Clinical skills development . A quasi-experimental controlled trial examining the role of inter-professional training

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A collaborative study between the Peninsula Medical School (PMS) and the Faculty of Health and Social Work (FHSW), University of Plymouth (UK)

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The following full report will be condensed for peer review in either 'Medical Education' and/or 'Resuscitation'.

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Abstract

Objective: To develop an understanding of interprofessional skills training, with a focus on attitudes, leadership, team work and skills performance; and the differences in outcomes between medical and nursing students.

Methods: A quasi-experimental trial using a nonequivalent before-after design involved consenting 2nd year medical and nursing students in uniprofessional and interprofessional settings. Participants were taught Immediate Life Support (ILS) resuscitation skills prior to observational ratings of video recorded leadership, team work and skills performance. Attitudes and beliefs about interprofessional learning (IPL) were measured in focus group interviews and in the Readiness for Inter-Professional Learning Scale (RIPLS).

Results: There was no difference in performance between interprofessional and uniprofessional teams from this one day intervention. This implies that uniprofessional teams performed no better than interprofessional, despite their greater familiarity with each other. However medical students, in comparison to the nursing students, had higher leadership ratings (p= .01) and tended to lead more dynamic (p= .039) and efficient teams (p= .021). Despite the lack of performance difference between inter- and uniprofessional teams the preliminary RIPLS results suggest that attitudes towards collaborative practice had been influenced by the ILS intervention and the focus group results broadly supported the notion of interprofessional training. There were perceived benefits for teamwork and communication, but concerns about professional identity, hierarchical inequities and feelings of intimidation by the nurses.

Conclusions: The results of this study suggest that collaborative practice may be enhanced through interprofessional training and that in the very least team performance outcomes are not reduced in interprofessional settings. Bearing in mind the logistics of

organising interprofessional education, we recommend that interprofessional episodes should be introduced at regular intervals throughout the training of health professionals.

Background

This study focuses on contemporary issues in interprofessional clinical education. It is set at a time where demands and substantial changes within the NHS are being carried over into the higher education institutions. Pressure is being applied on all those involved in health care education to produce personnel who are 'fit for practice' with a seamless service.

In 1993 *'Tomorrow's Doctors: Recommendations on Undergraduate Medical Education'*[1] was published, recommending educational strategies which encouraged learning through curiosity, a core curriculum, and an emphasis on clinical and communication skills. In addition, *'Tomorrow's Doctors'* also stressed 'the mastery of skills required to work within a team, and where appropriate, assume the responsibilities of a team leader, requiring an understanding and appreciation of the roles, responsibilities and skills of nurses and other health care workers'. These issues were reinforced by the workforce planning consultation document '*A Health Service of all the Talents: Developing the NHS workforce*'[2] where ministers emphasised, amongst others, the importance of team working, maximising the contribution of all staff to patient care, modernising education and training, and expanding the workforce.

Discussions continue about changes to the Quality Assurance Agency and government is pushing for a core curriculum for doctors, nurses and other health care professionals to break down what Alan Milburn, the former Secretary of State for Health, calls 'tribalism'[3]. An issue also raised in the report *'The Future Healthcare Workforce'*[4] is 'the need to address the problems associated with single-discipline training and in particular, the inflexibility for both the organisation and the trainee'.

The focus has begun to shift from a specific set of knowledge, skills and values that characterise a profession, to consideration of ways in which they overlap and can be used

to enhance patient care. The assumption being that learning together is the best preparation for working together.[5, 6]

Recent work has started to address the issues of multi-disciplinary education[7] and its effect on clinical outcomes, especially its value for reducing medical errors[8], for team working and effectiveness in community based settings[9], in the emergency room[10] and in skills lab simulation practice[11]. A comparison of performance by medical and midwifery students also demonstrated that shared resources encouraged equivalent levels of skill acquisition[12].

However there is very little objective evidence to support this approach. In fact, a recent systematic review could not find a single study that used a randomised control trial, a before-and-after or interrupted time series design that demonstrated inter-professional learning influenced clinical performance[13]. Research to date has tended to focus on education initiatives with an emphasis on student attitudes and perceptions. For example Rudland and Mires[14] found that first year medical students perceived nurses to be more caring despite similar life experience to doctors, but with the perception that nurses had a lower academic ability, competence and status. They felt that shared learning would help develop an understanding of doctors and nurses roles and therefore improve team work, although they were concerned that in a shared setting they would be taught skills irrelevant to their role. Tunstall-Pedoe et al[15] also found that students held very stereotypical views of health professionals but that students felt that interprofessional interventions would be beneficial.

Hind et al's[16] work with five professions reported high levels of identification with their own professional group but with an openness towards interprofessional learning, as measured by the Readiness for Inter-professional Learning Scale (RIPLS). Another study using RIPLS[17] found that medical, nursing and pharmacy students perceived interprofessional learning as a strategy for improving team working skills and relationships with other professionals. But Pollard et al[18] found that mature students and those with health care qualifications had negative attitudes towards health care professionals working relationships. Later work by Pollard et al[19] found that second year students had become

more negative about learning in a multiprofessional environment suggesting that students' attitudes will be influenced by their educational and clinical experiences.

In an interventional study, Cooper et al[20] also used RIPLS and found that the trial group participants developed more positive attitudes to other health care students and a readiness for team based approaches to learning. In Ponzer et al's[21] evaluation of multiprofessional health care students' learning in a clinical education ward, they found that students developed a clear understanding of their role, knowledge of other professions increased, and communication, team work and interprofessional education ratings increased. Cooke et al's[22] intervention with nursing and medical students (a two day course on breaking bad news) also found that stereotypical hierarchies were broken down, but that some students retained a professional distance in order to retain their professional identity. In work rotating medical students and midwives through a series of clinical stations, Symonds et al[23] found that students had increased their knowledge and understanding of the other profession and that it had helped to promote a team working attitude.

Leaviss[24] investigated whether a two-day interprofessional course (including students of medicine, radiotherapy, nursing, dentistry, occupational therapy and physiotherapy) in the final year of training, had influenced their practice on qualification. Respondents felt that their greater understanding of the professions had led to more appropriate referrals, increased their awareness of profession specific skills, and improved understanding of professional pressures and of holistic care. However, participants also reported negative professional attitudes which had not been changed by the interprofessional episode. In Reeves et al's[13] evaluation of an interprofessional training ward, focus group findings indicated that communication and team work skills had increased, but from practice observations the researchers noted that medical students were not as engaged in team duties as the nursing, OT and physiotherapy students. Most students felt that the intervention had been too short (two weeks) to form any lasting interprofessional effect, but on questioning a year later they reported that the training ward had given them a valuable insight into the roles of other professions and of interprofessional working. In a longer intervention over a seven week period, Lindqvist et al[25] organised experimental group meetings between professionals to discuss interprofessional learning and working,

finding afterwards that they were significantly more likely to view each others profession as being 'caring' than students in a control group.

It appears from these studies that students are generally positive about the concept of interprofessional learning, that there is a greater understanding of other professions and an improvement in communication and team work. However most of these studies are based on small surveys and interventions and tend to measure perceptions and attitudes as opposed to observed effect and clinical impact. The number of controlled studies is limited partly because it appears that there are so few examples of shared learning between doctors and nurses[26] despite the innovations of the Centre for the Advancement of Interprofessional Education (CAIPE) [27]. We aim to address some of these issues in the following study based on CAIPE's (2002) definition of interprofessional education 'Interprofessional Education occurs when two or more professions learn with, from and about each other to improve collaboration and the quality of care'[27]

Methods

Outline

The objective of this study was to compare attitudes, learning and team work outcomes between groups taught Immediate Life Support (ILS) skills in interprofessional and uniprofessional settings. Second year medical and nursing students were assigned to groups based on the geographical location of their studies. The groups were structured to be either uniprofessional and or interprofessional. The independent variable was therefore interprofessional training versus uniprofessional training and the dependent variable was the learning and team work outcomes. The uniprofessional group undertook learning in ILS skills (one day) in the Clinical Skills Resource Centre in Exeter (UK) and the interprofessional group in the Clinical Skills Resource Centre in Plymouth (UK). Group participant mixing was reduced by managing Peninsula Medical School (PMS) medical students, and Faculty of Health and Social Work (FHSW) nursing students, as separate cohorts on both sites. ILS skills were selected as there are specific national guidelines and assessment tools against which performance can be measured[28].

In the first phase students were taught (by clinical skills tutors) the key skills (airway management, semi-automatic defibrillation and basic life support - BLS) in their respective groups. They were then introduced to the concepts of leadership and team work in emergencies, before being trained to link the skills in a coordinated strategy through the use of SimMan™, an advanced computerised manikin training system which can be used to record and measure skill performance. After training, assessment scenarios were run and recorded using digital video to enable analysis by trained observers using recognised assessment tools and criteria. The key measures were leadership, team work and skill performance.

In addition to these observational ratings students were asked to complete the Readiness for Interprofessional Learning Scale (RIPLS)[29,30,31]. This was completed at the start of the ILS training day, at the end and after 3-4 months. Students were also asked to attend a focus group at this 3-4 month point where issues around interprofessional education were discussed.

Objective of the Project

To develop an understanding of interprofessional skills education.

Research Questions

- Does interprofessional skills training influence attitudes, leadership, team work and skills performance?
- Is there a difference in attitudes, leadership, team work and skills performance between medical and nursing students?

Hypotheses (two tailed);

- Inter-professional skills training influences attitudes, leadership, team work and skills performance?
- There is a difference in attitudes, leadership, team work and skills performance between medical and nursing students?

Study design

A quasi-experimental trial using non-equivalent before-after design: students were assigned to interprofessional and uniprofessional groups based on geographical location.

Sample

Second year medical and nursing students were approached and asked to consent to a study of immediate life support skills education, i.e. they were blinded to the study objectives. Excluded from the study were those who had previous ILS or advanced life support skills training or those who were working towards a second health care qualification (e.g. a nurse in medical training), as it was felt they would have significantly different views of the nurse/doctor role. A random selection of consenting students was then made prior to allocation to either the uniprofessional group in Exeter or the interprofessional group in Plymouth.

In our initial sample size calculations we aimed for 24 participants in the uniprofessional and 24 in the interprofessional groups i.e. four teams in the uniprofessional and 4 teams in the interprofessional. We achieved this (see below) but in slightly different proportions. Calculations were performed with 'Sample Power 2' software for all the observational rating scales. For example, for the leadership rating, an estimated minimum effect size of 8% (score difference of 3 on a scoring scale of 0-40) gave a power of 94.6%.

The ILS course was registered with the Resuscitation Council (UK) and run over a day for each group. Students who successfully completed the Council's assessment criteria received a Resuscitation Council ILS certificate. On the first ILS day nursing students (n = 13) attended, on the second and fourth days medical students (n = 5 each day) and on the third day both nursing (n = 14) and medical (n = 16) students. The objective was to mirror the clinical setting for life support teams in small group clinical skills teaching. To this end group size was based on approximately 5-7 participants in either uniprofessional or interprofessional groups in equivalent proportions.

Observation

At the end of each day individual (and team performance) was assessed at a video recorded resuscitation scenario. One camera recorded data from the foot of the bed and a second from the side. All students were asked to lead a different scenario with the help

of their respective teams. The scenarios were based on the Resuscitation Council ILS course scenarios and were run in the same sequence by all the assessment teams, after a random selection of student assessment order.

Three tools were selected to measure and rate performance. An individual rating of leadership using an adapted Leadership Behaviour Description Questionnaire (LBDQ)[32,33,34,35] with a focus on 'initiating structure' (time bound command and control behaviours, applicable to emergency leadership); a global assessment of team work with the 'Emergency Team Dynamics' (ETD) scale[32,35] (Appendix 1); and a global Resuscitation Team Task observational record[32] updated for current Resuscitation Council (UK) guidelines[36], for the recording of resuscitation tasks e.g. BLS and airway management. High validity and reliability has been reported for LBDQ[32,33,34]; and in recent work Cooper et al[35] found that LBDQ and ETD demonstrated good face and content validity, assessed by the research team and two external experts, and recorded an internal reliability/consistency (Cronbach's alpha) for both the scales of >.82.

SC, as a former Resuscitation Officer, rated all the recordings before a second independent rating of a sample of 12% (6 of the 52 records) was performance by FD. Inter-observer agreement (kappa score) was 'good' .649 (based upon Fleiss[37] social research ratings of .40 to .60 as 'fair'; .60 to .75 as 'good' and > .75 as 'excellent').

Demographic records

At the beginning of each ILS course information was collected from all participants concerning; age, gender, future profession, qualifications, whether they had been taught or worked with other professions, and previous leadership, team work, health care or resuscitation experience.

Focus groups

Focus groups are thought to be particularly applicable for the development and evaluation of a curriculum[38]. In this study we completed five focus groups three to four months after the ILS courses. Two groups were nurses from uniprofessional training, one group were medical students from uniprofessional training, one group were nurses from a interprofessional course and the final focus group were medical students from a

interprofessional ILS course. Each focus group was audio recorded and the researchers noted interactions and interplay between participants as the interviews progressed. Between 5 and 7 respondents attended each group with the objective to identify students' opinions and attitudes towards interprofessional learning. Our approach to data analysis is described below.

Readiness for Inter-professional Learning (RIPLS)

The RIPLS questionnaire[29,30,31] was issued at the start of the ILS course, at the end and then at 3-4 months prior to the focus groups, or by email for those who did not attend. The questionnaire was completed by 100% of participants immediately before and after the ILS course and by 80% on the third issue. RIPLS has been tested in the undergraduate setting[29] in the original 19 item form. We used the latest version of 29 items tested by Reid et al[30] which has yet to be validated for an undergraduate population. The provisional results given in this paper are based on the factors suggested by Mattick and Bligh[31] and described as; team work; professional role; uniqueness of discipline; collaboration and patient centredness. We plan further work to isolate the key factors in this study, the results presented here should therfore be treated with caution.

Analysis

All numerical data was analysed using SPSS version 14. Inferential statistics for the observational scales (LBDQ, ETD and RTT) included independent sample t-tests, Spearman's and Pearson's correlations. Linear regression identified the key predictors of the leadership score. 95% confidence intervals (CI) are reported where applicable. RIPLS scores were analysed using a within subjects ANOVA.

Focus group data analysis was based on Miles and Huberman's[39,40] analysis strategy using N5 software. In the first data reduction and display stage we (SC and FD) independently read and reread the transcripts (maintaining awareness of our preconceived ideas and categories). We looked for contradictions and exceptions, and differences between groups before independently identifying key codes and categories. Lastly we drew conclusions by identifying category clusters and noting relationships within

the data which, following discussion, led to the development of overarching themes and sub themes.

Ethical Approval

The study was granted full ethical approval by the ethics committees of the University of Plymouth and Peninsula Medical School.

Results

A total of 53 students attended the ILS training days with one medical student excluded from study as he was a registered nurse. A total of 16 medical students and 14 nursing students attended an interprofessional day and 9 medical students and 13 nursing students a uniprofessional day. Characteristics of each group are listed in Table 1. There was a significant difference in the gender of the two groups, men and women were equally matched in the medical student group whilst men were in a minority in the nursing group. Medical students had been trained to a slightly higher level of resuscitation skill and significantly more nursing students (than medical students) had been taught with other professions before. In this case through a multiprofessional common foundation programme in their first year which included all the health professions except medicine.

Table 1 – Participant Characteristics

Participant Characteristics	**Medical Students Number (%)**	**Nursing Students Number (%)**	**All participants Number (%)**
Age			
Under 21	9 (17.3)	14 (26.9)	23 (44.23)
21-30	14 (26.9)	4 (7.69)	18 (34.61)
31-40	1 (1.92)	3 (5.76)	4 (7.69)
41-50	1 (1.92)	6 (11.5)	7 (13.46)
Gender*			
Male	12 (23)	4 (7.69)	16 (30.77)
Female	13 (25)	23 (44)	36 (69.23)
Qualifications			
Certificate	1 (1.92)	0 (0)	1 (1.92)
Diploma	0 (0)	3 (5.76)	3 (5.76)

Bachelors	3 (5.76)	2 (3.85)	5 (9.61)
Masters	2 (3.85)	0 (0)	2 (3.85)
NVQ	1 (1.92)	2 (3.85)	3 (5.76)
Access Course	0 (0)	4 (7.69)	4 (7.69)
Taught with other professions?**			
Yes	3 (5.76)	24 (46.15)	27 (51.9)
No	22 (42.3)	2 (3.85)	24 (46.15)
Leadership or team work experience?			
Yes	19 (36.5)	13 (25)	32 (61.5)
No	5 (9.61)	12 (23.07)	17 (32.69)
Experience in health care?			
Yes	14 (26.9)	15 (28.85)	29 (55.77)
No	11 (21.15)	12 (23.07)	23 (44.23)
Previous training?**			
BLS	3 (5.76)	18 (34.61)	21 (40.38)
BLS + airway	4 (7.69)	2 (3.85)	6 (11.54)
BLS + airway + defibrillation	11 (21.15)	1 (1.92)	12 (23.07)
Type of learning			
Multi-professional	16 (30.77)	14 (26.9)	30 (57.69)
Uni-professional	9 (17.3)	13 (25)	22 (42.31)

Total number is not the same for each variable because of missing values
*p= <.05 ** p= <.001

The leadership rating (LBDQ), team dynamics rating (ETD) and the resuscitation team tasks (RTT) measures were all significantly and positively correlated with each other at varying levels; LBDQ and ETD (*r* .559, p=.000); ETD and RTT (*r* .395, p=.004); LBDQ and RRT (*r* .330, p=.017).

There was no difference in performance between the interprofessional and uniprofessional teams in any of the ratings (LBDQ, ETD, RTT), but there were professional differences in performance. In relation to LBDQ scores there was no significant relationship between the gender of the student or their experience in a health care field. However the medical students' leadership rating was significantly higher than the nursing students (t=2.704, p= .009, 95% CI 2.54 (9.89) 17.23). This higher rating was retained in both uniprofessional comparisons of medical and nursing students and in

comparisons between medical students in interprofessional settings and nurses in uniprofessional.

In addition, students who had reported previous leadership and/or team work experience had higher leadership ratings than those who did not (t= 3.191, p= .003, 95% CI 4.47 (12.11) 19.74) and those who had received a higher level of resuscitation training were better leaders (rho - .373, p=.019).

Medical students that led teams in interprofessional settings achieved higher team dynamics (ETD) scores than nurses in the same situation (t- -2.165, p= .039, 95% CI 0.44 (8.10) 15.76). Whilst in relation to resuscitation team tasks medical students uniprofessional global rating was significantly better than nurses uniprofessional rating (t= -2.504, p= .021, 95% CI 0.87 (5.21) 9.55).

Finally we produced a linear regression model to identify the key predictors of leadership scores (LBDQ). Predictors were included if they had had shown a significant correlation or relationship with the criterion variable. Using the 'Enter' method a significant model emerged (F= 5.443, p= .002) Adjusted R square = .324 indicating that 32.4% of the variance in leadership scores can be accounted for by the variables. The main and key predictor of leadership score was the profession of the student.

Table 2 – Predictors of Leadership score

Predictor	**Beta**	**t**	**p**
Type of Learning (Inter/ uniprofessional)	-0.167	-1.193	.241
Profession of Student	-0.529	-2.786	**.009**
Leadership Experience	-0.292	-1.944	.061
Amount of previous training	-0.074	-0.384	.704

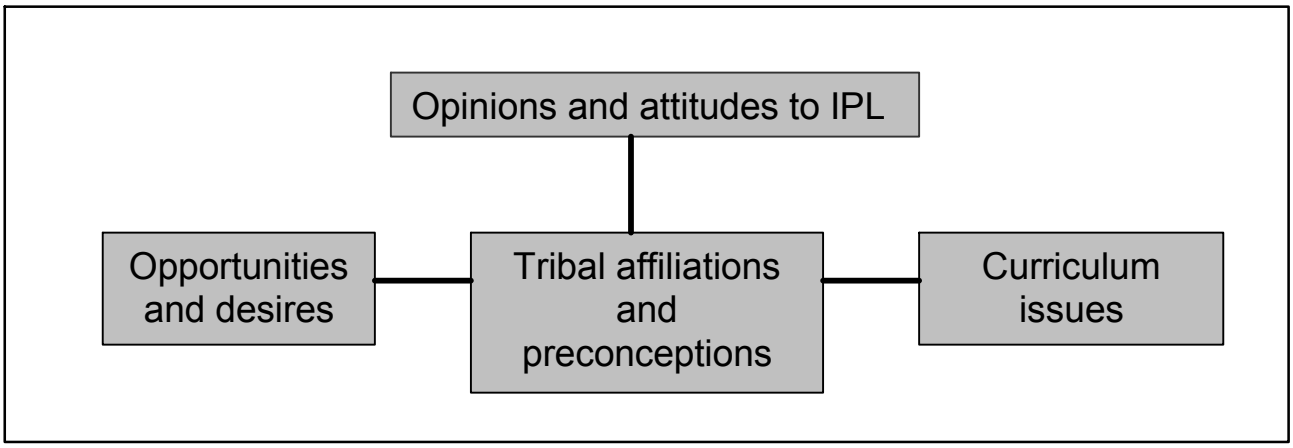
Focus Group Results

Pre existing peer and friendship groups were apparent within each group but did not appear to overtly influence the discussion as the researchers made a conscious effort to

draw in those with fewer opinions[38]. In fact the groups flowed particularly well with opinions and attitudes towards interprofessional education expressed clearly and enthusiastically. Having completed the independent phase of analysis the researchers found that they had identified very similar themes which were discussed and adapted into the following framework.

The three overarching themes are shown in Figure 1 and are discussed in detail below. Specific views about the ILS course are discussed at the end of this section. Quotes are identified from their source, e.g. multi-professional focus group student nurse = *MPSN* or uniprofessional medical student = *UPMS.*

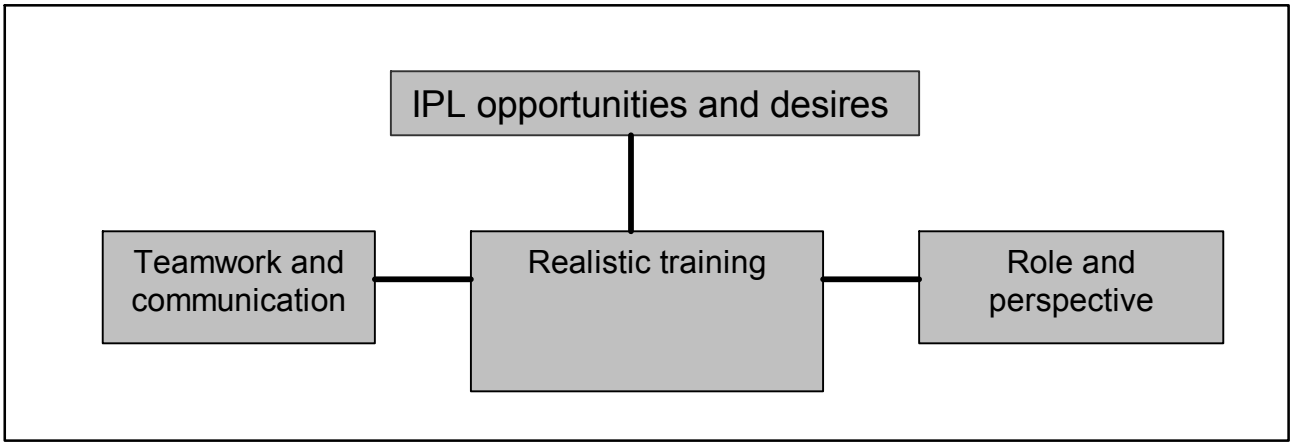
Figure 1: Opinions and attitudes towards interprofessional learning (overarching themes)



IPL opportunities and desires

Figure 2 illustrates the three sub themes associated with the opportunities and desires for IPL, expressed within the focus groups.

Figure 2: IPL opportunities and desires



Both medical and nursing students felt that IPL would enhance their working lives, for instance the opportunity to develop their **teamwork and communication** skills; for example:

> "*getting that other viewpoint so that you can understand how to communicate with the patient and the nurse to get the best result for the patient"* (MPMS).

> "*I think it* (IPL) *would make a lot of difference in practice as well if we'd had that experience before hand working together and once you get into practice you know the interactions, you know the different relationships and I think it would make a difference in the way you approach each other*" (MPSN).

Some students felt that it was more **realistic to train** with other professions, than in their professional groups, as they would be working with other professions on qualification; for example,

> "*I think realistically when you have to in the real situation you'd meet those kind of people anyway, they'd be around so it makes it more realistic if they were training with you*" (UPMS).

Students also felt that IPL would improve their understanding of professional **roles** and give them a different **perspective**; for example

"*I think we would get a different viewpoint which is always helpful. It gives you the opportunity to realise your strengths and weaknesses*" (MPMS)

"*I think it would help to banish any stereotypes both the nurses and the medical students might have of each other*" (MPMS).

Students often expressed concerns about their lack of understanding and demarcation of profession roles;

"*not really knowing who's role is what is quite important and you're never actually taught that*" (UPMS);

with the feeling that learning together would improve this situation:

"*I think it would help to modernise doctors if we did more training together*" (UPSN).

However, there were concerns that learning together would blur their sense of professional identity and make task allocation and focus more complex:

"*because only certain people can fill certain roles if that makes sense….doing that course with anaesthetic students and trying to teach them to do the intubating at the same time as teaching ourselves, would that get a bit awkward …..blurring of roles and things*" (UPMS).

In fact some of the nurses saw the doctor role as distinct, for example in leadership;

"*I don't think it's a bad thing that they take the leader's role in a resuscitation attempt in hospital because doctors do take the leaders role. It's their jobs really.* (UPSN);

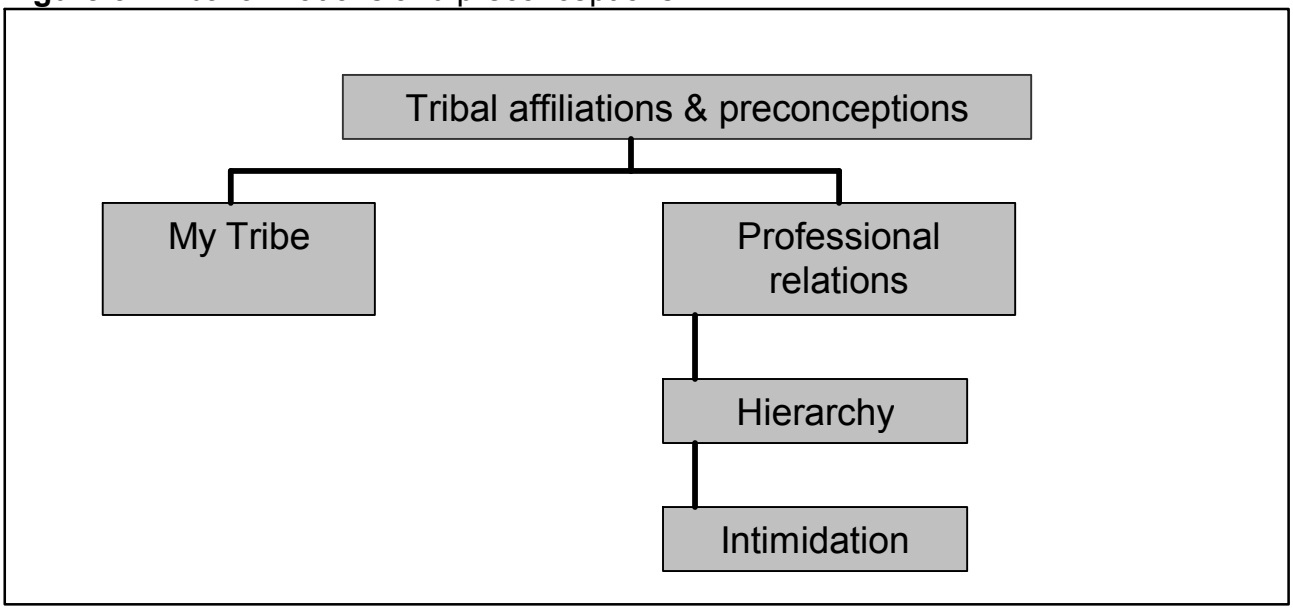
and there were concerns that:

"*you can't have nurses going round thinking he or she is a doctor which could happen*" (UPSN).

Tribal affiliations and preconceptions

In contrast to a desire to learn together there were also concerns about the hierarchical relationships, intimidation, and stereotypical notions of the professions. These sub themes are shown in Figure 3.

Figure 3: Tribal affiliations and preconceptions



Although the students recognised that interprofessional learning could provide them with opportunities to improve their working relationships some of them, especially nursing students from the uniprofessional group, still had strong reservations about learning with other professions. For instance some students felt that they had strong relations with their own group (**'my tribe'**) and would feel uncomfortable learning with other unknown professionals:

> *"I learn better in a group of people that I know and that I feel comfortable with" (UPSN).*

> *"I think we've got such a strong group dynamic now that wouldn't really mix with other students no matter who they are" (UPSN).*

Limitations to **professional relations** were highlighted by the separation of the professions in training:

"but you just feel there's a barrier straight away because we're separated. You know segregation between medics and nurses and it just seems to last doesn't it" (MPSN).

Poor relations were blamed on **hierarchical** views of medical power

"when you come up against a medic they take on this higher view, this status that I'm above you…..but you don't get that with physios or anybody or O.Ts cos they just seem more human in that respect" (UPSN);

which was reflected in another nurse's view of training:

"I immediately felt a bit anxious when I knew we were going to be working along side medics. I didn't feel that we were on the same hierarchical level" (UPSN),

and the subordinate view of the nurses role:

"doctors have trained for seven years or whatever, and they do know more medical things than us, so it should be respected" (UPSN).

In fact many of the nurses who had attended the uniprofessional group found the thought of working with doctors quite **intimidating:**

"if I was with say a group of doctors I'd feel intimidated and maybe wouldn't speak out as much as I would in a group of people that I feel comfortable wit" (UPSN).

"I wouldn't learn as well if there were doctors there. I wouldn't mind, its not the working together it's just that I think my learning would suffer" (UPSN).

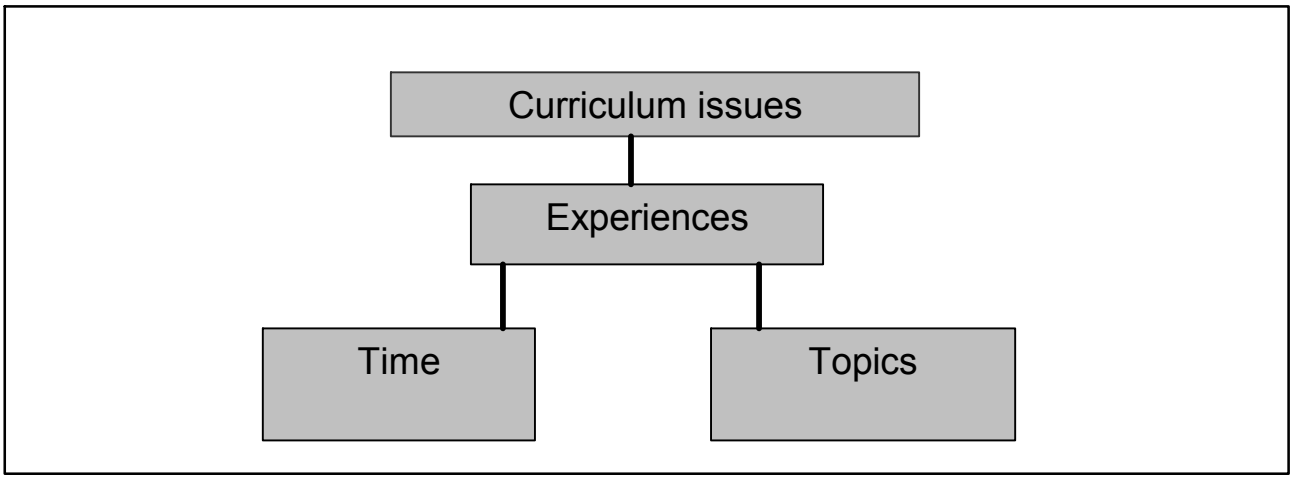
A medical student also raised this issue with concerns that

"they (nurses) *might have a vast amount of knowledge that might show you up" (MPMS).*

Curriculum Issues

The groups, based on a range of experience, had many opinions and attitudes towards their existing curriculum and how it should be organised and managed (Figure 4)

Figure 4: Curriculum issues



The nurses had experienced learning in a multiprofessional setting during their first year common foundation programme, which was run with occupational therapy, dietetics and podiatry students. The feeling was that at this early stage in their career they did not understand their own role or profession so there was little benefit in mixing with another:

> *"we couldn't tell them anything about what it is like to be nurses cos we didn't have a clue" (UPSN),*

and the nature of the teaching limited interaction:

> *"in the first year when we were in the same room as OTs, we were in a lecture theatre with about a hundred and fifty people, …..it didn't make any difference because we were all sat there listening" (UPSN).*

However when asked when the best **time** was for students to learn together the medical students felt it should be:

"from the start. If you mix it from the start then you don't have any of that us and them at all, it's like we're all in it together" (MPMS).

Both groups felt that it must continue throughout their training:

"cos if you have more learning with likes of medical students you would actually get to know them as people rather than just as a label of medical students" (UPSN).

Topics to be taught together included the view that it should be:

"any clinical activity which doctors and nurses are expected to do when they are qualified" (UPSN),

which others listed as manual handling, hand washing, injection technique, ethics, sociology, biology and resuscitation. The most cited topic however was communication skills. There were concerns, however, that the coordination of applicable levels of training would be difficult and that different professions required different skills and knowledge:

"one size won't fit all" (UPMS),

"I think doctors and nurses have different roles so it's no good teaching a doctor a nurse's role or a nurse a doctor's role" (UPSN).

Perceptions of the Immediate Life Support Course

The multi-professional groups tended to agree that, despite some initial hesitancy towards each other, learning together had been a positive experience:

"but towards the end of the day we were all as a team rather than us and them" (MPMS),

"they were asking questions of you as well, it was much more kind of we are all on the same playing field." (MPSN).

"It was quite good to have experience to work with them (medical students) *to see different approaches so I got something from it" (MPSN).*

However one nurse felt that:

> *"the doctors grew in confidence more than the nurses did as the day went on" (MPSN),*

and that there was a notable difference in the level of skills, for example, from a nurse:

> *"I really noticed that in our group the nurses had better people skills" (MPSN),*

> *"they* (medical students) *are more comfortable using the terminology of the drugs" (MPSN).*

The nurses also felt that the medical students had an advantage (on the ILS course) in that they had been taught in a

> *"much more systems orientated way" (MPSN),*

and that they were less phased by the clinical assessment scenarios at the end of the course.

Readiness for Inter-professional Learning Scale (RIPLS) results

The following report on the RIPLS outcomes should be considered a preliminary overview as outcomes from a factor analysis will be reported in a later paper. In the following summary we use the factors identified by Reid et al[30] and Mattick and Bligh[31] as a preliminary basis for analysis; namely team work; professional role; uniqueness of discipline; collaboration and patient centredness.

The questionnaire was completed by 52 (100%) participants immediately before and after the ILS course. The third distribution, 3-4 months after the ILS course, was completed by 42 (81%) participants.

All students scored significantly higher (F= 24.387, p= .000) on the **patient centredness** factor at the third RIPLS distribution. Possibly due to practice placements in the months following the ILS course.

Medical students (F= 4.545, p= .016) and multi-professional groups as a whole (F= 7.071, p= .002) had significantly higher **collaboration** scores on the second issue of RIPLS compared with the first and third. Uniprofessional and interprofessional nursing students and uniprofessional groups as a whole had no significant changes in collaboration scores; implying that medical students and interprofessional groups' attitudes to collaboration were influenced by the ILS intervention but not maintained over time.

The sub-group of nurses that learned in a uniprofessional situation had significant reductions (F= 4.315, p= .026) in their **uniqueness of discipline** scores at the second issue of RIPLS compared with the first and third, implying that they saw their role as less unique after the ILS intervention.

Discussion

This study is limited by the small sample and the broad somewhat subjective observational rating scales with the result that at times correlations are low and confidence intervals are broad. The reader should also note that the ILS intervention was of limited duration (1 day) so impact was likely to be limited. There were gender differences between the professional groups, levels of resuscitation training differed and nurses had had more exposure to interprofessional learning, but these differences had no measurable effect on the observational ratings.

Bearing in mind these issues, the study raise some interesting conclusions which adds to the body of knowledge in interprofessional education. The interprofessional teams, as a whole, did not outperform the uniprofessional teams in any of the observational ratings (LBDQ, ETD, RTT). But put another way the uniprofessional teams did no better than the interprofessional teams, despite their greater familiarity with each other. Previous leadership and team work experience did make a difference to performance whilst medical students had higher leadership ratings and tended to lead more dynamic and efficient teams. The reason for this is unknown; it may be related to greater levels of self confidence or perhaps differences in educational experience or cultural backgrounds.

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However, despite no obvious performance difference between multi- and uniprofessional groups, the RIPLS results suggest that attitudes towards collaborative practice was influenced by the ILS intervention and the focus group results broadly supported interprofessional education. There were perceived benefits for teamwork and communication skills, through an understanding of professional roles, in a setting that matched the clinical reality. But there were some concerns about hierarchical inequities and feelings of intimidation by the nurses. The development of professional identity did also appear to be an issue:

> *"there is no point in putting us all together to learn inter-professionally until we know what our profession is"(MPSN),*

which is wrapped up in the notion of 'tribal identity'. Perhaps tribal identity is not necessarily a bad thing. Tribes, in common parlance, provide security and create common meanings and objectives. What we need are open, insightful and understanding tribes who are prepared to work together for the greater good. Bringing groups together throughout their careers may brake down some of the barriers and improve collaborative practice.

The conclusions from this study are that team performance outcomes were not reduced in interprofessional settings; that interprofessional learning should be truly multi-professional (i.e. include medical students as well as nursing and the allied health professionals); and should be based on relevant episodes of collaborative learning throughout the undergraduate curriculum. In fact even for short 'one off' interventions there may be increased confidence in dealing with other professions which as Featherstone et al[41] argue, would be of benefit where optimal communication and collaboration is vital.

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Appendix 1: Leadership Behaviour Description Questionnaire (FormX11)[32,33,34,35]

In the following series of questions rate how the observed student has led his/her team Think about the teams' behaviour in general, rather than about specific situations. The questionnaire should be used as a global rating of performance at the end of a period of observation.

Use the following rating scale for each question; 4 = Always 3 = Very often 2 = About as often as not 1 = Seldom 0 = Never

LBDQ 'Initiating Structure'

1. The leader let the team know what was expected of them (*through direction and command*)
2. The leader encouraged/demonstrated the use of uniform procedures/guidelines.
3. The leader tried out his/her ideas in the team
4. The leader displayed a positive attitude
5. The leader decided what should be done
6. The leader decided how things should be done
7. The leader assigned group members to particular tasks
8. The leader made sure that his part in the team was understood by the team members
9. The team leader planned the work to be done
10. The team leader maintained definite standards of performance

Emergency Team Dynamics (ETD) rating scale: an observational rating scale for emergency teams[32,33,34,35]

Note: each item should be based on a holistic judgement of the leader/teams contribution to each factor:

Use the following rating scale for each question;
4 = Always
3 = Very often
2 = About as often as not
1 = Seldom
0 = Never

Item 1a below should only be used if the full Leadership Behaviour Description Questionnaire[32,33,34,35] *is not in use.*

1a. The leader let the team know what was expected of them (*through direction and command)*

1b. The team transferred information *(communication skills)*
2. The team were adaptable *(within the roles of their profession)*
3. The team were co-ordinated
4. The team co-operated
5. The team used initiative
6. The team put effort into its work
7. The team had a positive spirit and morale