

**Title**

The influence of culture, structure and human agency on interprofessional learning in a neurosurgical practice learning setting: A case study.

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## **Abstract**

The World Health Organisation support the notion that interprofessional learning (IPL) improves health care outcomes and contributes to safe, effective and high-quality care. Consequently, IPL is an integral component within most UK undergraduate health care programmes. Although much is written about IPL, research to date has mainly focused on the classroom or simulation lab as a setting for IPL. Less is known about how the practice learning environment influences the experiences and outcomes for those involved. A case study research design, situated within a critical realist framework, was undertaken which aimed to better understand how IPL was facilitated for undergraduate health care student within a neurosurgical practice learning setting. Interviews, non-participatory observations and secondary documentary data were used as the

methods of data collection to inform the case. Thematic analysis was undertaken, and the findings clustered into overarching themes of culture, structure and human agency, facilitating a more in-depth exploration of the complex interplay between the factors influencing IPL in the study setting. IPL was supported within the setting which operated as an 'interprofessional community of practice', facilitating student engagement and investing in its staff for the benefit of the patients who had complex neurological needs. A Practice-Based IPL Multi-Dimensional Assessment Tool was also created to enable colleagues in practice learning environments worldwide to better understand their capability and capacity for the facilitation of practice based IPL.

## **Introduction**

Interprofessional learning (IPL) and the collaborative practice it generates can improve global health care outcomes and contribute to safe, effective and high-quality care (World Health Organisation (WHO), 2010). IPL is defined as 'learning that arises from interaction between members (or students) of two or more professions, which may be a product of interprofessional education or happen spontaneously in the workplace' (Freeth et al, 2005 p. XV). In the UK, professional and statutory regulatory bodies require undergraduate, pre-qualifying health professional students to be exposed to IPL opportunities over the course of their profession specific programmes. This enables them to incrementally develop the skills needed for work in an increasingly complex, dynamic and interprofessional environment (Health and Care Professions Council (HCPC) 2017; General Medical Council (GMC) 2017; Nursing Midwifery Council (NMC) 2018). Interprofessional learning (IPL) is now embedded in all UK undergraduate health care programmes, clearly recognised and valued as an important effective learning experience for aspiring health and social care professionals.

Although classroom based IPL is well researched, there are fewer studies of IPL in a practice or work based setting (Derbyshire & Machin 2011; Furness, Armitage & Pitt 2012; Martin & Manley, 2018). Where IPL in practice learning settings has been shown to be effective, the context has been projects with trained facilitators (Department of Health (DH), 2006; Jinks, Armitage & Pitt, 2009), interprofessional training wards (Lidskog, Lofmark & Ahlstrom, 2009; Hood et al, 2014, Hallin & Kiessling, 2016), and interprofessional simulation (Lewis, 2011; King, Conrad & Ahmed, 2013). Activities of this kind often rely on specific project funding opportunities, their ongoing sustainability within mainstream resources is not always feasible. A focus on existing student placements and informal IPL may be viewed as more sustainable (Eraut, 2000; Hood et al, 2014; Kelly, 2015); however evidence suggests that some healthcare practice cultures may not be as conducive to IPL, particularly where there is a lack of interprofessional teamwork, increased workload pressures and perceived hierarchy between professional groups (Robson & Kitchen, 2007; Kelly, 2015). Power imbalance and hierarchy can significantly affect the collaboration as different stakeholders hold different positions in the healthcare hierarchy. This is often influenced by professional status, but can be exercised in different forms, depending on the context, and can affect collaboration between professionals (Foucault, 1995). These issues can create tensions that can affect the way professionals work and learn together, which may impact on the student's IPL experience (Derbyshire & Machin, 2011; Rotz & Duenas, 2016).

Some clinical areas such as a neurological setting, where patient needs are complex, and a multi-disciplinary team is required, are perhaps more conducive to IPL than others. Some studies have been undertaken in stroke care (Department of Health (DH), 2005; Pellatt, 2005; National Institute for Health and Care Excellence (NICE), 2006; Tyson, Burton & McGovern, 2014; NICE, 2014), but these focused largely on learning about teamwork and collaboration. Two studies reviewed made some reference to the value of IPL within a neurological setting (Catangui & Slark, 2012; Suddick & Souza, 2007). Neither study included a qualitative exploration of the factors that influence practice based IPL in those settings (Greenfield et al, 2010; Reeves et al, 2013; Barr, 2013; Olson & Bialocerkowski, 2014). This paper presents a qualitative case study that explored how IPL for undergraduate health care students was facilitated within the neurosurgical practice learning setting. To enable different perspectives to be sought, interviews with student and practitioner participants from a range of different professional groups that worked within a case was supported by documentary data sources and non-participatory observations. The findings will be reported using the concepts of culture, structures and human agency which led to the development of a practice-based IPL multi-dimensional assessment tool.

## **Methods**

### *Design*

The study was underpinned by a theoretical framework developed from a critical realist perspective (Bhaskar, 1975; Archer, 1995; Wilson, 2009) and supported by complexity theory (Plsek & Greenhalgh, 2001; Wilson, 2009). Critical realists purport that understanding organisational contexts requires an identification of key people, relationship patterns and

interactions within context specific systems; the culture, structures and agency inherent within the setting. Similarly, complexity theorists (Plsek & Greenhalgh, 2001; Wilson, 2009), suggest complex systems, such as the UK healthcare system, are dynamic and unpredictable. They are characterised by constantly changing interactions and feedback between people, systems and contexts. A methodology was needed that could investigate the different facets of this complexity in the single context of the study neurological practice learning setting, with a case study research design consistent with a critical realist philosophy and particularly well suited to complex situations within an organisational context (Easton, 2010). The case study design (Angus, 2011; Roberts, 2014; Yin, 2014) was used to understand the complexities of an acute neurosurgical ward in a large hospital in the North of England, and the factors that influenced the IPL opportunities and experiences of participants.

### ***Sampling and data collection***

Permission was obtained from the ward manager and medical consultant from the study setting to share participant information with relevant staff who were given a week to decide to participate. Eighteen participants were purposively selected from the potential sample population, specifically chosen to gain breadth and variation in perspectives. The sample comprised: eight undergraduate health care students from medicine, adult nursing, physiotherapy and occupational therapy on placement in the setting; and ten qualified health care professionals from medicine, adult nursing, physiotherapy, occupational therapy and clinical psychology who worked in this setting. Through researcher interaction in the setting, documentary data sources potentially relevant to the case were identified, as were opportunities to observe naturally occurring interprofessional learning working in action. Using multiple methods of data collection is acknowledged as a strength of case study research referred to as triangulation, where more

than one method or source of data is used so that findings can be corroborated to gain a fuller picture of the phenomenon being studied (Yin, 2014; Bryman, 2016).

Participants were interviewed individually. This was a digitally recorded, semi-structured interview which lasted from 30-45 minutes enabling in-depth exploration of experiences and perceptions (Bryman, 2016). A broad interview guide focused the discussion on relevant matters whilst facilitating emergence and probing of unanticipated themes introduced by participants. Topics within the guide were informed by evidence from related literature and research team experience with open questions such as “what do you understand by the term interprofessional learning” and “what interprofessional learning experiences are offered on this placement to students?”. Interview recordings were transcribed verbatim.

Documentary data were manually extracted from a range of sources including: student placement evaluation questionnaires, routinely collected from undergraduate students from different professions in the previous year; IPL data from annual educational audits; learning resource files supporting practice learning in the setting; and programme placement learning assessment documentation completed by students. The data was used descriptively to give a sense of the range and volume of IPL activity normally undertaken in the setting, beyond the participant group.

Five non-participatory observations of naturally occurring interprofessional working situations in the setting were also undertaken by the same researcher. This helped to capture the unpredictable and inevitable nature of their work enabling exploration of complex and dynamic social interactions occurring within the case (Thompson, 2011). Lasting between 30 and 120 minutes, observations included a patient bedside ward round, two team handovers and two patient focused multi-disciplinary team meetings. Condensed field notes were taken by hand during the observations, developed into an expanded account as soon as feasible after the observation, including researcher memos and reflections. The latter reflexivity provided added transparency to the data interpretation process (Bryman, 2016).

### *Data analysis*

Data collected was pooled to facilitate an analysis of the whole setting as a single case. Thematic analysis was used (Miles & Huberman, 1994) to identify recurring themes in the data that would help explain what was happening in the setting beyond the perspective of each individual. Data from transcripts, field notes and documents were coded and manually categorised by the lead researcher, labelled to reflect commonly occurring concepts (Simons, 2009). The codes and categories were then organised and presented in visual format using mind mapping on flip chart paper to facilitate interpretation and to identify themes and subthemes. Finally, themes were reviewed against the research aim which was to explore how IPL was facilitated for the health care students within the neurosurgical practice learning setting. The raw data was re-read for context. Themes were then clustered into the overarching concepts of culture, structure and agency to fit with the study's theoretical framework of critical realism and complexity theory.



## ***Ethics***

The Integrated Research and Application Service (IRAS Ref: 139577) and NHS Trust granted ethical approval. The study was guided by ethical principles of the British Educational Research Association (BERA, 2011), with participants' welfare as the primary concern. All study participants provided written informed consent. Explicit permission was sought to access pre-existing documentary data sources. Anonymity, confidentiality and withdrawal rights were reiterated throughout.

## **Findings**

This paper presents the study using the concepts of culture, structures and human agency, which include all of the themes that emerged from the study and are outlined in Figure 1. They have been aligned in this way for "best fit" to enable a more systematic structured discussion of the implications of the findings in the context of the research question and the theoretical framework. These findings will be supported by verbatim quotes, identifying data sources in brackets.

## ***Culture***

The concept of culture in this study refers to the subjective, non-material phenomena including belief systems, norms, values, social practices and patterns of shared assumptions (Houston, 2014) and was important to the facilitation of IPL in the study setting. The culture was considered conducive to the facilitation of IPL for students in the study setting and includes four sub-themes. These were collaboration and values based practice, hierarchical influences, stable leadership and a positive learning environment.

It was clear that collaboration and values-based practice existed within this team. Whilst collaboration as a term was not explicitly mentioned, 'teamwork', 'respect' and 'communication' which are all recognised as important for collaborative practice and subsequent student learning:

*“it was clear that there was mutual respect between the groups, they all listened to the ward sister read out each patient but then all had the opportunity to have their input and this was valued...” (observation team handover).*

*“...I am not here at weekends, but the ward staff are great, they might put hand splints on and become very skilled...I definitely could not do my job without them, we rely on each other and there is no other way of working here, this is better for the patients, it is all about teamwork and respect...it is important that this is seen by students to help them learn” (P10 physiotherapist interview)*

The learning that occurred appeared to be influenced by the complex needs of neurological patients which required practitioners from a wide range of professional groups to learn and work together to optimise patient outcomes, setting the context for effective IPL:

*“the complexity of the conditions nursed on neuro and the client cases made it easier for interprofessional learning as not one person could give all the care...” (physiotherapy student evaluation form).*

*“We’re all there to treat the patient and give them the best care we can...the patient is always at the centre of the care...that's why we as professionals are all here and none of us work in isolation and by working in this way the patient gets the best care... there is no other way to work on here...” (P9 occupational therapist interview)*

Whilst most of the participants agreed that the collaborative and values based culture within the study setting was conducive to IPL for students, some suggested there was hierarchy and unequal power within the practice environment:

*"it was interesting to see that the consultant on a ward round talk down to the junior doctor but not to a senior nurse...this is not just about position and power but the person they are...." (P7 medical student interview).*

Hierarchy was also observed during an interprofessional rehabilitation ward round where the input from other professionals was limited, particularly from the medical students in attendance which could have potentially impacted on IPL opportunities:

*"the consultant was clearly 'in charge' with minimal evidence of learning observed between professional groups, the medical students did not speak throughout the round, they did not ask any questions or seek clarification of any issues. I was unsure whether this was because of his position as a consultant neurosurgeon or his didactic approach to the round" (observation rehabilitation round).*

Some hierarchical issues were discussed by experienced professionals about their more junior staff who did not interact as much with other professionals, and were often reluctant to challenge others. This appeared to be due to their difference in status:

*" the junior staff do not like to question doctors or even staff who have been around for a long time, but I tell them it should be about respecting each other and being the patient advocate...it is important to question and challenge doctors regardless of the professional group if you believe it is the right thing for the patient..." (P17 nurse practitioner interview).*

Interestingly most of the student participants did not observe any hierarchy or power issues between professionals on the ward:

*"on neuro it was good that everyone listened to each other during meetings and there did not seem to be the hierarchy that exists elsewhere, everyone was professional, and they seemed to respect each other and their roles..." (P1 physiotherapy student interview)*

*"it seemed very democratic, there was no subordination or any kind of hierarchy... everyone listens and values each other..." (P6 adult nursing student interview)*

This may have been influenced by the ward sister who appeared to be keen to sustain such a positive collaborative culture, through effective leadership and communication:

*"I think sometimes nurses stereotype other professionals too much, particularly doctors, often due to past experiences which can affect future relationships and teamwork. It is important that we encourage everyone to see their worth and respect that ... no one is better than other, and my job is to instil that in my staff..." (P16 ward sister interview)*

However, it was acknowledged that she was not directly involved in the facilitation of IPL for students but supported the practice educators to do so:

*"I think the ward sister works really hard, but she just does not have the time to work with students, but she supports the mentors and student learning...she always allows them to go off the ward to learn with others and to different departments." (P12 adult nurse interview)*

It was clear from the data that the neurological practice setting provided a positive learning environment for students, who viewed the culture of their placement setting as open and inclusive with active participation in IPL encouraged. This appeared to be influenced by the value placed on the supernumerary status for students, where they were able to utilise learning opportunities, despite busy staff workloads, complex patients and time constraints:

*"as a student you are supernumerary so even if it was busy I was able to go off with the pain team, specialist nurse and other professionals which is good as you learn who is out there and what they do, and this is often so that you can follow the patients you are looking after...staff were all lovely and helped you to learn" (P4 adult nursing student interview)*

The practice educators and the wider interprofessional team within the study setting were recognised as essential to a positive learning experience for students, where they were exposed to IPL in their day-to-day work with other professionals and neurological patients.

### ***Structures***

The concept of structures in this study relates predominantly to the objective social structures that are tangible and exist in time and place (Archer, 1995). There were some structures in place to facilitate IPL for students and included three key themes. These themes were communication mechanisms, IPL encounters; and potential shared spaces.

The more formal structures in place to support IPL in the study context were the mechanisms used for communication between the different professional groups. One of these mechanisms was the weekly interprofessional bedside rehabilitation round, which appeared to facilitate improved interprofessional communication, speeding up the process of hospital based rehabilitation and transition into community services:

*"We have a rehab round every Tuesday and during this round there are different professionals like physiotherapist, dietician, speech and language therapist, psychologist ... We see all of the patients requiring rehab whether that be a traumatic brain injury or a complex case requiring rehabilitation, it is good for patients and good for staff to get together and learn" (P14 neurosurgeon interview).*

*"this was an excellent forum with over 10 professionals in attendance to discuss patients around the bedside, the consultant was clearly in charge, but he listened to others and he had the authority to make decisions and it was clear that transfers to other hospitals was quicker..." (observation rehabilitation round).*

This rehabilitation round was valued, given the number of professionals in attendance and was seen by some of the participants as a forum to potentially facilitate IPL, whilst others suggested attendance at the round itself did not necessarily facilitate learning:

*"I don't think this round is always appropriate for students...I don't see it as the best learning environment for them walking around the wards; there's a lot of hanging around and a lot of consultant chat that even I don't always follow. But medical students go on it and I am not sure if they even always get much from it either..." (P9 physiotherapist interview)*

However, at the end of the round away from the patient bedside, and in a safe environment, it appeared from the observation of the this round that IPL was occurring naturally between students and staff across the professional groups of attendees, where patient issues were discussed more openly:

*"learning often takes place after the round, each person gives their perspective from their role and their input for the patient. Staff listen to each other and this is important for learning, I have learnt so much from the medics, physio and OT and their role. There is not a week goes by without me not learning something new..." (P18 clinical psychologist interview).*

Other formal structures observed with potential for IPL were the in-patient ward round and patient handovers to different interprofessional teams between shifts. However, any opportunity for students and staff to learn interactively, from and about each other's contribution to patient care appeared to be opportunistic, arguably a missed opportunity for IPL enhancement:

*"the morning handover was really interesting, I could see that this was important for patient progress and was good for speeding up the referral process, it was clear input was valued from all professionals in attendance but not sure how much learning took place between the professionals and about their role" (observation team handover).*

Physical context and shared work spaces including the nurses' station, doctors' office and the patient's bedside were also observed as structures that could be the context for interprofessional collaboration and the sharing of professional knowledge, but more importantly their potential use in facilitating IPL for students. However, it was the more informal, social interactions that took place within these spaces that were valued in promoting positive interprofessional working relationships and subsequent IPL:

*"Good to see such positive social interactions as the different professionals huddled around the nurses' station discussing both professional and personal issues before the ward round" (observation ward round).*

*"like most wards, the nurses' station seems to be the place where professionals just hang about, they talk about patients, staff and just seem to generally chat to each other...there also seems to be some good discussions in the doctor's office" (P4 adult nursing student interview)*

Other examples of structures in place to facilitate informal IPL opportunities were experienced by students through their day-to-day learning and working with other professionals in the study setting for example, IPL that focused on the patient journey enabled students to learn with other professionals where it appeared to be more meaningful:

*"on the ward one day the OT showed me how they mould the splints and explained it so well, another day the dietician showed me how they carry out an assessment and calculate the feeds...this helped me to see what their role involves, and it helped me to learn better..." (P2 nursing student interview).*

*"I learnt about the role of the speech and language therapist on neuro...I had a good experience learning with a physio, but it wasn't planned, and it was to do with discharging a patient and trying them out on the stairs. great for learning but also to see more of the physio role..." (occupational therapy student evaluation form).*

Informal IPL appeared to occur opportunistically for all student participants when they happened to be in the same place as each other. In addition, several formal structures existed as a context

for promoting collaborative practice and subsequent learning. However, there was limited evidence provided by participants, or observed, that pre-planned, structured IPL activities existed within the practice learning context. There also appeared to be a lack of understanding of how structures supporting profession specific activities in the placement learning setting, such as nursing handovers, would be beneficial to students from other professional groups.

### ***Human Agency***

The concept of human agency in this study refers to the personal and psychological make-up of individuals in relation to their social and professional roles and their ability to act in a voluntary way (Archer, 1995). This included the students, their practice educators and the wider interprofessional team, who were all seen as key to the facilitation of IPL for students within the neurological practice context. The themes grouped into this concept included interprofessional values, reciprocal relationships and effective facilitation skills.

Most of the practice educators involved in the study did not see themselves as experts in IPL, but they appeared to possess interprofessional values, including teamwork, respect for other professionals and communication which are recognised as important to effective working relationships in this setting. This was reflected in positive IPL experiences for students:

*"my educator was so well respected by everyone and he had so much experience in this area...which was great for me...he was so enthusiastic too and created so many learning opportunities for me to learn from other professionals" (P6 physiotherapy student interview)*



Facilitation of IPL for the students also appeared to be influenced by the personal attributes of the practice educators, who the students described as positive role models:

*“my educator was so supportive... she made me feel valued...she created many learning opportunities for me to be with other professionals and was always keen and willing to talk about my learning experiences.... she was a really good role model” (P1 physiotherapy student interview).*

Whilst the term "professional credibility" was not used specifically, it was clear that some practice educators were recognised as experts in their field and this experience was valued by their professional colleagues, positively influencing IPL for students:

*“the head injury nurse is a real role model and is so credible in this team...there is no doubt about that, she gets on well with all of the professionals...she really does know how to deal with patients and their families too so if students learn from her, then this will be an excellent experience...” (P14 neurosurgeon interview).*

*"We have a clinical psychologist on neuro, I really respect her expertise and I think it is important for the staff and students to see her role and how we are not all experts and have to access others who have the most appropriate skill...she would be a valuable resource to students as she is to me..." (P13 specialist nurse interview).*

The reciprocal relationships between professional groups, appeared to have been forged from experiences in practice and development of professional networks built up over many years. This enabled access to some good examples of IPL for students to work with colleagues from the wider interprofessional team:

*"students are given time to go to work with other professionals...it is important that they see other roles...I never have a problem asking one of my colleagues to take a student for the day to see what they do, and I would do the same for their students" (P9 physiotherapist interview)*

*" we have access to so many different professional groups like doctors, physios, OT's, dieticians and the SALT team which is great for students...I encourage students to work with them all..." (P11 adult nurse interview)*

Such positive experiences appeared to have been influenced by practice educators who possessed effective facilitation skills, which were predominantly related to their generic role in providing good support to students in practice. However, it appeared that the practice educators also saw the facilitation of IPL as important, albeit opportunistic and unplanned but seen just as valuable by students and practice educators:

*"learning opportunities were provided so that I got a clear insight into all of the job roles, this was mostly working alongside other professionals and learning from them..." (adult nursing student evaluation form)*

*"learning does not always have to be formal you can learn a lot informally from other professionals in this speciality, there is access to all sorts of professionals and patients which as students is a really good experience that if facilitated well can be valuable to students..." (P18 clinical educator interview).*

The study findings did not appear to show that the knowledge and skills required to facilitate practice-based IPL, particularly informal encounters, were any different to the skills needed for facilitation of profession-specific learning.

## **Discussion**

This qualitative research case study aimed to explore how IPL was facilitated for undergraduate health care students within a neurosurgical practice learning setting. The study findings showed that there were a multitude of factors combined to generate positive IPL experiences for students, which have been clustered into the overarching concepts of culture, structures and human agency represented in Figure 1. In the centre of this figure is the neurological patient, whose complex needs influenced the positive way in which the students and practice educators engaged in IPL. The complexities of the interplay between culture, structure and human agency can be understood by drawing on perspectives of critical realism (Archer, 1995) and complexity theory

(Wilson, 2009), the key theories that informed this study. Both theories acknowledge that not all systems are orderly and determined but are much more complex, dynamic and often non-linear, with an interdependence on individuals within the system (Paley & Eva, 2011). It could be argued that this practice context was simply an effective multi-disciplinary team, working as a structural unit, role modelling collaborative working. However, there appeared to be a much deeper level of collaboration, strong cultural traditions of working together, with a willingness to share knowledge to 'learn with from and about each other' (Missen et al, 2012). This shared knowledge could be viewed as helping to create what Huxham (1996) referred to as the theory of collaborative advantage, where the perspectives of different individuals within a team are combined so that they can generate new meaning. This does not mean that there were no differences in power, as the findings in this study showed there was some evidence of hierarchy, but this was predominantly related to the expertise of specific professional groups and their hierarchical organisational position. It could be argued that hierarchy is inevitable within health care and is necessary in some contexts, however hierarchy within interprofessional teams is a recognised barrier to learning (Henneman, Lee & Cohen, 1995; Manias, 2015). The existence of hierarchy within the neurosurgical practice learning context did not appear to have an overt negative influence on the staff or students, there was a culture of collaboration and not competition (Pfaff et al, 2013). The collaborative culture links to what was described in this study as an 'interprofessional community of practice', which emerged as one of the key findings. Indeed, all students were encouraged to become part of this 'interprofessional community of practice', with access to the professional networks and structures that existed within it.

Most of these structures were in place to support collaboration and exchange of communication focused on the needs of the complex neurological patient, for example the rehabilitation round or ward round. Their potential for the facilitation of IPL was not always recognised by the participants in the study. In addition, other shared work spaces were identified as having real potential for IPL included the nurses' station, patient bedside and doctors' office. These spaces are recognised in the literature as important structures supporting collaborative practice, positive role modelling and subsequent IPL (WHO, 2010; Boys, 2011; Walker et al, 2013; Hallin & Kiessling, 2016). Further work is needed to identify what Gregory, Hopwood & Boyd (2014) described as 'hotspots' for IPL, which could be utilised more effectively for students to develop their knowledge and skills to learn and work interprofessionally.

In keeping with other studies (Gregory, Hopwood & Boud, 2014; Anderson, Ford & Kinnair, 2016; Eraut, 2000; Kelly, 2015), informal, patient care focused IPL encounters appeared to highly valued by participants in this study, that is those IPL opportunities which were spontaneous, authentic and incorporated into everyday clinical activities. There appeared to be a lack of formal IPL structures in place, which appeared to be more about student placement patterns, time and resources, rather than negative issues in relation to lack of commitment, hierarchical issues or poor facilitation skills, which have been highlighted in other studies (Anderson & Thorpe 2009; Pollard 2009; Furness, Armitage & Pitt, 2012).

Human agency was the most powerful concept in the study findings due to its influence on creating and managing the structures and sustaining the positive culture in this practice context.

The attributes and interactions of the individual agents (students, practice educators and interprofessional team) and the patterns of their relationships within this complex practice arena was integral to the facilitation of IPL. Interprofessional values such as mutual respect, trust and shared goals were recognised as important for effective collaborative and reciprocal relationships (WHO, 2010; Pollard, Miers & Rickaby, 2012). Some of the more experienced practice educators also discussed the importance of such reciprocal relationships and believed it was no longer enough for health care professionals to facilitate 'uniprofessional learning' but they also needed to be 'interprofessional' and had a responsibility to facilitate IPL for their students.

However, there are mixed views in the literature on whether the skills for IPL facilitation are any different to facilitation of uni-professional learning (Jinks, Armitage & Pitt 2008; Anderson, Cox & Thorpe 2009; Derbyshire & Machin 2015). Howkins & Bray (2008) suggests that IPL facilitation skills can take practice educators outside of their comfort zone, since this extends beyond the requirements of their profession-specific role. This study findings showed that the skills required to facilitate practice-based IPL appeared to be no different to the skills needed for facilitation of profession-specific learning. This could have been influenced by the personal attributes of the practice educators, who appeared to be confident and enthusiastic, all attributes recognised in the literature as generic to a positive role model for a practice educator with students from the same profession (Mulholland et al, 2005; Marshall & Gordon, 2006). It is important to note here that there were very few formal opportunities where the practice educators had facilitated IPL for students from different professional groups. If this had occurred, the skills needed and the challenges of facilitating IPL may have been very different.

In other research, the patient is not always considered a human agent or a key player in a complex adaptive system such as healthcare (Wilson, 2009), however the study findings showed that the neurosurgical patient was a key player and was at the focus of all IPL experiences in this setting (Figure 1). It was ultimately the patient that appeared to necessitate the positive way in which the professionals and students engaged in IPL. It must be acknowledged that no neurological patients appeared to be directly involved in the IPL experiences for students which could be attributed to their impaired cognitive ability or lack of capacity to be involved in learning in this study setting, or simply because it was challenging to involve patients/service users in IPL initiatives. Further work is needed to identify ways in which patients might become involved in IPL experiences in the real world of practice, which could potentially improve students' understanding of the importance of patient involvement in the collaborative interprofessional decision-making process (GMC 2017; NMC, 2018; CAIPE 2012; Anderson, Ford & Kinnair, 2016). Similarly, more real patient involvement in IPL within university settings might better prepare students for practice-based IPL and collaborative practice.

The insight that this study has provided in relation to the facilitation of IPL for health care students within the practice setting enabled the development of a Practice-Based IPL Multi-Dimensional Assessment Tool to support others in their efforts to improve the IPL experiences for students. This tool incorporates the study findings using the key concepts of culture, structure and human agency (Figure 2). Other practice tools are available (Chan, 2003; Salamonson et al, 2011; Freeth & Reeves, 2004; Anderson, Cant & Hood, 2014), however none of them consider the full range of cultural, structural and human agency related factors identified in this study. The Practice-Based IPL Multi-Dimensional Assessment Tool is intended to be used by

interprofessional teams within their own setting whatever that might be, to identify the factors in their environment to support and facilitate informal and/or planned IPL (if any) and where there might be opportunities for improving the culture, structures and human agency related dimensions in the practice learning setting. Across a healthcare system, a hospital for example, some areas may use the tool and conclude IPL is not feasible in their setting. However, other areas might use the tool and conclude that their environment is particularly well suited to IPL, it may be feasible for students on placement elsewhere to do a short IPL placement in the area to experience collaborative interprofessional working and learning as part of their overall practice learning placement.

### ***Study Limitations***

As a consequence of the single case study research design used, the findings can only be understood in the context of that study (Simons, 2009). This means they cannot be generalised in a predictive sense to other clinical settings, even other neurosurgical settings, however as a qualitative study there was no aim to generalise. Rigor is assured through multiple data collections methods, the rich explanatory data generated, and the critical reflexive approach used throughout. This gives a degree of confidence that the findings and the tool developed is likely to be transferrable to some degree, to understand, inform and influence similar practice contexts with complex patients and diverse interprofessional teams. Although developed from a study in a neurosurgical practice setting in the UK, the self-assessment tool developed is not context specific and is likely to be of use in a full range of international clinical settings where health

professions education with an IPL requirement takes place, although further research is needed to explore this transferability.

### **Concludng comments**

Whilst there is no 'off the shelf' solution for facilitating IPL in practice, this article provides a valuable insight into the complex array of factors influencing the facilitation of IPL within the neurosurgical practice context. These have been clustered into a triad of culture, structures and human agency, with the neurological patient at the centre whose complex needs influenced the availability and type of IPL experiences for students. The development of an innovative Practice-Based IPL Multi-Dimensional Assessment tool reflects these findings and it is proposed that other practice contexts could use this tool to assess their capacity and capability to facilitate IPL for undergraduate health care students. Practice learning areas assessed positively by the tool should be specifically identified as exemplars of best practice where students will benefit from being exposed to IPL. Furthermore, these areas can be promoted as 'interprofessional communities of practice', investing in their staff and providing optimal IPL opportunities for students. Further research is needed to test the assessment tool and understand its influence on the development of placement based IPL opportunities in different contexts. Whilst class room based IPL is well embedded across most undergraduate pre-qualifying health professions programmes in the UK and in other countries, there is added value in further developing IPL opportunities in the practice learning setting, especially where students can view patient centred interprofessional working at its best.



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