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Understanding students' experiences of professionalism learning: a 'threshold' approach

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Understanding students' experiences of professionalism learning: a 'threshold' approach

Abstract

Professionalism is a core element of curricula in many disciplines but can be difficult to teach and learn. This study used audio-diary methodology to identify professionalism threshold concepts in a small group learning setting in undergraduate medicine and to understand factors that might facilitate students to 'get' such concepts. 15 students and 7 tutors kept audio diaries over two terms. Data were analysed qualitatively for content. The key themes were then cross referenced to threshold concept criteria (for example where language indicated that learning was troublesome, integrative or transformative). Seven potential threshold concepts were identified which centred on students' developing professional identities including working with uncertainty, considering the bigger picture, not needing to know everything and professional culture. Reflection on workplace experiences within a small group helped students 'get' these concepts. The study concludes that threshold concepts and audio-diaries are useful tools for understanding lived experiences of professionalism learning.

Introduction

Professionalism learning

Professionalism is increasingly becoming a focus of teaching and learning for higher education programmes as they prepare graduates for the world of work, supporting them to become ethical and reflective professionals, able to apply and adapt theory and skills to complex workplace settings (Trede, Macklin, and Bridges 2012). There is ongoing debate about the definition of professionalism, yet broad agreement that it is a complex, multi-dimensional and dynamic concept. For example, professionalism can encompass attitudes and aspirations in addition to knowledge and reasoning (Heggen, and Terum 2013), have individual, inter-personal and societal dimensions (Hodges et al. 2011) and usually involves being part of a professional community (Wilson et al. 2013).

Professions as diverse as engineering, the police, human resources and health are critically reviewing and researching how students learn about professionalism and how they can be supported to develop their professional identities: to think, feel and become a professional within a community of practice (e.g. Bradbury et al. 2015; Cruess et al. 2015). The emergent,

complex and contextual nature of professionalism learning is increasingly being recognised, as is its potential as a transformational, life changing process rather than simply involving the acquisition of knowledge and skills (Wilson et al. 2013). Recent literature suggests that meaningful professionalism learning and professional identity development can be fostered by authentic experiences in and around the workplace (Reich, Rooney, and Boud 2015, Wilson et al. 2013) and by providing opportunities for guided, critical reflection on such experiences (Mann 2009; Webster-Wright 2009; Trede, Macklin, and Bridges 2012). Moreover, where curricula provide opportunities for students to reflect on experiences which challenge or disrupt their worldviews and to share and to discuss their reflections with peers, this can lead to “*more powerful and generative understandings*” (Ryan and Carmichael 2015). Coherence, the ability to link theory and practice and see the practical relevance of learning, particularly when developed through interactions with peers and teachers, can be key to fostering students’ identification with their profession (Heggen and Terum 2013).

One way curricula can achieve many of the goals above is through facilitated small group learning, where students reflect on their experiences with peers, are encouraged to consider issues from multiple perspectives and challenged to consider things more deeply (Platzer 2000; Kahn 2013). This can result in more sophisticated and embodied understandings of professionalism (Monrouxe, Rees, and Hu 2011). Yet exactly how small group learning impacts on students’ professionalism development and identity is under-researched; we know very little about students’ lived experiences of such learning, including which professionalism concepts are troublesome and transformative and which elements of the small group setting facilitate shifts in student understandings.

Threshold concepts

There is growing interest, across the disciplines, in the idea that within each subject there exist significant ‘threshold concepts’ which once understood, can lead to “*new and previously inaccessible ways of thinking about something*” (Meyer and Land 2003, 1). While ‘core’ or ‘key’ concepts describe the broad ideas that form the building blocks of a curriculum, threshold concepts are defined as being transformative, integrative, irreversible and bounded (Meyer and Land 2003). They are transformative in that they change a learner’s way of being in, or knowing, the world. They are integrative, enabling learners to integrate different aspects of the subject and

see connections that were hitherto hidden from view (Cousin 2006), often an ‘aha’ moment. They are irreversible: once understood they are hard to forget or unlearn. In addition, threshold concepts are said to be bounded and delineated from other concepts.

Significantly threshold concepts are likely to involve troublesome knowledge that can initially seem alien, conceptually difficult or counter-intuitive (Perkins 2006). This may feel uncomfortable and unsettling, leading students to become stuck, avoid a topic or just give up. While students grapple with their learning around a threshold concept, they are said to occupy an unstable ‘liminal space’, where they may “*oscillate between old and emergent understandings*” (Cousin 2006, 4). Understanding where threshold concepts feature in the curriculum can help teachers recognise where learning is troublesome and assist them in providing appropriate time and activities to support learners more effectively (Cousin 2006).

The international literature on threshold concepts focused initially on ‘hard’ disciplines rooted in the scientific paradigm (Kuhn 1962) such as mathematics, science and economics (Atherton, Hadfield, and Meyers 2008). More recently researchers have explored threshold concepts in ‘softer’ disciplines (Matthew and Pritchard 2009), including those that relate to professional practice and the development of professional identity (e.g. Clouder 2005, Martindale 2015; Cove, McAdam, and McGonigal 2008; Parker 2013). Diverse methods have been used across disciplines to identify threshold concepts (Barradell 2013). Research however, often studied these concepts from the perspective of teachers rather than students. In order to better understand the troublesome and transformative nature of threshold concepts in professionalism, we also wanted to understand “*how they are experienced by students*” (Entwistle, 2008, p32).

Aims

The aims of this study were to

- 1) explore threshold concepts associated with professionalism
- 2) identify factors that might enable students to ‘get’ such concepts

A further objective was to contribute to the emerging literature on threshold concepts

The study context

This study took place in an experiential, small group learning context in a UK medical school which operates an integrated, spiral curriculum (Harden 1999). Disciplinary themes are woven through the five year programme. Much of students' learning about professionalism and the human aspects of medicine takes place in 2 hour, clinician facilitated, 'Jigsaw' groups of 8-10 students, which run throughout the 5 year undergraduate programme. Students attend clinical placements from the start of their course. In Year 1 and 2 these are mainly in community and primary care settings. From Year 3 onwards, many placements are in hospitals. In Jigsaw sessions, students share and reflect on their placement and life experiences and are encouraged to apply new learning to their future roles as health professionals.

Our small group tutors report that while some students find professional concepts hard to grasp and struggle to see their relevance to the daily world of doing medicine, others find them life changing. We wondered whether taking a threshold concepts lens to our setting might shed new light on how this learning is experienced. This could assist us in better supporting students' learning and have implications for learning about professionalism in the wider healthcare education context and beyond.

Study Methods

Design and rationale

A naturalistic method of enquiry was considered most suitable for gaining insights into students' everyday experiences of learning in Jigsaws and for identifying possible threshold concepts. As learning takes place in and outside the class room over time and is consolidated in small groups, it can be unpredictable and difficult to research using quantitative methods. Qualitative interviews and observations were deemed inappropriate due to practical constraints. Audio diary methodology has not previously been used to research threshold concepts but was considered to be well matched to the project. Described as "an underused but *powerful tool for researchers interested in narrative enquiry*"; its *discursive think-aloud process* enables participants to tell their stories straight after the moment, offering new insights into how they make sense of the world (Monrouxe 2009, 99, 100).

The study took part in 3 phases: firstly, data collection via audio diaries; secondly a respondent validation exercise towards the end of the study and thirdly a triangulation of data

from phase 1 and 2 to negotiate a ‘best fitting’ analytical framework from which to draw conclusions. Ethical approval was obtained from the University Research Ethics Committee.

Participants and recruitment

22 individuals took part in phase 1 of the study across all 5 years of the programme (Table 1): 16 students (9 female, 7 male) and 6 small group tutors (3 female, 3 male).

[Table 1 near here].

Of these, 9 participants (6 students and 3 tutors) took part in phase 2.

Students were recruited via an announcement on the Medical School intranet. Tutors were invited by email. Student participants were offered no remuneration for participating. Tutors were offered payment to cover their expenses. Participants were provided with detailed information about the project and all gave written consent.

Phase 1: Audio-diaries

Following an initial orientation session participants downloaded a voice recording app on their smart phones and, from October 2013 - April 2014, were asked to keep audio diaries after each Jigsaw session, reflecting on specific learning moments and uploading their reflections to a secure storage cloud facility. Specific instructions about ‘what to record’ can be seen in Table 2.

[Table 2 near here].

Phase 1. Analysis

The data from the smart phone reflections was downloaded, transcribed and imported into the qualitative data analysis package NVivo Version 8 (QSR International Pty Ltd, Doncaster, Vic, Australia). Using NVivo as a data management tool, the data was coded in two ways: firstly, into conceptual (content based) themes. Secondly (see Table 3 below), according to core threshold concept criteria (Meyer and Land 2003). At the end of phase 1, a thematic matrix was produced,

cross referencing data relating to the conceptual themes with data meeting the threshold concept criteria.

Phase 2. Respondent validation

Discussion groups with both student and tutor participants were used to explore the phase 1 findings and to investigate the extent to which the concepts identified were considered 'irreversible'. During these sessions the notion of threshold concepts was introduced and discussed and participants were given their own diary transcripts to read. Participants were then shown a visual map of concepts identified in phase 1 and asked to consider whether any of these resonated or made sense to them as threshold concepts. They were also asked to share any other possible threshold concepts they had come across in their Jigsaw groups. Questions were asked to probe for possible enabling factors. The discussions were audio recorded and transcribed.

Phase 2 analysis

As with phase 1, the transcribed data was coded by conceptual theme and by threshold criteria and cross referenced using NVivo.

Phase 3. Identifying threshold concepts

The data from phases 1 and 2 were imported to a refined analytical framework developed by three researchers (TC, HN, HL) who looked independently at the data and met regularly to share their interpretations and negotiate the emerging conceptual framework. Notably, in keeping with qualitative tradition, the themes were coded using students' own language. Therefore the potential concepts we describe have emerged from this, rather than from the language used to describe concepts in the disciplinary literature. Core principles in the analysis were consensus, incorporating participants' words and checking the analysis for disciplinary bias.

There was little evidence of irreversibility in the 'straight after the moment' diary data and little evidence of boundedness in either data set. To identify which conceptual themes stood out as possible thresholds, we identified those that met all four remaining criteria (transformative, integrative, troublesome, liminal) in the diary data and those that met these four criteria and irreversibility in the group data. Conceptual themes identified as possibly threshold in both Phase 1 and 2 were deemed to be the most likely threshold concepts overall.

Findings

72 recordings audio-diary recordings were received, 53 recordings were from students (mean 3.3 recordings/student; range 1-6). 19 were from tutors (mean 3.2 recordings/tutor; range 1-7).

Individual participants' recording frequency varied throughout the study. There was no significant fall off in recording rate as the study progressed. Analysis of student and tutor reflections showed that they frequently used language indicating that threshold concept criteria had been met (Table 3).

Commented [h1]: Comment on fall off or just variable throughout once Helen has checked. E.g. or "there was variability in the recording frequency of participants with some fall off as the project progressed"

[Table 3 near here].

The following seven conceptual themes stood out in this study as being possible threshold concepts related to professionalism in both the audio-diaries and respondent groups. The description of each concept draws on the language used by students in the study. We illustrate each concept with quotes that demonstrate their threshold nature.

Threshold 1: There is a professional culture and I am becoming part of it

This refers to the student's own socialisation into the profession of medicine, to the nuanced way in which this profession operates, an awareness of its style and practice and an awakening to the profession's socially constructed nature. Students referred to codes of behaviour and dress, hierarchies and professional ways of thinking.

Doctors, don't have strict uniforms, we dress smartly but in comparison to nurses for example, who wear scrubs or given uniforms, doctors tend to wear suits or any smart, slash casual clothes, I wondered whether there was sort of a doctor culture. (Rebecca, Year 3 student; diary; liminal)

I have to make sure that my face is very neutral and my, you know, my posture and my whole body language is very neutral...Um, and that I found quite difficult... and I found myself, um, struggling to keep myself composed and not really say out loud, or put in any way in my body language the things that I was thinking. (Megan, Year 2 student; diary; troublesome)

Several students described a discomfort as they reflected on the transformation ‘into a doctor’ and described struggles with personal identity, the power implicit in healthcare systems, the weight of responsibility that doctors carry and with the act of separation between patient and doctor.

... And I realised that we're slowly, gradually over the years becoming more and more sort of mature in our attitude, and for lack of a better phrase, almost like a doctor, we were actually becoming more like them, um, whether for better or worse, um, ... not sure. (Simon, Year 3 student; diary; troublesome & liminal)

The transformative stage appears to mark an acceptance of some kind although it is unclear whether this acceptance is a passive or critical one.

I remember walking home and thinking oh what have I got myself signed up for basically, like I'll always have to be the moral one in a situationand kind of you sign up with medicine without really understanding that's, or really appreciating that that's what's going to be you for the rest of your life. (Louis, Year 1 Student; group; liminal)

I had that kind of realisation, [that] actually no that's a culture of medicine thing rather than a general public cultural sort of thing to talk about. (Hadim Year 2 student; group; transformative)

Threshold 2: Consider the whole person

This concept was often described by students as an integration of many strands of learning. It often led students to question the primacy of a narrow (in this case, biomedical) approach and the importance of considering wider social and person-centred perspectives. Indeed for a number of students this appeared to significantly shift their understanding of health.

Basically it changed my view from being a very scientific and very logical point of view and it made me realise there's a completely different aspect to health that I probably, I hadn't really appreciated beforehand. And, um, it provoked thought that...I...will challenge the view of health to other people, and I won't just say 'okay there's nothing biologically or physically wrong with you' and you also have to take a completely different aspect and you have to look at their side and their views (Will, Year 1 student; diary; transformative)

Some students found this concept difficult and took time to fully ‘get it’

... quite a lot of medicine is just about noticing things, about observing people ... So, I think I'm just kind of realising how important that is, and that there's a whole different level to conversations (Hadim, Year 2 student; diary; liminal)

As suggested by Will above, those who ‘got it’ referred in their diary entries to there being more to the practice of medicine than just the clinical application of biomedical science.

It gives you a different viewpoint on the ways that you are a doctor, you're not just medically going to treat them, it's also about your personality and your relationship with the patient as well. Um, it's just another angle of the approach in the way that you see a patient and that's what the first couple of sessions have kind of made me realise instead of you're just treating a patient purely by their symptoms, it's actually the whole, that encompasses what a patient is and what a patient means to you and what you mean to the patient as well as doctor. (Will, Year 1 student; diary; integrative & transformative)

... and this has led me to realise the importance of practising medicine as an art, as well as a science" (Evie, Year 1 student; group; transformative)

Threshold 3. I don't need to know everything

Here, participants referred to ideas such as it being acceptable for a professional not to know as long as they are willing to learn, to ‘not being alone’ and that ‘everyone struggles’.

The doctor didn't know the answer to a question the patient had asked, but assured her that he was going to find out, and you know instead of looking horrified ... she seemed relieved that he was actually being honest with her. Then at my placement ... the GP there had also admitted that he didn't know the answer to a question and then went on to research it with the patient....So I think this is something else that has made me change the way I sort of see things. (Jessica, Year 2 student; diary; transformative)

Don't feel stupid, nothing is, you know, a stupid question when it comes to patient safety... ..one of the things I realised that if you know definitely speak up, but if you don't know, don't feel stupid to ask because, you know, these things are important (Annie, Year 5 student; group; transformative)

Some students found this troublesome because their previous education had instilled into them that they should know the answers.

Whilst I know it's not a weakness to ask for help, it feels like a, almost a failure on a part, and as medics a lot of us will be so driven to avoid failure and be so scared of it that that acceptance of being in a team and again not knowing things but it's ok in the sense of you can ask your colleagues, is something that I haven't really come across... ..so I guess that's something I've still got to come. (Hadim, Year 2 student; group; troublesome)

Threshold 4: Consider the bigger picture

This concept refers to the shift from thinking about their future profession in individualistic terms to acknowledging the structural forces that impact on medicine and on the role doctors may play in this wider arena. Participants referred to resource allocation, the difficulties of balancing the needs of an individual with those of a population, inequalities in health and that medicine is a small part of a bigger picture.

You can't give all the best medicine to just one patient, you've got to step back and then treat everyone..... I think there must be different lectures at different times that actually come back to the same point, getting me thinking of it and then finally ingrained in my mind. (Elaine, Year 4 student; group; integrative & irreversible)

It's just given me like the big picture of how government levels and international politics and economics level affect what we do, and we are just a very small part of this entire thing that's going round so it sort of I had like a shock moment. It's one of those moments where in an aeroplane you look down and realise how little we are, that was how I felt. (Evie, Year 1 student; group; integrative & transformative)

I'm not sure when (the) aha moment was, so before that to me, I have a patient I'm going to treat it [sic] properly, so a hundred percent for one patient, but now I wouldn't do that so I would see the whole picture instead of just one patient. (Elaine, Year 4 student; group; transformative)

The implications of this could be troubling, for example how to address different patients' needs fairly in practice:

I was a little bit confused as to how a health care professional is supposed to decide when to shorten or lengthen appointments, you know, are there particular types of patients that you wouldn't rush with, even if the appointment is running over its allocated slot, because you know, if that's the case does that mean that low risk patients are essentially disadvantaged So I think that's one of the examples of something that I found quite difficult to understand. (Jessica, Year 2 student; diary; troublesome)

Threshold 5: We have to work with uncertainty

Many students described a gradual, or sudden, recognition that there is no 'no single solution'. Students referred to their being no such thing as a straightforward consultation: that the commonly held perception of 'simply providing pills and patients getting better' is often a fiction. They also highlighted how 'risks and benefits might conflict' and that the 'real world is more complex than the academic'.

Towards the end of it (GP placement) more recently, I would have started to realise that you know, this is a big element of general practice and that it's going to be important for me to work out a) where, where medicine can be black and white, but more importantly it could be where it is so difficult to get to a specific answer and how it's going to be important for me to explain that to my patients. (Hadim, Year 2 student; group; transformative)

Some students struggled with this:

I can understand and appreciate that it should, you should know that there is a whole load of grey area and it is quite complex, but just me personally I don't think I fully accepted that yet. (Jessica, Year 2 student; group; liminal)

I think the group struggles with the idea that there are not always absolute answers, they want to give patients absolute answers. (Aisha Year 2 tutor; diary; troublesome)

Some students realised that patients might also struggle with the notion of uncertainty

And that's what I've come to learn in the past few weeks really. That medicine is much more of a grey area... ..It just suddenly clicked with me that the patient, the population might see medicine as very black and white subject, that you give the drug, it helps, you carry on taking the drug... ..and trying to then explain that to the patient can be difficult. (Joseph, Year 3 student; diary; transformative)

Threshold 6: People have different expectations

Threshold 3 refers both to the realisation that people have expectations of their health care professionals and that these may be unpredictable. This concept appears to represent a profound shift in the way students and facilitators see themselves in relation to the people they are caring for.

It sounds silly as you say, but when I started doing my placement and shadowing GPs, I start realising that different people can have very different expectations of what doctors can actually do, and that was something that had never crossed my mind before I started. (Evie, Year 1 student; group; transformative)

I had a postgraduate ah ha moment about that, which is what we think the patient's expectations are and what the patient's expectations actually are, they're often very different and an awful lot of what happens in medicine is because we think we know what patients want us to do. (Rob, Year 5 tutor; group; integrative)

Students highlighted the expectation placed upon health professionals to 'get everything right', but also realised that patients often do not expect the doctor to know it all.

There might be a tendency to almost put our own expectations of ourselves under the name of patient expectations, um so like D was saying where you find that actually the patient's expectation of you probably aren't as crazy high as you expect it to be..... I think I understood

that only when I realised how many patients were ok with the idea of doctors not knowing things.
(Jessica, Year 2 student; group; transformative)

Threshold 7: Emotional intelligence

Threshold 7 refers to the emotional elements of being a health professional and understanding how it is to be a patient. It includes empathy, managing emotions, kindness and being non-judgemental

In Jigsaw we talked about what we've learned and we process our emotions of what we've seen in placement, and that has, that means we reflect on what we've learned, and it will probably make us more emotionally intelligent for that reason, because we can then realise how other people empathise with patients, and how we feel in certain situations. (Evie, Year 1 student; diary; liminal & integrative)

A little bit of kindness is worth a bucketful of medicines, and everybody, the whole of group stopped and thought about that...you know the medicines were being jigged around to try and improve things, but the whole group sort of just, you could almost hear them draw breath.
(Andrew, Year 4 tutor; group; transformative)

There was evidence that some students struggled with the idea of empathy

I do feel that this maybe lack of empathy is troubling because I only hear my, constantly told was like empathy, empathy, empathy, which is kind of fair enough and I don't have that yet. (Louis Year 1 student; group; troublesome)

Factors that might enable students to pass through thresholds

We identified a number of themes related to the learning setting which appeared to facilitate transformation and enable students to explore troublesome areas and emotions. The safety of the small group setting appeared to be key:

I think more than anything else now Jigsaw is just becoming a safe place to talk about things kind of unhindered and nobody really minds what everyone else says too much or they feel comfortable enough challenging. (Hadim, Year 2 student; diary)

The opportunity for learners to reflect and discuss issues in a group and to consider different perspectives was also important:

It was a really good session... .Once we discussed everything through, it actually became quite clear that even though we've got lots of people, even though the same things were being said, we still had different opinions on what was the main point of each story, so that's what I took from it ((Will, Year 1 student; diary)

I'm just wondering if it's perhaps often, when you actually get the aha moment is when you see things in a different way, and taking that a step further maybe it's to do with seeing it in a different medium, you know be it visual, be it written down, but something that you haven't looked at that issue in that way before. (Andrew, Year 4 tutor; group)

Particularly important was 'understanding the relevance of their learning', for example by relating to workplace experiences and scenarios.

One girl in particular, um talked about the concept of medical unexplained symptoms and it appeared that she hadn't really hadn't really appreciated it before, but now we'd talked about it, she relayed some of her experiences in general practice, and now realised that the patient had medically unexplained symptoms, and the GP had dealt with them very well (Rosie, Year 3 tutor; diary)

It's only when you apply it to a real case or a real life scenario like I did in my Jigsaw and my GP placement that you really see the relevance" (Jessica, Year 2 student; diary)

Prompts from the facilitator helped students:

We saw it as something more clear cut... .which, then, um, prompted the tutor to say that actually medicine isn't as black and white as the public think, or can think it is, and that it's actually more of a grey area. And it was on him mentioning that, that I realised how true that statement was and how I hadn't really considered it. (Joseph, Year 3 student; diary)

Conceptual models and frameworks were mentioned as integrating and giving shape to difficult, woolly or opaque ideas:

This small group session we discussed the giving and receiving of feedback and how important it is in our daily lives, it had some aha moments in it in terms of the different models that people use, and when you finally realise that they are using these models it is very obvious in certain feedback situations. (Carla, Year 4 student; diary)

It was also clear from students' reflections that crossing the threshold often took time, multiple and different experiences:

I think it's like a slowly, slow change, it's not like a sudden, but I think it does, it's a combination of PBL (problem based learning) and Jigsaw I reckon, I say talking about my placement in Jigsaw and in PBL. (Evie, Year 1 student; group)

My first example is something that we actually discussed about in a previous Jigsaw session, but it was reaffirmed in this one. (Jessica, Year 2 student; diary)

Discussion

Principle findings

The aim of this project was to identify threshold concepts related to professionalism and to explore what might enable this learning. The findings are important as there has been little research into students' lived experiences of professionalism learning, yet professionalism is an important element of learning in a wide range of professions and can be difficult to learn. While this study took place in a medical education context, the concepts identified and the enabling factors are likely to have broader relevance to the teaching and learning of professionalism in other subjects. In addition the use of audio-diaries as a new methodology for exploring threshold concepts in a range of disciplines may be of interest to researchers across the range of health professions disciplines. There was no significant fall off in diary recordings over time, suggesting that this methodology was well received by participants. It would be interesting however, in a future study, to explore participants' experiences of keeping audio-diaries. It may also be that such diaries, used to reflect on troublesome and threshold learning, could offer different benefits.

For example they could be useful as reflective or evaluative tools for health profession students or tutors.

It may be that audio diaries, used in this way, could offer other, different benefits. For example they could be useful as reflective or evaluative tools for health profession students or tutors.

The seven most likely threshold concepts identified related to students' developing professional identities, demonstrating that students, within their small group Jigsaw sessions, were learning to think like a practitioner. Students regularly experienced trouble in grasping these concepts. For some students, reaching transformed understandings took considerable time and multiple learning experiences. In line with Heggen and Terum's work on coherence (2013), linking theory to the workplace and seeing the relevance of learning to real life and to their workplace experiences and future roles helped students to cross thresholds. Students were also helped, as anticipated by the literature on meaningful professionalism learning (Wilson et al. 2013) and professional identity formation (Ryan and Carmichael 2015), by the opportunity to share and discuss their reflections with peers in supportive, small groups. As this was a qualitative study we are unable to comment on the rate at which threshold moments occur in Jigsaws. However in this study, the concept most frequently mentioned was that of working with uncertainty.

Strengths and limitations

Much research into threshold concepts has focused on the teachers' perspective, so a particular strength of this study was that it provided insights into how thresholds "*are experienced by students*" (Entwhistle 2008, 32) as well as what was seen and heard by their tutors. The use of smart phones to record audio-diary reflections straight after Jigsaw sessions proved easy for participants and also helped us investigate threshold concepts while students were still grappling with them (Zander 2008). This 'straight after the moment' approach minimised the risks of hindsight bias and "*the illusion of memory*" (Shinners-Kennedy 2014). Respondent validation groups were helpful in corroborating findings and, as they took place some time after the learning experience, enabled us to identify examples of irreversibility (Zander 2008). Both students and facilitators attended these groups, stimulating dialogue and creating a forum for transactional curriculum enquiry (Cousin 2008).

As all participants were volunteers, the findings may not reflect the experiences of the wider cohort. The study focused on a small group learning setting which is unique to one medical school, so we cannot assume the findings are generalisable to other education settings. By detailing the methodology, however, we hope the reader can assess this. Participants came from all five years of the course. This provided a broad overview of learning within the curriculum but much less information about which thresholds were crossed at different stages of the course. We saw no clear pattern as to which year each concept was grasped. The concepts we identified as likely thresholds were those where data from different participants suggested threshold concept criteria had been met. Because of the nature of this study, a concept may have been transformative for some participants, integrative for others and troublesome for a third. While in some respects, using data from multiple participants strengthens the data, we cannot conclude that any concept met all the criteria for any individual participant.

It was notable that the concepts highlighted by tutors in this research mapped closely to those emerging from student diaries. In general they provided confirmation of the troublesome and transformative concepts in student reflections, rather than adding new or different insights into the learning experience. For this reason we have drawn more on-student quotes in this paper. It was interesting, however, that tutors' involvement in the project, particularly in the focus group discussions, often reminded them of thresholds they themselves had previously. Several reflected on the difference between their students' learning experiences and their own more traditional medical school education. For example one tutor, reflecting on his own experience of "getting" the concept that medicine is not black and white, stated:

"It probably happened in my postgraduate career at some stage, there as a junior doctor who was desperately trying to sort everything, and then it was enormously relieving to realise it was a bit muddy and grey"

The same tutor, reflecting on his students' learning adds

"I look at them and think I'm really glad you've got that now, and don't have to wait all those years I had to wait"

Defining threshold concepts

Commented [HN2]: See what you think. Should we explicitly state that we used tutor quotes less because of this? Should this be in the results section or discussion?

We encountered a number of issues when defining the emerging threshold concepts. We found few examples of boundedness within our data. This may be an artefact of the method used or may relate to the pluralistic explanations of “softer” threshold concepts related to professionalism (Shopkow 2010, 321). Interestingly Meyer and Land’s (2003, 4) definition of threshold concepts is in itself fuzzy, suggesting that they are “*possibly often (though not necessarily always)*” bounded. In addition, as suggested by Cousin (2010) the more interdisciplinary a subject, the more complex this will be. Moreover, ‘how’ and ‘when’ students arrive at these broad understandings may depend on their own experiences. As Andrew suggests:

Now here’s a defibrillator and this is what a defibrillator does and you know, it’s all kind of straightforward, but with the professionalism stuff it’s so kind of personal and depends so much on personal experiences of health, my own and others (Andrew, year 4 tutor; group)

Each of the seven threshold concepts we identified is a cluster of ‘sub-concepts’. For example, the concept ‘we have to work with uncertainty’ incorporates notions such as medicine not being black and white, complexity and the lack of a single solution. We cannot be sure whether these sub-concepts are strands or steps (Shopkow 2010) that students need to integrate in order to ‘get’ the broader concept, or whether they are themselves threshold concepts. The notion of threshold concepts not as isolated concepts but as “*highly interrelated webs or networks of concepts*” (Hokstad and Flanagan 2012) particularly resonates with our findings.

A strength of this study is the relationship between some of our findings and research in other settings. For example, uncertainty has been identified as a possible threshold concept in the context of industrial design and climate change (Osmond and Turner 2010; Hall 2006). ‘People have different expectations’ links to Kirwan’s (2014) proposed threshold concept of ‘service user knowledge’ in relation to social work. Mazella (2011), writing about cultural studies, suggests that the “*rich and complex notion of ‘culture’*” may be a threshold concept, correlating with our finding of professional culture as a possible threshold. There are also parallels between our findings and research in the wider health professions: emotional intelligence links to the threshold concepts of ‘care’ (Clouder 2005) while ‘consider the whole person’ maps onto Wilkinson’s 2015 concept of ‘maternalistic care’ in geriatric medicine as active, holistic and nurturing.

We were initially surprised that most of the threshold concepts did not align neatly with Jigsaw learning outcomes (such as gender, health beliefs and ethical principles) but rather were broad cross-cutting concepts related particularly to ways of thinking and practising. We do not know whether our curriculum topics are not threshold concepts, whether they did not appear in the data due to the small sample size in each year, or whether the Jigsaw setting is not facilitating students to engage with and ‘get’ these.

An essential element of professionalism learning is understanding the human aspects of professionalism (McNair 2005) and considering the perspective of service users. This is often termed ‘patient-centredness’ in healthcare (Greiner and Knebel 2003) and informed by the social and psychological sciences. A striking finding from our study was that student learning from workplace experiences led them to think about being a doctor and how to interact with patients, but they rarely considered how it might *be* to be a patient or service user. This is an area for future development and study. In addition, it would be interesting to explore the relationship between facilitator level and type of input into sessions and student threshold moments.

Commented [HN3]: Not sure about this?

In professions such as law, business and public affairs, as well as in medicine, many students prefer to engage with the more prestigious ‘hard’ science subjects than with ‘softer’ subjects such as professionalism and social sciences, which can seem vague and ill-defined (Litvia and Peters 2008; Birden et al. 2014; Hoberman and Mailick, 1994). The threshold concepts we identified lacked clear edges and this may contribute to the troublesomeness of these concepts for learners. We suggest that grasping the threshold concept of ‘uncertainty’ may be particularly important for students and bring broader benefits, helping them accept and appreciate the less tangible nature of other professionalism concepts. Open boundaries can be helpful; understanding that learning is unfinished can enable learners, over time, to further modify their understanding of concepts (Savin-Baden 2008).

Implications for teaching and learning

Our study suggests that small reflective groups can facilitate transformative learning about professionalism from workplace experiences. The groups seem to provide a kind of liquid learning space (Savin-Baden 2008) where learners bring their own perspectives to the meaning of concepts, where uncertainty, reflection and diverse views are embraced, and where a range of real life scenarios act as catalysts for learning. Students described Jigsaw groups as safe places

for exploring troublesome areas. The use of ground rules, such as confidentiality, and the fact that students and facilitator meet regularly throughout each year may have facilitated this.

The findings of this study can be used in several ways. Firstly, it is difficult for teachers and curriculum designers to retrace ‘*the journey back to their own days of ‘innocence’’*’ (Cousin 2006, 4), to recall which concepts in their own learning might be threshold. By identifying troublesome and threshold concepts for students, we can design curricula to facilitate learning around these, by providing learners with adequate time and enabling them to revisit the ideas in varied ways. Secondly, the findings can help teachers to become more mindful, helping them notice where students are struggling or close to the thresholds and to support them more effectively. Our insights into the language students use to describe both transformative and troublesome times can help teachers with this. Thirdly the threshold concept framework may be useful as an evaluative tool. We plan to explore using it in this way within our Jigsaw setting.

Finally the study findings have broader implications for professionalism learning outcomes and fitness to practise guidance across the health professions. While Perhaps concepts identified in this study, such as working with uncertainty, managing different expectations and considering the bigger picture, should feature more explicitly within these.

Conclusions

This research, which aimed to describe and ‘stay true’ to student and facilitator experiences of learning offers new perspectives on students’ learning around professionalism. Seeing the relevance of learning to their future professional roles by reflecting on placement experiences in a safe, reflective, small group setting seemed to facilitate the crossing of thresholds. The use of audio-diaries, supported by groups, can help identify threshold concepts in these areas and could be used more widely in other contexts. We identified a number of likely threshold concepts, which were relatively un-bounded, yet fundamental to thinking and practising as a doctor. These may also be relevant to teachers and learners in many other disciplines. Further research is needed to corroborate these.

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Commented [TB4]: YES 100%

Commented [HN5]: I have done a v quick search of UK documents and little about these, I don't think we can be expected to do more – and I'm reluctant to name them without a) doing a proper search and b) because it makes it too UK focused

Kingston, Ontario, June 18-20.

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