated curriculum and assessment at the end of Year 5 will enable students to embed learning they have from university more effectively
- early exposure to practice to support students to understand the changing nature of work in pharmacy and, as a consequence, to make more informed choices about their future careers in pharmacy
- closer collaboration between higher education institutes **(**HEIs) and employers (possibly on the basis of a regional structure and national structure) to strengthen their partnerships to support the initial formation of pharmacists e.g. through professional as well as academic mentoring and better management of work-based learning and assessment to pave the way for their subsequent professional development
- review of the current assumptions that underpin the relation between theory-practice amongst pharmacy stakeholders in the process of initial formation
- arrange for pharmacy stakeholders to meet regularly to discuss and monitor the effectiveness of different pedagogic arrangements for delivering the curriculum
- collaboration and networking with other healthcare professionals e.g. doctors within the wider health system to give pharmacists a better understanding where pharmacists fit, in the larger spectrum and also that other healthcare professionals get an idea of what pharmacists can do
- better balance between the development of traditional skills of research (i.e. laboratory-focused) and the skills to support research into patient-focused settings (i.e. practice-focused)
- a uniform orientation and careers brochure - so that all students have the same or similar starting points for choosing their MPharm programme and are exposed to what could be the different ways of working or pathways in the profession

- the issue of assessment is important - currently students are allowed to re-sit exams until they pass. This brings in the issue of standards, yet, in practice there is no second chance, it is thought important that the profession ought to be less flexible and ensure that assessment standards reflect the reality of practice more closely.

2. The way forward

2.1. Introduction

This section of the report starts by outlining the main assumptions that underpin the design and delivery of inter-disciplinary curricula and the problems associated with those assumptions generally. It then shows how these problems have cast a shadow over the attempts to modernise the theory-practice relation in the pharmacy curriculum described in 1.2. The section concludes by introducing an alternative conceptualisation of the theory-practice relationship and highlighting its implications for pharmacy.

2.2. Problems with interdisciplinary curricula: 'front-loading' and 'transfer'

The integration of theory and practice in academic degrees, especially inter-disciplinary degrees and degrees that support professional formation, has been a consistent concern for policymakers and universities in the UK since the post-War expansion of higher education led to the growth of more degrees to support professional formation (Rothblatt and Whitrock, 1993). Initially, researchers considered how to improve the design and delivery of programmes of professional formation in higher education by changing the balance between academic study and periods of practice-based learning (Bines, 1992). New models that attempt to redress the balance between theory and practice have emerged, for example, in the fields of teacher education (Moore, 2003) and in social work (Winter and Maisch, 1993)

More recently, researchers have addressed more fundamental issues. They have identified that, by and large, most degree programmes rest on two assumptions: one is concerned with the design of curricula and the other is concerned with the outcome of learning. The former is best encapsulated by the notion of the 'front-loaded' curriculum (Winch and Clarke, 2004),

that is, extensive periods of study to introduce learners to theoretical axioms, followed by opportunities much later in the period of study to see that these axioms are applied in practice. The phrase, 'the transfer of learning' (Anderson et al. 1996) from one setting to another can be used to characterise the latter. Taken in combination, advocates of the front-loaded curricula as the generator of a capacity amongst learners to transfer knowledge and skills tend to conceive of this process of development as a single movement as encapsulated in the term 'from theory to practice'. This is the traditional model adopted in pharmacy in the 3+1 and 4+1 models.

Over the last decade, both assumptions have been challenged in contemporary curricula and learning theory. It has been recognised that one problem that afflicts all inter-disciplinary curricula is that different forms of theoretical knowledge are characterised by different knowledge structures (Young, 2007) and, moreover, that this state of affairs poses curriculum and pedagogic problems for inter-disciplinary curricula. Stated simply, the problem is: how to incorporate forms of knowledge that are characterised by different knowledge structures in the same curriculum and how to teach them so they cohere meaningfully for learners (Hoskin and Anderson-Gough, 2004; Young, 2007). A further problem is because, all too often, theoretical knowledge is conceived of and presented as though it is an 'abstract' form of knowledge in educational contexts and students struggle to transfer such knowledge. Their attempts are continually dogged by not being able to 'see' the connection between the knowledge they have been taught in universities and the situations that they encounter in outside educational contexts in general (Greeno, 1998) and in the case of pharmacy, irrespective as to whether it is an academic, industry, or patient-focused setting.

2.3. The situation in pharmacy

Over the last decade, schools of pharmacy have introduced a number of new curriculum and pedagogic strategies, as we have seen in Section 1.2., to integrate theory and practice more closely in the current '4+1' period of qualification to support the professional formation of pharmacists. The problems described above have manifested themselves rather differently in programmes of professional formation, such as, pharmacy, compared with inter-disciplinary areas, such as, bio-chemistry. The purpose of the former is to support learners to make

successful transitions into research, hospital or patient-focused contexts. In contrast, the purpose of the latter is to support learners to see ‘connections’ between separate, albeit, complementary disciplinary fields.

Subjects, such as, pharmacy, have always faced therefore a dual-conundrum. Decisions have to be made about: the scientific content of the pharmacy curriculum and how to teach it in such a way that it has a meaningful relationship with research and/or patient-focused contexts; and, the forms of organisational knowledge and skill that pharmacists require to operate effectively in these three contexts and how to support pharmacists to develop and use such knowledge and skills.

The well-intentioned and considered revisions to the front-loaded model of professional formation that have been undertaken in the field of pharmacy have been skewed, as we saw in Section 1.4., by the ‘4+1’ model of the period of qualification and the backwash effect of assessment throughout the period but particularly the impact of the final academic assessment occurring in year 4. They have also been skewed, as is now evident, by the legacy of the assumptions about front-loading and knowledge transfer that continue to reverberate through the pharmacy curriculum.

To offer a different starting point for considering how to address the above conundrum, we propose a different conceptualisation of the relationship between theory-practice. The conceptualisation is based on the notion of the continuous ‘recontextualisation’ of knowledge and skill in different contexts (Evans, Guile, and Harris, 2009; Guile, 2010). The concept is explained in the next section of the report and explores how the concept of recontextualisation can be used in the field of pharmacy to enhance and extend the direction of change that has already begun to improve the design and delivery of the pharmacy curriculum, as well as to respond to the call in the 2008 White Paper to modernise careers in pharmacy.

2.4. From ‘front-loaded’ formation to continuous ‘recontextualisation’

The concept of recontextualisation (Evans, Guile and Harris, 2009; Guile, 2010), unlike the notion of front-loading and knowledge transfer, offers the field of pharmacy a way to trace the link between the selection of content; the decisions about pedagogic strategies (i.e. behavioural or constructivist) and tactics (i.e. lecture, seminar, problem-based learning, placement); the opportunities to participate in professional practices in different workplace contexts, and learners’ engagement and embodiment of those different experiences. There are four distinct but nevertheless related modes of recontextualisation. These are:

- *Curriculum recontextualisation* (CR): this occurs when knowledge, pharmaceutical science or organisational, moves from its original academic context of production into the formal learning programme offered by a university;
- *Pedagogic recontextualisation* (PR): this refers to the inter-relation between the organisation, structuring sequencing of different forms of knowledge into, for example, modules, and the decisions about the learning activities to support people to engage purposively with those modules;
- *Workplace recontextualisation* (WR): this refers to the way in which concepts and/or practices associated with different forms of knowledge are embedded in workplace routines and procedures or embodied in people’s performances or conditions;
- *Learner recontextualisation* (LR): this occurs as learners engage with the different forms of knowledge and skill they encounter in different contexts, participate in the different traditions of thinking, reasoning and acting associate with those contexts, and come to develop their own embodied sense of meaning and use of knowledge and skills in different contexts.

Recontextualisation is therefore, in contrast to the assumptions of front-loading and knowledge transfer that currently underpin explicitly or implicitly the pharmacy curriculum, a multi-faceted concept. It refers to the idea that concepts and practice change as professionals use them in different settings, for example, in the curriculum and/or workplace, and that learners’ understanding and use of concepts and practices develop as they make

iterative transitions between education and work, based on the use of, for example, work shadowing, visits, placements, etc., throughout the period of their initial formation.

Based on the conclusions that we drew in section 1.4., and the above observations about the legacy of front-loading and transfer in the attempts that have been undertaken to modernise the pharmacy curriculum, we suggest that the concept of recontextualisation can be used to offer some insights to realise the goal of a single, holistic (i.e. the integration of theory and practice) period of initial professional formation. (The process of recontextualisation is also summarised in Annexe 2 of this research paper.)

3. A new direction for the pharmacy curriculum

3.1. Introduction

This section starts by explaining why, in light of the challenges it faces, the pharmacy curriculum needs to be based on a number of new principles. In the process, it explains how the enactment of those principles will enable the pharmacy curriculum, in future, to prepare pharmacy students more effectively for the transition into careers in research or patient-focused contexts. The section concludes by identifying two main options for implementing those principles, and discusses the relative advantages and disadvantages of those options.

3.2. New principles for the pharmacy curriculum

We concluded in Section 1.6 with an agenda of issues that would help the Modernising Pharmacy Careers Programme Board to address the continuing pressures on the pharmacy curriculum. In summary they were to redesign the pharmacy curriculum around:

- a continuous period of formation with registration and graduation at the end of Year 5;
- early exposure to practice to support students to make more informed choices about their future careers in pharmacy, to develop the 'organisational' (see below) knowledge and skill required in academic, industry and patient-focused contexts, and to underpin a commitment to lifelong learning in their chosen career;

- closer collaboration between HEIs and employers to strengthen their partnerships to support the initial formation of pharmacists and to pave the way for their subsequent professional development.

We also concluded in Section 2 that the concept of recontextualisation offered a way to support the recommendations advanced in Section 1; that schools of pharmacy should:

- review the current assumptions that underpin the relation between theory-practice amongst pharmacy stakeholders the process of initial formation

We would suggest that the best way to integrate both sets of conclusions is to formulate a new overarching aim for the pharmacy curriculum and a new set of principles to underpin that aim. We outline our suggestion below.

The aim of the pharmacy curriculum should be to provide students with:

- a continuous five-year period of professional formation where accreditation for the academic and practical aspects of formation are awarded at the end of the period.

The notion of formation is critical for two inter-related reasons: pharmacy students, unlike students studying physics or sociology, are not only studying for a degree; they are, like engineering or medical students, being enculturated, via the integration of education and work-based activity, into a way of reasoning and acting that supports their transition into, and development within, a specific profession. The key purpose of the pharmacy curriculum is therefore broader than curricula that are only seeking to enculturate students into the traditions of a discipline. The term formation has been chosen, therefore, to convey this message to all pharmacy stakeholders.

This curriculum should be based on the following principles:

- an agreed set of learning outcomes to support development as scholars, clinicians, practitioners, and professionals;
- the design and delivery of a curriculum to support learner recontextualisation of scientific, and organisational knowledge and skill in scholarly, clinical, practitioner contexts;
- the design of multiple transitions to support the recontextualisation and embodiment of scientific and organisational knowledge and skill in all three contexts;
- the use of reflection as a strategy in the scientific and organizational dimensions of the curriculum and as a personal resource to develop a commitment to lifelong learning;
- the assessment of knowledge and skill to include formative and summative methods in educational institutions and workplaces.

and underpinned by:

- formal collaboration between higher education institutions (HEIs) and employers to design, deliver and assess the scientific, organisational dimensions of the curriculum in educational and workplace contexts.

3.2.1. Recommendations

Schools of pharmacy and their employer partners should:

- agree a formal partnership to enact the above principles;
- urge the full MPCPB to recommend that the Higher Education Funding Council for England (HEFCE) recognises this partnership as critical to achieving the goals articulated in the White Paper.

3.3. Options to enact the principles

We outline below two options – the 'Single' and 'Dispersed' practice period – for enacting the above principles, and summarise their relative advantages and disadvantages in tabular form.

Option 1. Single practice placement (SPP)

The key feature is a continuous five-year period of qualification, with summative and formative assessment in each year. This option would entail one academic assignment being held over to the fifth year and that assignment and the period of practice being assessed in the fifth year. The bulk of the practical experience would be in a one-year block at the end of the five-year period. This arrangement would mean that students started the fifth year in their chosen field of practice in September but returned to their school of pharmacy in May to sit all final examinations and to complete their Professional Profile of Transition (see, Indicative Example Year 3 Profile in the Annexe.) By including assessment of academic and practical work in the 5th year, the problems identified in Section 1 with the backwash of assessment of the current '4+1' model are significantly diminished or even removed. The single practice period option enables universities and employers to:

- build upon the revisions that have been made to front-loaded models of curricula, for example, through introducing visits from employers into the curriculum in Year 1, 2, 3 and 4;
- enhances the use of practice-based activity within a pharmacy degree by; (i) encouraging students to undertake, at least one, holiday placement during the first four years of their degree, and (ii) arranging for students to start the academic year with a period of practice-based learning (i.e. visits 'in'/visits 'out' to help to orientate them to the relation between some aspects of that academic year's pharmacy curriculum and practical settings.

Model	***Key Features***	***Pros***	***Cons***
Single practice placement	*A continuous five-year period of qualification with final year spent in practice*	*-Professional formation based on: (i) strong front-loaded pharmaceutical scientific component and late exposure to practice; (ii) wide pharmaceutical science-based course work with many optional modules; and (iii) front-loaded organisational skill development and late opportunities to apply/further develop skills* *-Distorting effect of backwash of assessment removed from year 4* *Extended opportunity to expose pharmacists to other medics/patients etc in class but not in practice* *-Programme of mentor support for pharmacy students could be introduced*	*-Professional formation still un-balanced* *Science is still siloised* *-Contextualisation of pharmaceutical knowledge and practice end-loaded* *-Development of organisational knowledge and skills end-loaded* *-Programme of mentor support for pharmacy students decontextualised from practice* *-Minimal opportunity for pharmacy students to get to grips with reality of the research/clinical/community work prior to selecting their preferred career route*

Option 2. Dispersed practice placement (DPP)

The key feature is a spiral of opportunities to learn about practice throughout all five years. This spiral could take one of several forms:

- Years 1 and 2 (visits 'in' and 'out', work shadowing, simulations); one-three-month block of workplace learning in Year 3; further opportunities to learn about practice in Year 4., and to undertake a holiday placement in Year 4; and, one nine-month block of workplace learning (Year 5);

- Years 1 and 2 (visits 'in' and 'out', work shadowing, simulations); one three-month block of workplace learning in Year 3; a further three months of placement activity in Year 4 (a mix of short term-based and holiday placements) as agreed with employers,
- and to undertake a holiday placement in Year 4; and, one six-month block of workplace learning (Year 5).

Model	Key Features	Pros (Indicative)	Cons (Indicative)
Dispersed practice placement	A continuous five-year period of qualification with a multi-faceted programme to introduce pharmacy students to pharmacy practice	-Professional formation based on programme of early exposure to pharmacy practice to increase capacity for making links between curriculum and practice -Programme based on an integrated curriculum (pharmaceutical science, organisational knowledge and skill and experiences of practice) to establish relevance of each aspect to clinical/community and research careers in pharmacy -Pharmaceutical science and organisational knowledge and skill curriculum designed to dovetail with experiences of practice to support recontextualisation of knowledge and skill and alert pharmacists to growing importance of developing entrepreneurial knowledge and skills at an early stage -Exposure to practice based on differentiated model of exposure (work visits "in" and "out"/simulations/work shadowing/work placements etc) to: (i) develop insights and deepen experience: (ii) increases opportunity for working with other medics and other pharmacy colleagues; and (iii) raise awareness about the need to have and relevance of critical organisational skills eg leadership, change management, communication -Periods of post-experience reflection to be introduced into the pharmacy curriculum to support recontextualisation of experiences in relation to pharmacy and organisational knowledge base -Transition between contexts presented as a recurring feature of initial and continuing formation	-Early exposure to pharmacy practice increase pressure on employers to support visit/placement programme -Integrated curriculum increases pressure on Departments of Pharmacy to "match" curriculum to practice -Recontextualisation of knowledge and skill increases pressure on Departments of Pharmacy and employers to develop new pedagogic models -Differentiated model of exposure forces Departments of Pharmacy and employers to collaborate more closely with one another -Post-experience reflection forces Departments of Pharmacy and employer to become more responsive to learner feedback -Managing recurring transitions may require shift from learner- to sector-generated placement progamme

4. Implementation of the 'dispersed curriculum option' (DPP)

4.1. Enacting the DPP option

The single practice period (SPP) option provides a way to address a couple of the basic, albeit important, problems with the current '4+1' model of the pharmacy curriculum, specifically, the problem of the backwash of assessment. It does not provide, however, a vision or a set of practical measures to address the other pressing problems identified in Section 1, for

example, earlier exposure to practice to assist pharmacy students to make more informed career choices.

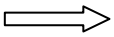
In contrast, the DPP option has a number of attractions. Firstly, it recognises that there are a number of different interpretations of current '4+1' model: some offer learners considerable opportunities for practice-based learning while others offer relatively few opportunities. Secondly, the DPP offers all schools of pharmacy and their employer partners an opportunity to further extend or to re-think the design and delivery of practice-based learning.

Both options entail the introduction of pedagogic strategies and tactics to assist students to re-contextualise learning. Moving towards a DPP model will involve schools of pharmacy and their employer partners addressing a broader number of curriculum, pedagogic, workplace and learner issues. For this reason, we have drawn on current thinking about the design of curricula to support professional formation, to outline the key issues that will have to be addressed and made recommendations as to how this process could be supported.

4.2. Curriculum challenge of enacting the DPP model

The first step that schools of pharmacy will have to take to enact the DPP model is to review the design of their existing curriculum. Before embarking on this task, it is important to remember that existing curricula consist of forms of pharmaceutical and organizational knowledge and skill that have been *recontextualised* from their original context of academic production. Theories and concepts from, for example, biology, chemistry, organisational theory, have been included in a formal learning programme offered by a school of pharmacy. As a consequence, theories and concepts have changed because they are now serving a new purpose. Instead of being part of their original domain base, the theories and concepts are now a part of an interdisciplinary domain which supports professional practice and clinical decision making.

Curriculum recontextualisation
knowledge from scientific disciplines, workplaces and professional contexts moves into the pharmacy curriculum



One way for schools of pharmacy to review the design of their interdisciplinary curricula is to draw on Bernstein's (2000) distinctions between the 'classification' and 'framing' of curricula. The former refers to the degree of insulation between different concepts and modules. The latter refers to the locus of control over the selection, sequencing and pacing (see below) of the knowledge to be acquired. These concepts direct the attention of those involved in the review process to appraising critically the existing selection, sequencing, pacing and criteria of the pharmaceutical and organisational knowledge and skills in the curriculum. This will help reviewers to decide whether to retain or revise:

- the existing pattern of pharmaceutical and organisational modules and their existing content in the same terms and years or introduce some at a later stage or even to cease to include them in the curriculum.

This decision has to be made at the outset. Any attempt to introduce a more explicit practice-based dimension of the pharmacy curriculum inevitably means either that more time will have to be found, or that time will have to be redistributed in the curriculum so that activities, such as, work shadowing, work visits, work placements etc, can occur more regularly and/or at an earlier stage than in the past.

In addition to reviewing the above forms of knowledge and skill, schools of pharmacy will have to ensure that the process of review also takes account of the knowledge and skill gaps identified in Section.1.5. Taking decisions about which organisational knowledge and skill should be included is, however, relatively straightforward compared with the subsequent decisions that have to be made.

Forms of knowledge, as noted earlier, are characterized by different knowledge structures (Young, 2007). Some forms of knowledge have clear "rules of combination", for example, mathematics, that can be used to determine the sequence of concepts in relation to one another (Hoyles, 1999). Other forms of knowledge have less clear "rules of combination", for example, knowledge about entrepreneurship or leadership, and this means it is much more tricky to decide what to teach and when it should be taught (Drucker, 1985). The conundrum

is therefore how to include them so they cohere meaningfully for curriculum designers and learners in a curriculum.

The notion of knowledge structures and the sequencing of knowledge will help clarify the issue further. Schools of pharmacy can use the former to help them to determine the order in which different aspects of the pharmaceutical and organisational knowledge and skill are introduced in the curricula. In contrast, the latter can be used to determine how aspects of pharmaceutical and organisational knowledge are framed, and sequenced in relation to one another (taught through reference to one another) as well as to the practice-based elements of the programme of formation. Taking such decisions, however, raises the following issue: should organisational knowledge and skill be an implicit feature of the curriculum or be assessed explicitly?

Schools of pharmacy may find the distinctions made by an Open University (OU) report helpful when addressing this issue (Hodkinson, 1996). The OU report made a distinction between three approaches that could be employed to assist the teaching and learning of organisational knowledge and skill. The report suggested that they could be 'totally embedded', 'part-embedded' or they could 'stand-alone' in a curriculum.

It is clear that each approach has advantages and disadvantages and in order to illustrate this more clearly the subject of ethics, an identified skill gap, has been used to illustrate the issues that will have to be considered.

a) The approach of total embedding would result in ethical issues being included as an integral element of scientific pharmaceutical modules as well as practice modules. This approach presupposes that lecturers would raise and encourage students to raise ethical issues about module content as well as from their experience of practice, rather than teach ethics as a separate issue (Reiss, 2006). This would help learners to appreciate that there are differences between ethical reasoning and scientific reasoning and that the methods used to arrive at scientific knowledge are therefore not the same as those used to reach ethical conclusions (Reiss, 2006). The issues and discussions would, however, not be subject any

form of assessment.

b) At first sight, part-embedding pre-supposes a similar approach. Where it differs is that schools of pharmacy would agree whether to use formative or summative methods to assess students' appreciation of ethical issues.

c) Finally, the stand-alone approach presupposes that ethics would be taught and assessed as a separate topic in the curriculum. This has the advantage of making ethical issues explicit but as professions, such as, accountancy have discovered (Hoskins and Anderson-Gough, 2004), it leaves students with the problem of how to transfer their de-contextualised understanding of ethical debates and issues into the real world of the profession.

From the perspective of the report, all three approaches could be employed to teach ethics. The critical issue would be to determine how they would be classified, framed and sequenced in relation to one another. One well-regarded strategy is to use total and part-embedding approaches to orientate students to ethical issues, and to consolidate this process of orientation with formatively assessed stand-alone modules (Hoskins and Anderson-Gough, 2004).

The mention of assessment introduces the final issue for consideration. Recent discussions of the role of assessment have consistently stressed that assessment should be "constructively aligned" (Biggs, 2007) with curriculum goals so that assessment contributes meaningfully to student outcomes. Schools of pharmacy can use the notion of constructive alignment, in conjunction with the embedding, part-embedding and stand alone models of teaching knowledge and skill, to determine the balance between formative and summative assessment.

The former, specifically, self and peer assessment, are particularly useful ways for students to profile their developing sense of self-confidence, their analytical skills etc. (Boud, 1986), while the latter – for example, written assignments or Objective Structured Clinical Examinations (OSCEs) – enable staff to discriminate between different levels of written or behavioural performance. Although it has almost become axiomatic in the literature on student learning that self and peer assessment play a vital role in supporting academic, personal and skill development (Boud, 2009; Light and Cox, 2001), it is still recognised that

the critical issue is striking the ‘right’ balance between the use of formative and summative assessment. This is, however, a time consuming task. It presupposes that all parties involved in the assessment process have agreed how to sequence formative and summative assessment, and are competent to use the agreed methods of assessment.

The importance of setting time aside for all parties involved in the ‘change processes’ to address curricula, pedagogic and assessment issues has long been recognised in educational research on curriculum change since Fullan’s (1988; 2009) pioneering work on managing educational change was first published. Parties involved in most forms of educational change, which are subject and/or institution-specific, normally have to engage in cross-institution discussions. In the case of programmes of professional formation, such as pharmacy, the constituency is much wider. As a consequence, it is vital that staff from schools of pharmacy and the employers negotiate a memorandum of agreement to commit one another to meet to ensure the latter can support curriculum expectations (Boud, 2009).

4.2.1. Recommendations

Based on the above analysis, we suggest that schools of pharmacy use:

The concepts of ‘classification’ and ‘framing’ to:

- review the existing design of their curriculum and to redesign the curriculum to include/extend more periods of practice-based learning;
- identify the preferred pattern of sequencing of pharmaceutical and organisational knowledge and skill to ensure that they complement one another in the curriculum and in the periods of practice-based learning;
- discuss the viability of the preferred pattern of sequencing with employers to ascertain whether the “right” balance of visits/placements can be secured (see, 4.4.1.)

The distinctions between ‘embedded’, ‘part-embedded’ and ‘stand-alone’ should be used to determine:

- which aspects of and when to assess pharmaceutical and organisational knowledge and skill

The distinctions between formative (i.e. ‘self’ and ‘peer’) and summative assessment (i.e. written assignments, OSCEs) to identify:

- how to assess different aspects of pharmaceutical and organisational knowledge and skill.

Schools of pharmacy and employers to meet in regional clusters to:

- share the outcomes of their review
- agree a joint programme of professional development for university lecturers and ‘industry educators’ (see, 4.4.1.)

4.3. Pedagogic challenge of enacting the DPP model

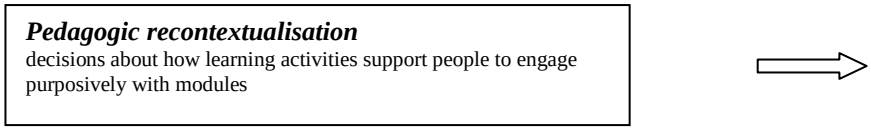
The second step schools of pharmacy will have to take to enact the DPP model is to review the pedagogic strategies and tactics used to introduce students to pharmaceutical and organisational knowledge and skill. This is vital because most institutions and staff operate with highly taken-for-granted or ‘folk’ notions (Bruner, 1996) of how people learn and how to teach people to learn. These notions are, by and large, the product of lecturers replicating uncritically the ways in which they were taught, rather than having an understanding of theories of learning and their implications for pedagogy (Light and Cox, 2001).

The most common folk notion that many lecturers, and students, in higher education adopt is a ‘transmission’ conception of learning. In this perspective, learning is a one-way process of assimilating knowledge from a subject specialist, rather than a ‘dialogic’ process where students develop their understanding of concepts and their relation to other concepts and to fields of practice through debate and reflection (Light and Cox, 2001; Ramsden, 2003).

One problem with the transmission concept is that it overlooks the complex inter-relationship that exists between the organisation, structuring and sequencing of different forms of knowledge into, for example, modules, and the decisions about the learning activities to support people to engage with those modules. Sometimes pedagogic decisions can have the

effect of insulating concepts from one another and sometimes they assist students to *recontextualise* knowledge and skill.

In the case of the former, decisions to teach modules without any explicit reference to their connection to other modules or to periods of practice-based learning tends to reinforce "insular specialisation" amongst students (Young, 1998), that is, knowledge bounded by its mode and context of teaching. This pedagogic approach makes it extremely difficult for students in general and specifically in pharmacy (as students reported in Section 1.5) to see connections to other parts of the curriculum or practice (Young, 1998).



In contrast, pedagogic strategies that assist students to recontextualise the content of modules make it easier for them to appreciate the relation between different modules and periods of practice-based learning. The process of recontextualisation can be supported by both traditional and modern pedagogic approaches.

It is possible, for example, to deliver lectures so they provide students with opportunities to clarify conceptual issues, and to highlight the connections between those issues and the conceptual content of other modules or aspects of pharmaceutical practice. Equally, modern pedagogic approaches, for example, 'team-based learning' (TbL) can also be used on their own or in conjunction with traditional methods, such as, lectures, to support the recontextualisation of pharmaceutical and organisational knowledge and skill (Parmalee et al. 2009). In contrast to problem-based learning (PbL), TbL is both learner-centred and instructor-led. Using a very structured individual and group accountability process, TbL offers small groups an opportunity to work together to solve problems and, in the process, to assess their conceptual development and their individual and collective capabilities to work together.

The hallmark of using both the traditional and modern pedagogic strategy is knowing which teaching strategies support learners to engage with not only with conceptual representations,

but also to draw inferences for pharmaceutical practice from those representations (Guile, 2007). These observations about representation and inference alert us to the one of the main challenges of the move to a recontextualised curricula and pedagogic approach: the development of 'pedagogic content knowledge' (PCK) (Schulman, 2005).

PCK presupposes that lecturers know how elements of the content of the curricula can be arranged for better teaching and what pedagogic approach will support this goal. Good subject-based teaching requires lecturers to consider, on the one hand, which pedagogical techniques will make concepts in their field difficult or easy to learn and, and on the other hand, how to use students' prior knowledge of their field of study as a resource to support the learning process. Hence, PCK is different from the knowledge of a disciplinary expert and also from the general pedagogical knowledge shared by teachers or by bodies such as the Higher Education Academy (HEA) across disciplines.

The notion of PCK may help schools of pharmacy and their employer partners to appreciate the intersection of content and pedagogy in the context of education and professional practice (Schulman, 2005). Instead of viewing content and pedagogy as separate issues, in other words, determined by groups who have responsibility for taking decisions about curriculum content separate from pedagogic practice, it becomes apparent that content and pedagogy are an amalgam of one another. By emphasising the way in which they blend together it becomes possible to consider as interrelated issues:

- how particular aspects of subject matter are organised, adapted, and represented for instruction?
- how to teach concepts so they are comprehensible to others?
- who should be involved in this process?

The answer to the second question cannot be found in the literature about learning and teaching in higher education alone (Evans, Guile and Harris, 2009). That literature is primarily concerned with teaching subjects as part of normal degrees. Pharmacy is concerned, as was noted earlier, with professional formation. Consequently, it has to take

explicit account, as the 2008 White Paper recognises, of the learning that occurs in the workplace.

This entails taking three types of decision about PCK. The first one is described above – the best way is to strike a balance between the use of lectures, seminars, and laboratory work and the use of small group work, simulations and TbL, to assist the learner to comprehend pharmaceutical knowledge and skill. The second decision is how to sequence work-related pedagogic approaches (Miller *et al*, 1990) gradually to assist students to recontextualise aspects of the pharmaceutical curriculum in relation to pharmaceutical practice.

Work-related approaches include the following: a) work shadowing (i.e. following an individual for a sustained period of time); b) work observations (i.e. observing a specialist activity in a time-bound period); c) visits to research, clinical and community settings (i.e. to orientate groups to work culture and practice), and d) visits from representatives of practice settings (industry, hospital, community, primary care to schools of pharmacy (i.e. lectures/case-based presentations to contextualise aspects of pharmaceutical and organisational knowledge and skill in university settings); and e) work placements (i.e. sustained exposure to practice).

Work shadowing, work observations, visits and work placements have been recognised for many years as an iterative continuum rather than a linear sequence of simple to more demanding activities (Miller *et al*, 1990). Take, for example, work shadowing. This could be used in Year 1 of the MPharm to assist students to appreciate the nature of work in a community pharmacy, and in Year 5 to deepen their understanding in the same context of a specific aspect of their chosen career route. Similar differentiated uses are regularly made of the other work-related approaches.

The third decision is how to broaden the range of research experiences offered to learners. Traditionally, schools of pharmacy have offered learners opportunities to develop the skills required to undertake pharmaceutical research in industrial laboratories or laboratories in higher education. In light of the growing number of pharmacists who work in patient-facing contexts, such pharmacists will increasingly need to develop the skills to undertake small-

scale research in these contexts. This will involve, as medical education (primary care) has demonstrated, schools of pharmacy supplementing laboratory research skills with the skills to research patient activity.

For schools of pharmacy to make the above type of decision, it is vital that employers are active partners in discussions about the sequencing of the curriculum (Evans, Guile and Harris, 2009). This does not mean that universities have to surrender their autonomy as regards determining the content of a professional degree, rather it means that there is a shared understanding and therefore negotiation and agreement about the type and level of support can be offered as well as an agreement about the timing and level of that support.

4.3.1. Recommendations

Based on the above analysis, we suggest that schools of pharmacy use:

- The notion of dialogalism to assess how far the current pedagogic methods offer learners an opportunity to build conceptual understanding and the capability to infer the implications of theory for practice.

- The concept of subject pedagogic knowledge to determine which aspects of pharmaceutical and organisational knowledge and skill should be taught through:
  (i) using existing pedagogic strategies, such as, lectures and seminars, to develop conceptual understanding and the capability to infer the implications of theory for practice; and
  (ii) introducing new pedagogic strategies, such as TbL, to enhance the process of skill formation and to position students to make more effective transitions in their chosen field of practice.

- The experience of medical education (primary care) to determine how to supplement the range of research experiences they offer to pharmacy students.

Schools of pharmacy and their employer partners should use:

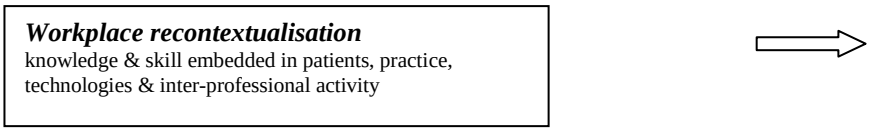
- The spectrum of work-related pedagogic techniques to achieve a good balance between class- and practice-based learning though out the five-year period of professional formation;

Schools of pharmacy and employers should meet in regional clusters to:

- share the outcomes of their review
- agree a joint programme of professional development for university lecturers and "industry educators" (see. 4.4.1.)

4.4. Workplace challenge of enacting the DPP model

Implementing a DPP model of professional formation in pharmacy, as noted earlier, presupposes an even more explicit partnership with employers than exists at present in pharmacy. This is because the DPP model requires students to understand at an earlier stage in their programmes the way in which concepts and/or practices associated with different forms of pharmaceutical and organisational knowledge are embedded in workplace routines and procedures or embodied in people's performances or conditions. Employers will therefore, have to support the process of recontextualisation by, on the one hand, providing more multi-faceted forms of access to research, clinical and community contexts; and, on the other hand, playing an even more active part in the programme of professional formation.



For many years, the use of work-related approaches to support early immersion in practice was treated as an issue of access (Griffiths and Guile, 2004). The plethora of books (Billett, 2003; Boreham *et al*, 2003; Evans *et al*, 2006; Felstead *et al*, 2009; Rainbird *et al*, 2004) that have been published about workplace learning over the last decade, have drawn attention to a number of hitherto overlooked issues.

Firstly, there is importance of experienced professionals in any work context making explicit what is implicit in their use of procedures and in technological artifacts (Boreham *et al*, 2003) in the case of pharmacy, for example, diagnostic devices, compliance packaging. Secondly, there is the importance of employers recognising that all staff who are employed in a managerial capacity should see themselves as having a "conjoined working-teaching role" (Felstead *et al*, 2009) in all aspects of their professional practice (i.e. normal work role and work role supervising work placements), rather than treating teaching as an addition to their normal work role. Thirdly, there is the importance of complementing this formal working-teaching role with a system of coaching and mentoring to offer less experienced members of staff, newcomers and students on work visits/placements opportunities to inquire about aspects of practice that they do not understand or feel under confident about engaging in (Eraut, 2007). Fourthly, the importance of using everyday work settings and bespoke teaching sessions to assist less experienced people understand how disciplinary concepts are embedded in artifacts, practices and people (and by extension patients) (Bakker *et al*, 2007).

There is, therefore, a symbiotic relationship between curriculum, workplace and pedagogic recontextualisation. The challenge in the workplace is to identify the most effective way to work with educational institutions to support students to understand the way in which different aspects of pharmaceutical and organisational knowledge are embedded in workplace routines and procedures or embodied in people's performances or conditions.

One interesting example that has arisen from recent research on programmes of professional formation in the banking, aeronautical engineering, financial services and media industries is the role of the 'industry educator' (Evans, Guile and Harris, 2009). This is a multi-faceted rather than a skill-specific role. It can include the following teaching activities:
(i) organising case studies/presentations about industry that are taught in educational settings;
(ii) supporting experienced professionals in the workplace to enact their working-teaching role when they are being shadowed/responsible for overseeing a work placement;
(iii) supporting students to undertake project assignments during periods of work placement and advising on how employers might contribute to the assessment of projects; and
(iv) acting as a 'first-port-of-call' in person or by email for student concerns etc. In those

industries, such as the media industry, where ‘portfolio’ careers are common, the industry-educator role is a well-established and well-regarded role (Evans, Guile and Harris, 2009).

In the case of pharmacy, it could provide a way for employers to enhance the teacher/practitioner role by establishing a career pathway and, in the process, help to consolidate links between universities and the workplace clinicians who may be involved as tutors/mentors.

Joint education-industry projects and assessment of projects have been a feature of the higher education landscape since the Teaching Company Scheme was first introduced in the 1980s (TCS, 1986). Since that time, education-industry projects and assessment of projects have become a regular feature of the undergraduate and postgraduate curriculum in ‘soft’ and ‘hard’ science subjects. Evaluations consistently show that these arrangements can assist students to, in the terms of this report, recontextualise different forms of knowledge and skill (Senker and Senker, 1994; Billett, forthcoming). Nevertheless, it is also clear from these evaluations and commentaries that joint education-industry projects and assessment of projects are irregular and inconsistent because of a lack of continuity of planning and monitoring between the two partners.

Schools of pharmacy and their employer partners may, therefore, find the role of an industry-educator a helpful and cost-effective way to develop their particular model of a DPP curriculum. The title industry-educator would offer them a way to professionalise and thus raise the status of the ‘boundary-crossing work’ between education and industry that is undertaken by various personnel from industry. This professionalisation of the role may, in the process, provide a more robust way to secure and sustain employer support to design and assess projects.

4.4.1. Recommendations

Based on the above analysis, we suggest that schools of pharmacy use:

The notion of the industry-educator to:

- professionalise the role of boundary-crossing between universities and employers, especially in the case of teacher/practitioners,;
- support employers to develop a conjoined conception of the role of professionals who are shadowed/supervise work placements/project assignments;
- work closely with representatives from schools of pharmacy to decide when to use formative and summative methods to assess students' project assignments;
- liaise with employers to identify suitably experienced staff to assess students' project assignments;

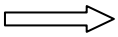
and to:

- agree a joint programme of professional development for university lecturers and industry educators to support the implementation of the DPP model.

4.5. Learner challenge of enacting the DPP model

Up to now the analysis and recommendations have all focused on improving the quality of professional formation for students. In leaving the student (hereafter, learner) to last, we may have inadvertently conveyed the impression that the proposed changes will automatically improve the quality of their learning. This is not the case. As learners engage with the different forms of knowledge and skill they encounter in different contexts (clinical, community, research), participate in the different traditions of thinking, reasoning and acting associate with those contexts, and come to develop their own embodied sense of meaning and use of knowledge and skills in different contexts.

Learner recontextualisation
embodying knowledge & skill by participating in different traditions of thinking, reasoning & acting in clinical, community & research contexts



It is widely recognised that as learners move between contexts they develop generalisations, for example, ideas about the diagnostic and dispensing process, about practice (Beach, 2003). At one level, this is an important, albeit hidden, dimension of learning because it contributes to the development of professional expertise (Beach, 2003) and professional identity (Felstead *et al*, 2009). At another level, it can be counter-productive, because un-articulated personal generalisations may unintentionally distort the nature of practice or even contain some erroneous conclusions about practice.

This process of learner recontextualisation requires support from schools of pharmacy and employers. One way to do so is to incorporate learner generalisations as a resource in the curriculum so as to offer learners opportunities to reflect in both educational and workplace contexts (Boud, 2009). Schools of pharmacy and their employer partners could consider using the following options to achieve this goal:

- one-to-one/group discussions with industry-educators/employer mentors during placements to clarify understanding and to negotiate access to more demanding forms of practice (Evans, Guile and Harris, 2009);
- pre-and post-placement de-briefing in educational contexts to assist learners to make retrospective connections between curriculum content and periods of practice-based learning (Miller *et al*, 1990) and to position them to make prospective connections between periods of practice-based learning and the next phase of their study (Billett, forthcoming);
- encouraging learners to use university resources, such as, access to virtual learning environments and Web 2.0 technology, to create and self-manage their own internet-based group discussions (Oliver, 2008);
- using Year 4 and 5 students as facilitators/mentors pre, during and post placements (an option that is already pedagogic practice in some schools of pharmacy).

The issue of forming generalisations and acting in professionally effective ways is central to the traditional conception of the development of expertise presents it as a single movement from novice to expert (Dreyfuss and Dreyfuss, 1997): a conventional wisdom that appears to be self-evidently true. The DPP model of formation, however, operates with a rather different notion of the development of expertise. From this perspective, expertise is multi-faceted. Firstly, it contains two different forms of knowledge and skill – pharmaceutical and organisational knowledge and skill – and this means that learners' pharmaceutical and organisational knowledge and skill may follow a discontinuous (i.e. one set of skills develop faster than another) rather than a uniform pattern of development. Secondly, the DPP model is designed to assist learners to not only make an informed choice about the direction of their future career, but also to develop the expertise to work with other professionals and customers they will encounter in their chosen field of practice (Sandberg, 2003).

The disbanding of the '4+1' model of formation will go some considerable way to supporting learners to adopt a more holistic view of the development of expertise. The challenge facing the DPP model is, however, to enable learners to acquire a realistic sense of their progress during their five-year programme of formation, and a realistic sense of the next stage of their development.

Schools of pharmacy and their employer partners could address this issues is by devising 'profiles' (Kumar, 2007) for pharmacy that support academic and career progression. Profiles could be designed to contain annual statement of formative and summative achievement, for example, concise summaries of the knowledge and skill that they have gained, and to alert learners to the next set of issues about knowledge and skill that they will have to address as they make their transition into full-time employment.

It has been increasingly recognised over the last decade that the development of identity is critical to learning in general (Lave and Wenger, 1991) and learning in programmes of professional formation in particular (Brown *et al*, 2007). There has been a shift in the debate about identity. In the past, it was seen as an issue of individual choice (Erikson, 1996) and/or social determination (Bourdieu, 2000). Increasingly, identity is understood as being

individually and socially constituted (Holland et al. 2003) and, thus, a more multi-faceted phenomenon (Sen, 2006). The last perspective alerts all parties, that is, learners, employers and universities, involved in programmes of professional education, to their respective roles and responsibilities in supporting the process of learner recontextualisation of knowledge, skill and now identity. The latter should be seen by: (i) schools of pharmacy and employers as an integral part of the design, delivery and assessment of modules and periods of practice-based learning; and, (ii) learners as an integral part of their decision to study pharmacy. This suggests that the development of a pharmaceutical identity should be an explicit feature of all parties' discursive culture about learning, rather than a taken-for-granted feature of formation.

4.5.1. Recommendations

Based on the above analysis, we suggest that schools of pharmacy use:

The notion of reflection as the basis of:

- a joint professional development programme to develop the capabilities of university staff and industry educators to assist pharmacy students to 'connect' class-based and practice-based learning;
- a formative model of assessment for pharmacy students.

The idea of profiles as the basis of:

- a joint professional development programme to develop the capabilities of university staff and industry educators to assist pharmacy students to keep track of their formative and summative learning whilst enrolled on their programme of formation;
- a formative and summative document that pharmacy students use to keep track of their achievements.

The notions of reflection and profile to break new ground by pioneering:

- the first unified initial and continuing formation scheme to assist pharmacy students to make effective transitions to employment and pave the way for them to become lifelong learners.

5. Conclusion

Taken in combination, we feel that the above recommendations offer the pharmacy profession a number of ideas as regards how to:

- prepare pharmacy students to: (i) make more effective transitions into their chosen field of practice because they have developed a broader base of knowledge and skill, and a greater capability to apply that knowledge and skill at the point of recruitment in their chosen field of practice; and, (iii) understand why they need to continue learning throughout their professional lives and why they should support anyone they supervise or mentor to continue their learning;

- justify to Medical Education England that the recommendations outlined above are both education- and employer-led.

The recommendations are, in the case of the former, underpinned by the most up-to-date ideas and evidence from the field of professional, vocational and workplace learning about the most effective curricula and pedagogic strategies to support initial formation; and, in the case of the latter designed to provide employers with recruits who have a: (i) higher level of, and broader experience of, applying pharmaceutical and organisational knowledge and skill; (ii) greater capability to work with all stakeholders and interest groups; and, (iii) greater capacity for entrepreneurial activity in research and patient-focused settings.

6. Impact of the report

6.1. Process of endorsement

The momentum of support for the recommendations contained in the report was gradually built up from January 2010 to January 2011. The MPC, which had accepted the report in full, organised a number of presentations to stakeholder groups for Dr Guile to present the rationale and evidence for the recommendations.

Based on the very positive feedback that surfaced from these meetings and the presentation to Medical Education England (MEE) in March 2010, Professor Anthony Smith and Mr Rob Darracott, Joint Chairs MPC, worked collaboratively with other colleagues between March 2010 and January 2011 to develop a series of practical proposals to implement the principles for reform agreed by the MPC Programme Board and MEE. In parallel to this development, Dr Guile was invited by the General Pharmaceutical Council (the regulatory body for pharmacy) to present the report to its members and they, in turn, were supportive of the principles for reform or recognised the educational case behind the principles

Following receipt of the MPC proposals for reform of pharmacist undergraduate and pre-registration education and training, the MEE Board endorsed Professor Smith and Mr Darracott's final MPC Review Report, The final MPC Review Report, which is based on the principles identified in Dr Guile's evaluation, includes proposals to implement an integrated five-year programme; partnerships between universities and employers; and, appropriate clinical teaching in universities. MEE also endorsed the MPC Board's advice that implementation of the proposals needed to be based on a sustainable funding framework for university teaching and work-based placements unequivocally in April 2011. The MEE Board noted that emerging clinical and public health roles of pharmacists, together with the clear educational case and case for sustainable financial arrangements, provide a strong basis for the MPC proposals.

The final Review Report will be submitted to the Secretary of State, Department of Health, the Department of Business, Industry and Skills (BIS) and the Higher Education Funding Council (HEFCE), as independent advice from MEE shortly. Following receipt of the report, SofS will consider this independent advice from MEE, and working with BIS and HEFCE, develop funding models to implement the proposals contained in the Review Report over the next few months.

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Annexe 1: List of Interviewees

1. Professor Duncan Craig, Head of School of Pharmacy, University of East Anglia
2. Dr Philip Rogers, Director of Undergraduate Studies, Department of Pharmacy and Pharmacology, University of Bath
3. Damian Day, Head of Education and Quality Assurance, Royal Pharmaceutical Society of Great Britain
4. Professor Keith Wilson, Deputy Dean of the School of Life and Health Sciences, Aston University
5. Professor Soraya Dhillon, Head of School of Pharmacy, University of Hertfordshire

Tutors:

6. Susan Sanders, Director, London Pharmacy Education & Training. Organiser/ Facilitator for pre-registration students

Students

7. James Davies, Past President, British Pharmaceutical Students Association
8. Focus group discussion with students from: Bradford, Brighton, East Anglia, Nottingham, University of London, Aston, Leicester, Hertfordshire, Bath

Employers

9. Raminder Sihota, Head of Pharmacy & Healthcare Learning & Development, Boots
10. Julie Sowter, Professional Lead for Pharmacy, University of Leeds
11. Carol Trower, Professional Development Manager, The Co-operative Pharmacy
12. Helen Howe, Chief Pharmacist, Cambridge University Hospitals NHS Foundation Trust
13. Janet Gilbertson, All Wales Principal Pharmacist, Education, Training and Personal Development
14. Rob Darracott, Chief Executive, Company Chemists Association

Annexe 2: Summary of Recontextualisation

Curriculum recontextualisation ⇨

Pharmaceutical Scientific Aspects in Curriculum:
- knowledge and skill embedded in science modules

Key challenge: 'classification' (what is included), 'framing' (how relate to parallel modules and to subsequent modules);

Organisational (i.e. leadership etc) Aspects
- knowledge and skill embedded in modules

Key challenge: are the different aspects embedded' (identified but not assessed), 'part-embedded' (identified and assessed) or 'stand-alone' (taught by itself and assessed)

Pedagogic recontextualisation
decisions about how learning activities support people to engage purposively with modules ⇨

Pharmaceutical Scientific and Organisational Aspects in Curriculum
- learning and teaching facilitating the development of knowledge and skill

Key challenge: pedagogic strategies (i.e. 'transmission' v 'dialogicalism' & general pedagogy v pedagogic content knowledge) & tactics (lectures & seminars/work shadowing/visits/placements)

Workplace recontextualisation
knowledge & skill embedded in patients, practice, technologies & inter-professional activity ⇨

Pharmaceutical Scientific & Organisational Aspects in Practice:
- knowledge and skill as embedded in patients, pharmacy practice and technologies and inter-professional activity (Co, Cl, I, PC)

Key challenge: making the implicit explicit (work as teaching/modelling) (Bakker et al. 2006, /Felstead et al 2009) and learning to infer (sharing reasons) (Guile 2009).

Learner recontextualisation
embodying knowledge & skill by participating in different traditions of thinking, reasoning & acting in clinical, community & research contexts ⇨

Pharmaceutical Scientific & Organisational Aspects in Practice:
- knowledge and skill as embedded in personal, professional and inter-professional practice

Key challenge: developing expertise and identity by learning to make transitions and vary participation (learner/worker/colleague)

Annexe 3: Pharmacy Year 3 Transition Profile – Indicative Example

PHARMACY YEAR 3 TRANSITION PROFILE: INDICATIVE EXAMPLE										ANNEXE
Learning Activites		Organisational Knowledge and Skill					Pharmaceutical Knowledge and Skill			
	Curriculum ? / Pedegogy?	Technical (e.g. Dispensing) Clinical (e.g. Blood Pressure)	Constultation and Communication (e.g. history taking)	Leadership and Team Work (e.g. Negotiation)	Professionalism (e.g Ethics)	Entrepreneurship (e.g. Business development)	Health and Illness	Patients	Patients	Medicines
	Lectures									
	Seminars									
	Practicals									
	Workshops									
	Tutorials									
	Projects									
	Simulation									
	Team-based									
	Learning									
	Shadowing									
	Visits									
	Workplacements									
	Mentors									

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