1   **Title**: **The development of undergraduate pharmacy students as reflective thinkers for the**
2   **evolving field of pharmacy**

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1   **Abstract**

2   **Introduction:** Iterative reflective practice is recognised to support learners' formation of humanism

3   and resilience, facilitating healthy development of professional identity. In one undergraduate pharmacy

4   programme, students experience a series of seminars to develop their understanding and skills in the

5   practice of reflection and its articulation. In Stage (year) 4, students engage in a reflection conference

6   where they present a reflective account of a 'Significant Learning Event' or upon their journey 'From

7   Student to Professional'. Student abstracts for this conference were investigated to explore the nature

8   of reflective practice.

9   **Methods:** The student abstracts submitted for the reflection conference in the academic years 2017-18

10 and 2018-19 were subjected to qualitative manifest and latent content analysis to investigate what and

11 how students chose to reflect. This was supplemented by the ethnographic approach of the researchers,

12 who attended, observed and engaged with students at the event.

13 **Results:** 107 abstracts were submitted across the cohorts. Students reflected mainly upon experiences

14 across a range of extra- and co-curricular activities, and reported significant learning, according to

15 Fink's taxonomy, mainly in the human dimension, caring and learning to learn.

16 **Conclusions:** At the culmination of the reflection educational strand within this programme, students

17 demonstrated purposeful, deliberate introspection and metacognition in their abstracts for the reflection

18 conference. These skills are fundamental to support transformative learning, whereby students have the

19 ability to self-regulate and critique their frames of reference with autonomy and flexibility that will

20 enable them to most effectively engage and benefit from lifelong learning within the profession.

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1 **Introduction**

2 Healthcare educators are tasked with designing and providing opportunities for students to observe,

3 appreciate and engage with activities that demonstrate and facilitate the linkage between the world of

4 practice and the theoretical world of the classroom. Reflection has been identified as crucial element at

5 various points in this learning experience: (i) at the start in anticipation, (ii) during the experience

6 towards managing the array of information and provoked thoughts and feelings, and (iii) following the

7 experience during a phase of debriefing and consolidation.[1]

8 These are known as *conscious reflective activities*, which are purposeful and pervasive towards the

9 reconstruction of a learning experience.[1] In doing so, learners are able to describe their experience,

10 realise their preconceptions and subsequent thoughts and emotions, which might influence their

11 understanding to make sense of new ideas and information. The purpose of reflection has been described

12 to serve two aims: first to develop learning that is focused on conceptual knowledge and understanding

13 and second, consequently, to improve professional practice.[2]

14 A recent commentary called for healthcare educators to find time and space to share their 'stories' of

15 professional practice adopting the activity of reflection. The author noted that sharing stories of

16 challenge, adversity, and successes provides a powerful perspective to training professionals and

17 students about how to approach a situation or failure. Audiences can also benefit from hearing how

18 experiences make people stronger, professionally and personally. Sharing of stories as a framework

19 could provide a personal and authentic perspective to the concepts of grit and resilience that are well

20 researched as essential for successful careers. [3] Many strategies have been adopted by schools of

21 pharmacy within the curriculum, to encourage the knowledge, skills and behaviours underpinning

22 reflective practice towards preparing students appropriately for their life-long practice.[4-7]

23 This study outlines the strategy at one school of pharmacy in England to facilitate and develop the skills

24 and attitudes of pharmacy students that underpin reflective practice across the four years of the

25 undergraduate integrated Master of Pharmacy (MPham) programme. In the final year, there was a

26 student-led reflection conference whose objective was to provide a time and space 'to appreciate and

27 celebrate reflection'. External guest speakers (pharmacy and non-pharmacy practitioners) were invited

to share their stories of a specific experience or of their professional career. Students were also required to submit reflective accounts to be presented at this event. The aim of this study was to explore the topic of the reflection shared by students in their final year of study (Stage 4) and what this meant for their learning and development.

Educational intervention

The reflective practice teaching, learning and assessment has been described using the Guideline for Reporting Evidence-Based Educational Interventions and Teaching (GREET) checklist (Supplementary File 1).[8, 9] An additional item detailing the assessment at each stage has been included. The culmination of this educational strand is a student-led reflection conference, dedicated to the shared appreciation and celebration of reflective practice. Further information about the specific programme, and other strands of teaching and learning are included in previous work. [10-14] Students in Stage 4 were tasked to submit an abstract outlining a reflective piece on either a 'Significant Learning Event' or 'From Student to Professional'. The abstract had to include brief details of the chosen area, why they had chosen to reflect on this and how this will affect their future practice. Students were given flexibility in the format of presentation or delivery of their reflection including audio, audio-visual, visual, or oral format. This approach was adopted to promote the celebratory aim for the event, and encourage the sharing of uncomfortable issues of reflection, e.g. self-doubt, feelings of insecurity, in an honest and open way. This differed from reflective submissions in previous years, which recommended students use a model to guide their reflective writing. It has been suggested that models of reflection that promote uniformity can suppress students' creativity and thinking.[15] Students were informed there was no marking criteria for their submission, instead it was their engagement that was mandatory rather than the quality of the reflection. These abstracts captured the essence of the story that students wanted to share and why they wanted to share it. They served as the substrate in this study to be analysed.

Methods

Abstracts of the cohorts 2017-18 (n=45) and 2018-19 (n=62) were downloaded from the online document submission platform in May 2019. Content analysis was employed to systematically explore

the student-reported experience of learning and development. Abstracts were openly coded through immersion in the data, categories created and abstractions formed, so specific findings could be combined into a larger whole that described the student experience.[16] Qualitative manifest content analysis was used initially to describe what was happening on the surface and easily observable, e.g. what topics/types of experiences the students were reflecting on.[17] This was mapped to the content of the curriculum and labelled as co-curricular (*"generally speaking, co-curricular activities are an extension of the formal learning experiences in a course or academic program"*)[18]*,* or as extra-curricular (*extracurricular activities may be offered or coordinated by a school, but may not be explicitly connected to academic learning"*).[18] An example of a co-curricular activity is clinical placements or experiences that were not provided as part of the formal undergraduate programme, which students had organised for themselves, e.g. during holiday periods. An extra-curricular activity could also be work place experience, but not in an environment that is connected to healthcare, e.g. working in retail. During analysis, the researchers convened to discuss initial thoughts and reactions to the data. It became clear that students were sharing experiences and reflections about what and how they learned and reacted to their experiences. Researchers identified Fink's taxonomy as a useful framework that was then used in the analysis. The taxonomy describes six kinds of significant learning: foundational knowledge; application; integration; human dimension; caring, and learning how to learn.[19] The taxonomy is non-hierarchical, non-linear and acknowledges that the nature of learning can span across the different types simultaneously.   Latent pattern analysis was also adopted, using Fink's taxonomy as a lens, to explore the deeper meaning of the submitted account,[17] i.e. what were the feelings, emotions and motivations behind students selecting these topics/experiences to reflect on. This form of analysis acknowledges the intimate involvement of the researcher in the analytical process where there is co-creation of meaning in the text.[17] This approach of using Fink's taxonomy has been adopted previously to analyse service-learning reflections.[20] .

An ethnographic approach was undertaken through the following steps of data collection and analysis:

- The two researchers [HN and AR] attended the conferences and observed the students in this specific context. The observations and experiences from the conferences provided the

'persistent observation', aligning to the strategy of ethnography, which involves the examination of participants in a specific social situation and understanding the group members' own interpretation of what is happening. [21]

- The two researchers engaged with the students during the presentation of their reflective accounts, asked them questions and experienced students elaborating and bringing their reflections alive. The researchers were able to explore, check and clarify meaning of the reflections with the students.

- The two researchers met after the conferences to discuss and capture initial impressions and observations of the reflection conference in relation to how the students demonstrated their development and learning.

The two researchers then independently analysed the abstracts, and discussed impressions and initial analysis. The two researchers then derived codes and sorted into categories. Where discrepancies in findings and abstractions occurred, a third researcher was consulted who had consensus [AH]. An advantage of this approach is that information is gained directly from the participants rather than imposing *a priori* categories or theoretical perspectives. Lincoln and Guba recommend activities including peer debriefing, member-checking, triangulation, and persistent observation as strategies to enhance credibility.[22] The ethnographic approach employed in data collection did provide the opportunity for elements of these strategies. This meant the researchers began to form interpretations of student learning and development during data collection, which influenced the later approach to latent content analysis of the data. This co-creation of interpretations between the participants (students) and the researchers can be considered to increase the trustworthiness and credibility of the findings presented. It is clear that the findings reported here are inexplicably a culmination of the reading of the abstracts and reflections of the researchers' experiences, observations and interactions with students during the reflection conference. Interestingly, the research team has realised that the undertaking of this study has incorporated many of the facets of reflective practice, including: a description of what has happened; why it has

happened; explained why it is thought to have happened through personal interpretations but also tried to understand this better through the lens of theoretical literature.[23]

This study was submitted for ethical review to the Faculty of Medical Sciences Ethics Committee. Due to the non-invasive research design and non-sensitive research question as judged by the institutional electronic ethical review system, no full review was required and permission was granted to proceed with the study. All students were informed of the study with a participant information sheet and offered the opportunity to opt out through submitting an email to the research team within two weeks of being informed.

Results

In total, 45 and 62 abstracts were downloaded for the 2017-18 and 2018-19 cohorts respectively as no student opted out of the study. There was an even distribution of students (50% each) reflecting upon a 'Significant Learning Event' and their experience 'From Student to Professional'. Most students opted to present their reflections in the form of a poster (n=37) or as a slideshow (n=11). More unconventional presentations included a balloon display, a cake, sculpture, comic book, origami and collages.

Students mainly reflected upon skills, attributes and emotions from a range of experiences as shown in Table 1.

The most prevalent skills featured in the abstracts were: communication; teamwork; time management; organisation and clinical skills. The main attributes resonating from the students' accounts included: confidence, resilience, adaptability; self-motivation and leadership. A large proportion of the student abstracts related experiences that provoked emotions such as: empathy (mainly in relation to interactions with patients); and anxiety; frustration; stress and loneliness (which pertained to reflections about personal development). In reflections on patient interactions, students tended to reflect on some extremes of practice such as dealing with death, suicide, palliative care and mental health. Many students reflected holistically about their experience through the Masters programme rather than focusing on one isolated experience or event, e.g. n=26 student journey, demonstrating their awareness of their learning how to learn. Students often focused on a personal quality, *e.g.* time management,

professionalism, and its longitudinal development or upon their increasing professional identity and appreciation of their future roles and responsibilities, relating most poignantly to the human dimension of Fink's taxonomy. The other main source or contexts of reflection were clinical placements (n=24), where learning about caring and the human dimension were most frequently referenced; and the Stage 4 capstone research project (n=15) where students dedicate a 10-week period to following a line of enquiry from designing a project, undertaking data collection, subsequent data analysis and then completing a written dissertation. Students tended to reflect upon particular challenges and/or achievements involved in this endeavour, or the development of specific skills and attributes, e.g. organisation, independent learning. These aspects of learning link most appropriately to the dimensions of application, integration and awareness of oneself and others (human).

Other curricular teaching and learning experiences were also mentioned (n=7), many of which had a clinical focus and incorporated contact or consultations with patients. Some students reflected upon extra-curricular experiences where they perceived their development or appreciation of specific skills, *e.g.* effective communication, managing conflict that could be applied to their practice as a pharmacist. These stories demonstrated awareness of learning of integration, caring and the human dimension.

Discussion

Students in their last year of undergraduate pharmacy education shared stories about their skills, attributes and emotions, experienced across a range of environments and contexts. The commonality in these situations was often the involvement of patients or the public, and the students' self-derived appreciation (rather than the directed signposting) of those gained, experienced or observed skills, attributes and emotions. Wald *et al.* describe an interactive reflective writing exercise that provides medical students with the opportunity to recognise and grapple with 'disorientating dilemmas' towards emotional development and wellbeing of the student. Authors also describe this process of 'cognitive and affective disequilibrium' may result in threshold moments of intellectual, emotional, and/or moral development, contributing to professional identity construction and new learning as one adjusts their previously held perspectives and assumptions.[24] Students articulated learning related to Fink's forms of significant learning [19]: (in the order of most commonly referenced) the human dimension > caring

> learning how to learn > integration and application > and finally, some foundational knowledge. However, Fink also highlights the interactive, synergistic nature of his proposed taxonomy, where each type of learning is related to the other kinds of learning, and in achieving one form simultaneously facilitates the potential of other types being achieved.[19] This suggests that the experiences shared by students offer insight into a spectrum of their learning. There appears to be a richness to appreciate and recognise that is often ignored, and undervalued in conventional training and assessment.

A large proportion of the stories pertained to experiences that could be classified as co-curricular*",* with a few classified as extra-curricular.[18] Vos *et al.* posit the benefits of co-curricular activities including the enhancement of classroom learning and facilitation of well-rounded learners. Co-curricular activities, in their inherent diversity and flexibility, offer the opportunity for students to de-compartmentalise their foundational learning, reflect on and critically assess their fundamental knowledge and link to real-world contexts and practice.[25] These situations call for learners to draw upon facets across Fink's taxonomy, thereby enhancing the holistic significant learning potential. Clinical experiences have been reported and valued as an opportunity for students to assess what they know, and how they can apply that to real life. This exercise is reflection-in-action, as students are compelled to decide how much, and in what way they can interact with the environment, and realise their need for learning and development in the process.[26]

The insight gained in this study, demonstrates that engagement in the student-led reflection conference provides students the opportunity to deliberately engage in a process of critical self-reflection and re-evaluation of an experience, that is often perceived as disorientating, which, as stated by Mezirow, requires significant metacognitive and introspective effort. In doing so, learners are developing the skills to become autonomous, active and responsible thinkers.[27] These qualities have been theorised by Mezirow as crucial in achieving transformative learning, whereby individuals, when introduced to new information, learn to identify and challenge the validity of their *frames of reference* (or ingrained assumptions), successfully assimilate this information into existing knowledge and beliefs, which may provide a basis for improved decisions and choices in professional and clinical practice.[27]

Lonie *et al.* emphasises that the rapidly evolving landscape of pharmacy professional practice highlights the need for pharmacy graduates to develop skills of introspection and autonomy in thinking to thrive and navigate the challenging terrain of their future professional careers.[28] Authors also suggest strategies to enhance the potential of achieving transformative learning through educational interventions. One such technique is to 'lead students towards self-reflection'.[28] Self-reflection in writing has also been acknowledged to develop emotional intelligence competency of enhancing emotional self-awareness and accurate self-assessment.[29] This method most closely describes the strategy employed with the student-led reflection conference presented here, where students are encouraged to describe and reflect upon a significant event or experience, articulate what made it meaningful and how that could impact future practice. In doing so, Lonie *et al.* suggests that learners are developing the skills of cognitive flexibility and resilience to better manage the shifts being observed within professional practice and the wider healthcare system.[28]

This work evidences that an informal and creative event can be a feasible strategy for students to engage, demonstrate and participate in reflection that is not driven by curricular structure, assessment or criteria. Healthcare training is challenging for students; rigid in its construction and assessment as it is standardised to meet the accreditation criteria set out by the professional bodies. Students are often left with little space to be creative and free in their expression. This could be curtailing some potential to develop skills in true introspection and autonomy in thinking, as the extent of learning and development from an experience is restricted within the bounds of conventional forms and structures of formative and summative assessments.

The study is limited by the contextualised nature of the undergraduate programme and specific experience of the reflection conference. However, the qualitative approach adopted has aimed to provide a rich insight of the learning and experiences of undergraduate students that can be shared through stories and multimedia in a creative, informal conference event. To further understand the student perceptions of the event, follow-up inquiry would be required and is intended for future iterations of the conference.

Conclusions

An educational strategy has been designed and delivered to develop student skills and practice around reflection across a four year undergraduate programme. The culmination of this, a student-led reflection conference, dedicates time and space to appreciate and showcase deliberate thinking about a learning event or experience for the purpose of further knowledge and learning development. Students across two academic cohorts actively engaged with this formative event, sharing stories from mainly co- or extra-curricular activities. Students demonstrate significant learning across Fink's taxonomy, with the areas of the human dimension, caring, and learning how to learn most widely articulated. This educational event appears to promote and provide the opportunity for students to engage in a significant experience of introspection and metacognition which are key prerequisites to support transformative learning, thereby supporting students in becoming resilient and adaptable thinkers in the ever-changing field of pharmacy.

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Table 1. The nature, type of experiences and examples shared by students in their reflection abstracts

Experience/context of reflection	Example activity and example excerpt from an abstract	Example skills/attributes	Nature of experience/context	Number of reflections of this nature (n=107)
Clinical practice	Undertaking physical assessment of a simulated patient *'I have learnt skills which I value… I will really need them so I can do the best for my patients'*	Clinical skills; confidence	Co-curricular	1
Pre-registration application	*'I was juggling everything…but it was about my future so I was really disciplined'*	Organisation	Extra-curricular	1
Hobby/pastime	Team sports *'It's the joint goal that brings us together…it is so applicable in healthcare, when it is all about the patients…we should work like the team.'*	Teamwork	Extra-curricular	2
Personal emotion: empathy	Undertaking a workshop on the importance of empathy *'I did not focus on the patient as a whole…I needed to be more compassionate and less focused on the medication'*	Communication; adaptability	Co-curricular	2
Multi-disciplinary team (MDT)	Observing a MDT discussion *'I hadn't really tried to see hierarchy in healthcare before…it made me proud to see that I will have the opportunity to work with such teams to help people.'*	Communication; teamwork; confidence	Co-curricular	2
Assessment	Performance at summative or formative assessment	Organisation; time management; confidence; self-motivation	Curricular	2

Patient-Healthcare practitioner interaction	*'…the signposting part was probably most important for the patient. I hadn't realised that part of the role could be so important. The pharmacist was able to work out what was important to the patient at that time.'*	Communication; confidence	Co-curricular	3
Transition between Universities	*'…it disrupted everything…disorientated…It has taken a lot of effort and support…It has just made me really aware now when I talk to others about their experiences'*	Resilience; adaptability	Extra-curricular	3
Personal experience	Managing conflict *'managing an angry patient was really challenging…I tried to remain positive and respectful…I suggested privacy in the consultation room… the professional approach helped calm the situation.'*	Communication; confidence	Extra-curricular	5
Personal quality	*'taught me to be resilient and adaptable…I am proud to have acquired…'* [from the degree]	Leadership; organisation; resilience	Co-curricular	6
MPharm Teaching & learning experience	Clinical skills seminar *'…I appreciate the fragility of the human body and the strain caused by illness and medication…I understand how my approach needs to be sensitive and patient-focussed.'*	Communication; teamwork; time management; resilience	Curricular	7
Work experience	Jobs in retail or customer service *'…like the training. We have to keep up to date with the training to do the job in the warehouse or we would be breach of the terms but also not know up-to-date practice. I can see it applies*	Communication; organisation	Extra-curricular	8

	to pharmacists and how they are expected to do CPD.'			
MPharm Thesis	Research skills development *'the project challenged my organisational skills and time management'*	Time management; self-motivation	Curricular	15
Clinical placement	Observing pharmacists in practice *'...it's important to remember they* [patients] *are still human. It's important to remember that we can take an extra moment to get know our patients.'*	Communication	Co-curricular	24
Student journey	Joining the undergraduate programme and developing professional identity *'...I used to be complacent about my learning and development...I learnt I had to engage better, more efficiently and effectively... I grew and developed my approach.'*	Confidence; self-motivation	Curricular/co-curricular/extra-curricular	26