

**Medical Students' Views about Interprofessional Clinical Skills Sessions for Delivering
Interprofessional Education**

Short Title: Developing Interprofessional Clinical Skills

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Abstract

Objective

The need to improve interprofessional collaborative working to increase patient safety is now well recognized. This has led to interprofessional education (IPE) becoming a familiar component of medical education in the United Kingdom. Advocates of IPE are encouraged to evaluate their initiatives and share findings to contribute to the evolving evidence base for delivering effective and innovative IPE. Norwich Medical School (NMS) has developed a form of IPE focused on clinical skills, which involves students from different healthcare professions working in partnership. This paper describes the sessions and presents evaluation findings from the medical students.

Methods

Medical students' views about engaging in interprofessional clinical skills sessions (ICS) with students from pharmacy, nursing or paramedic science were analysed using data from 1030 end-of-year course evaluations completed between 2013-2017. Year 4 and 5 medical students from a five-year undergraduate Bachelor of Medicine and Bachelor of Surgery (MBBS) degree course in the UK participated in the study.

Results

Medical students commented on the ICS format being engaging and useful; with clinically authentic OSCE-style simulations being relevant for both upcoming clinical exams and future clinical practice. It was also preferred to classroom-based IPE activities the students had undertaken in earlier years of the course. ICS was regarded as an effective way of learning about their role and responsibilities, those of other healthcare professions, and how different professions complement each other. Medical students felt that ICS helped develop their interprofessional teamworking skills and it was regarded as a highly satisfactory activity.

Conclusions

The findings suggested that ICS was effectively contributing to the development of interprofessional collaborative working skills in medical students. Furthermore, the ICS was enabling the medical students to practice safe delivery of care in their roles as a doctor in collaboration with other members of a multi-disciplinary team.

Keywords: Interprofessional Education, Interprofessional Learning, Interprofessional clinical skills, Evaluation, Medical Students, Simulation.

Introduction

The safe delivery of healthcare requires the unified efforts of a wide range of allied health and social professionals. Despite being dependent on one another to deliver high-quality care, these professions historically trained in isolation ^[1,2]. In recent years, the importance of improving interprofessional collaborative working to increase patient safety has rapidly gained recognition ^[1,3-5], and interprofessional education (IPE) has become a familiar component of medical education in the United Kingdom (UK) ^[1,6].

At the outset of the millennium little evidence was available to guide the development and delivery of IPE ^[1]. Subsequently, over the course of the first decade, many approaches appeared within undergraduate medical curricula with varying outcomes ^[1,7-9]. Since then, guidelines for successful IPE ^[10-13] have become more frequent. However, institutions championing new approaches to IPE are still encouraged to evaluate their initiatives and publish their findings to promote continued development and learning.

This paper describes medical students' views about an IPE initiative using clinical skills to encourage collaborative working between medical and other healthcare students at a UK university.

Introducing IPE at Norwich Medical School

Norwich Medical School (NMS) at the University of East Anglia (UEA), UK, established its five-year undergraduate Bachelor of Medicine and Bachelor of Surgery (MBBS) degree in 2002. As a new school, NMS was able to design and launch a modern curriculum incorporating IPE throughout the course. Between 2002 and 2009, IPE opportunities at UEA were mainly classroom-based ^[14-16] and underpinned by adult education theories ^[17], and the modified contact hypothesis presented by Brown and Hewstone ^[18], which emphasizes the need for face-to-face purposeful and supported learning environments.

However, feedback from medical students regarding these classroom-based IPE activities indicated that whilst students had appreciated the opportunity to meet students from other healthcare professions and to learn about their syllabus and profession's role in the multidisciplinary team, they desired IPE activities with a more clinical focus in a situational learning environment. In response to this feedback, in 2010 the NMS clinical skills team devised a practical IPE opportunity that was centered round clinical skills.

The principal objective of these interprofessional clinical skills sessions (ICS) is to offer an interprofessional learning (IPL) opportunity with a focus on clinical skills relevant to the professions involved (e.g. prescribing or manual handling) with a view to enhancing interprofessional competency between participants as they perform these skills together in a simulated 'real' setting. The ICS require students to problem solve together during six timed,

formative, objective structured clinical examination (OSCE) style, practical scenarios (see Box 1 in the Supplementary Material for the themes of the 6 stations for each ICS). The scenarios provide a range of challenges/tasks derived from those likely to be experienced in their future practice. Half of the scenarios are designed to be led by medics, the other half will be led by their colleague from a different profession. All scenarios require collaboration and input from both professions. There were no formal marks or grades awarded, but tutors gave immediate feedback to the student pair (for some scenarios feedback was provided to a small group comprising of three pairs).

The ICS are delivered to full cohorts as a mandatory requirement. At the time of writing, Year 4 medical students are participating in an ICS with final-year pharmacy or second-year paramedic students, and Year 5 medical students participate in an ICS with final-year nursing students. Learning is facilitated by tutors from the professions involved, who provide clinical guidance when required and facilitate team reflection at the end of each scenario. A more detailed description of the evolution of ICS at NMS can be found in Webb et al. [19] and an outline of the paramedic ICS in Nagraj et al. [20].

Methods

Study Design

This is an evaluation of medical students' views of the ICS using a course evaluation survey collecting quantitative and qualitative data. Medical student feedback is the focus of this evaluation, as the intervention was designed and implemented to address suggestions and short comings identified in previous years' medical student evaluation surveys regarding their experiences with the existing classroom-based IPL activities on the MBBS. Additionally, medical students participated in ICS in both Year 4 and 5, working with a different health

profession each time. All medical students then completed the same compulsory annual evaluation survey; this allowed efficient, comparable data collection from a large number of students. Unfortunately, there is not an equivalent survey currently completed by students from the other healthcare professions involved to include in this paper.

Sample

All NMS students are required to complete annual evaluations during their five-year course of study to actively contribute to the quality assurance and ongoing development of the MBBS course through providing feedback on their experiences. The ICS were evaluated by all Year 4 and 5 NMS students two-thirds of the way through their fourth year and at the end of their fifth year for four consecutive academic years; 2013-14 to 2016-17. Approval was obtained from the NMS' Faculty's Research Ethics Committee to ask students for their consent to use the data they provide in the course evaluations anonymously for additional purposes, i.e. research, presentations, publications, and NMS promotional activities. Students were provided with full details of how their feedback might be used via a question and answer format information sheet and they were able to contact the medical school's course evaluation lead (author SM) with any questions before choosing whether or not to provide their consent on the accompanying consent form. The sample comprised of those students who gave consent for their evaluation data to be used for publication purposes.

Data collection

Students were sent an individual link to their own copy of the online evaluation form, hosted by SurveyMonkey, with up to three reminders to their university email address. In all four academic years, students were asked to rate their overall satisfaction with the ICS in a single closed question (rated on 5 points, from 1 = Not at all satisfied to 5 = Completely satisfied)

and to provide comments on the most useful aspects of the session and what improvements they would suggest for the future via two open-ended questions. Students are asked to complete this set of three questions about *every* area of the MBBS course in their annual evaluation form each year. Using a core set of questions enables NMS to monitor the quality of each aspect of the course over time, and to compare student satisfaction across different aspects of the course. Where ratings of satisfaction are low, responses provided by students to the two open-ended questions are used to understand where the strengths and weakness of that aspect lie, with a view to making improvements for the future. For the first academic year questions related to the ICS were included in the annual evaluation (2013-14), the students were provided with four additional closed questions where they were asked to rate their agreement with statements about the value of the ICS for their learning. The four questions related to stated learning objectives of the ICS; the purpose in asking these questions was to ascertain whether the student experience of the sessions was in line with these objectives. See Supplementary Material, Box 2 for all questions asked and response options.

Data analysis

Data from SurveyMonkey were imported into Microsoft Excel 2013. Analyses on the quantitative data were performed in Excel and IBM SPSS Statistics 22. There were five dependent variables (the five closed questions) and three independent variables (gender, age group and year of study). Non-parametric analyses were performed (Chi-square test) as the data were ordinal. A corrected significance level of $p = 0.01$ (Bonferroni correction: $0.05/5 = 0.01$) was used, as multiple tests were being performed for each independent variable. The qualitative responses provided to the two open-ended questions were subjected to basic content analysis by two of the authors (SM, HKB) to categorize and summarize the data.

Results

Consenting sample

For the four consecutive cohorts of students between 2013-14 and 2016-17, 1158 medical students completed the annual evaluation in Years 4 and 5 (100% of the Year 4 and 5 cohorts in these four academic years). Of these, 1030 (89%) consented for their evaluation data to be used in a publication (see Table 1). Demographic data gathered in Year 1 indicated that there were more female than male students and a slight majority had come straight from secondary education and were 18 years of age or younger on admission (Table 1).

TABLE 1 ABOUT HERE

Findings from the quantitative data

Data showed that the students had found the ICS to be an effective learning exercise (Table 2). In the first year of evaluation (2013-14) across both Years 4 and 5 it was found that over three-quarters of the students agreed or strongly agreed that this type of exercise enabled them to “learn about my own and others’ respective professional roles and responsibilities”, helped them “develop my own interprofessional teamworking skills”, was an effective way of learning about the clinical skills being taught, and was an “effective way of learning about how these two professions complement each other’s skills” regarding prescribing (Year 4) and clinical skills (Year 5). Across both Year 4 and 5 students over the four academic years overall satisfaction with the ICS was high, with 71% of the students being very, or completely satisfied.

TABLE 2 ABOUT HERE

There were no differences between male or female students, or between students of different ages in their level of agreement with the statements or how satisfied they were with the ICS (data not reported here). However, there was a tendency for the ratings from Year 5 medical students to be higher than those from Year 4 students across all five questions, but this only reached significance for two questions (Table 2). Paramedic students were first introduced to the Year 4 ICS in 2015-16 (prior to that the ICS included medical and pharmacy students only); further analysis of the Year 4 data for 2015-16 and 2016-17, indicated that there was no difference in overall satisfaction with the ICS for the medical students who had been paired with a pharmacy student partner versus those with a paramedic student partner (data not reported here).

Findings from the open comments

Students were asked to comment on the aspects of the ICS that had been most useful for their learning needs and to provide any suggestions they had for improvement (see Supplementary Material, Boxes 3 and 4 respectively for example comments). Whilst there were some minor differences in comments about specific practical issues which were noted for attention over the four academic years, the feedback was otherwise similar over time and across both Year 4 and 5 students. Students' responses indicated that IPE delivered through formative OSCE-style clinical scenarios was found to be enjoyable, fun, interesting and useful. It was also felt to be a reflection of true multidisciplinary team (MDT) work, thus making it a relevant learning experience. Students had found it useful to identify their own role and skills within the partnership while working through each clinical case, and then coming to understand how their counterpart as a pharmacy, nursing, or paramedic student could contribute additional skills and knowledge. Students mentioned that the activity led to new insights into their

counterpart's course, their skill-set and role within the MDT. Furthermore, medical students expressed specific skills sets being enhanced in this joint alliance, such as communication skills, delegation, knowing when to lead and when to step back, and ultimately how to integrate different skill-sets to ensure synergistic clinical decision making for optimal patient care.

Students expressed a desire for more similar learning opportunities earlier on and throughout the course; often linked to comments indicating that students preferred this style of IPL to the classroom-based learning activities that they had completed in earlier years. Students' particularly enjoyed the OSCE-style stations as they felt it provided a good opportunity for OSCE practice and working on simulation models, thus allowing them to prepare for their clinical assessments on simulated patients. Related to this, students valued the real-time feedback provided by tutors during the activity, since it gave them valuable insight into their current knowledge and skill-base.

Effectiveness of the IPL process was felt to fall short whenever there was poor engagement, or participation from their counterpart; such as when their partner showed an unwillingness to take the lead or appeared to lack knowledge about their role or the skill required. In some cases, medical students felt this might be due to their partner being too early in their own training to optimally participate in the activity. Some students mentioned a lack of information prior to the ICS, which prevented them from preparing for the activity beforehand and was felt to be particularly problematic for their counterparts from other professions. Some felt their partner lacked experience with simulation models and OSCE-style activities which, when combined with a lack of preparation, left the other students unclear as to what to expect during the session. Some medical students described a lack of

clarity in the scenarios, regarding what was expected in a particular activity, or in relation to who was supposed to lead for different components. Some felt that there was an imbalance in some scenarios, such that one member of the pair had less to do. Additionally, practical issues were highlighted, including the timing of the activity alongside other medical course activities and assessments. Furthermore, as the number of students from each profession can be uneven a few students had to work as part of a triad, and occasionally a pair of medical students completed the scenarios without a colleague from a different healthcare profession; the students recognised this as being less useful from an IPE perspective.

Discussion

Data collected from medical students in Years 4 and 5 of a five-year MBBS course, over four successive academic years from over a thousand annual evaluation surveys, repeatedly demonstrated the perceived value of ICS to medical students of all gender and age. Whilst medical students had found the classroom-based IPE activities of the early years of the MBBS to be an enjoyable opportunity to interact with students from other health professions and they had been interested to hear about the other students' training, they consistently fed-back a preference to have their IPL in a more practical, clinical context. The objective when developing the ICS was to provide a practical IPL experience, which centered around clinical skills pertinent to the health professions involved, performed in a simulated 'real' setting; with the aim of enhancing skills needed for interprofessional collaborative working that promoted safe care to patients. The findings reported here suggest that this objective was successfully met, and that the ICS was a valuable addition to the Norwich Medical School medical students' IPL experiences (see also ^[19,20]).

As outlined in the results, ICS was consistently reported by medical students as an effective and satisfying form of IPE and it was preferred to the classroom-based learning. A key reason given by students for scoring these IPE sessions so highly was the simulated clinical environment which helped the students to make connections with 'real' practice; as has been reported previously in the literature (e.g. [21,22]).

The desire to practice skills for their assessments was also given as a reason why the medical students rated ICS as a more worthwhile exercise than previous IPE experiences at NMS, as discussed by Lindqvist et al. [15]. Although exam preparation was not the primary aim of ICS, the feedback indicated that students valued the opportunity to practice working through problems in a multiple, timed, station format they could relate to their future OSCEs and that they perceived a benefit from real time feedback.

Many students commented on the authenticity of the scenarios, describing them as a true reflection of MDT work. Each healthcare professional can observe something different in the same clinical setting. This diversity in observation and information synthesis can be a key ingredient to enable holistic and seamless care. As the scenarios identified gaps in their own knowledge, ICS enabled the medical students to step back in a safe environment and observe their colleagues' expertise in motion, this allowed students to learn about their counterpart's role and value their professional input, which is important in producing positive outcomes of IPE and patient care [10].

Although 71% of the 1030 students described themselves as being 'very, or completely, satisfied' with the experience, it was interesting that the feedback was significantly more positive from the Year 5 than the Year 4 students. This may be the result of Year 5 students

being just a few months away from entering clinical practice and thus spending much of their final year on placement in the hospital. Increased clinical exposure provides insight into the practicalities of working in the ward environment and with other professionals. It is possible that they consequently valued these sessions more highly as opportunities to practice interprofessional skills and learn about their colleagues' roles. This theory is supported by McFayden et al. [23] who found that students in their longitudinal study scored 'perceived need for cooperation' and 'positivity of attitude towards IPE' more highly as they progressed through their studies and gained clinical exposure.

Tunstall-Pedoe and colleagues [24] warned that IPE can also foster negative attitudes. This highlights the need to address the findings presented here that some medical students felt that their counterpart during the ICS lacked engagement. Potentially, this could translate to a long-term negative view of the wider profession if left unattended. This emphasises the importance of debriefs during the ICS to encourage reflection on the interaction, and also the value of involving tutors from both professions so that students can have exposure to role models from each. The significance of debriefs and preparation of tutors is also reported by Nagraj and colleagues [20] who looked specifically at the interaction between the medical and paramedic students at NMS.

According to Brown and Hewstone [18] and the contact hypothesis, students need to be on equal footing in order to have an optimal IPE experience. Our findings demonstrate that despite best intentions, this is not always the case. The OSCE-style format of this simulated learning environment, although beneficial to the medical students, may have contributed to hindering other professions from contributing their knowledge and skills. Other healthcare

professions at UEA are less familiar with the OSCE-style approach and thus may have felt uncomfortable taking the lead and thus effectively engaging with the task.

To address the issue of unequal contribution to the ICS activity, each scenario now clearly indicates which profession is expected to lead the scenario. Additionally, to encourage communication around decision-making and the leadership role, students are now given a chance to plan their approach before each scenario begins. Having increased clarity at the beginning addresses some of the points raised in student feedback reported in this study, and has resulted in improved sessions. The ICS tutors also play a key role here in supporting students who may feel less confident with the format.

Another issue identified in the open feedback, that of failure to pair students evenly from each profession is more difficult to address due to variation in cohort size and illness or non-attendance on the day. But it has been acknowledged that this has a negative effect on effectiveness of the session and so every attempt is now made to find an optimal solution with the numbers that attend. It has also been recognised that pairing students with students from their own profession in response to a shortage is not an acceptable solution. While students may gain benefit from practicing the clinical skills and being encouraged to think from the perspective of another profession, this is not allowing professions to learn with, from and about one another, and so by definition is not IPL ^[25,26]. Students are now placed in triads, as opposed to same-profession pairs, should a cohort malalignment arise.

Specific examples of changes made in response to student feedback can be seen for the Year 5 medical and nursing student ICS in Boxes 5 and 6 of the Supplementary Material (details of the ICS with paramedic and pharmacy students can be found elsewhere ^[19,20]). From initial

piloting in 2012-13 through the four years of evaluation reported in this paper a number of changes were made to improve the students' IPE experience. Subsequently, the content of the stations and instructions have been largely unchanged from 2017-18 to the present, and student feedback is now consistently positive (aside from occasional 'on the day' issues). The value of regular student feedback in supporting the development of this new IPE experience has been readily apparent throughout the period of time reported in this paper. Even for a learning opportunity such as this which has been highly regarded by the students since its introduction, consistent feedback has identified areas which can be, and have been, addressed to optimise the value of the IPE experience for the students.

The main limitation of this evaluation of student experience of ICS as a learning experience and vehicle for IPE is that the results are based on feedback from only medical students, as part of an MBBS annual evaluation form which is not specific to the ICS. McFadyen et al. [23] report in their longitudinal study of the effectiveness of a four year IPL intervention, that there was a significant difference between professions in their response to the intervention. Although we have different forms of feedback gathered from other professions about the sessions (an internal satisfaction questionnaire was completed by all students during the paramedic ICS immediately after the intervention [20]), the annual evaluation is carried out by NMS and we do not have equivalent data for the nursing, pharmacy or paramedic students. We are therefore unable to equivocally determine if this activity was found to be equally beneficial by all professions, or if the same issues reported by the medical students were perceived by students from other professions.

As with almost all other IPE evaluations, although our results show high satisfaction with the ICS and high agreement to the statements given, we appreciate that this is only an indicator

that successful IPL has actually occurred. We thus recognise that our evaluation remains a surrogate marker of the achievement of the goal of IPE, which is to improve interprofessional collaborative working with the aim of increasing the quality and safety of care [11,12,27].

Although we have no empirical data to demonstrate the effectiveness of the ICS in achieving this goal, the comments provided by the medical students regarding what they found most useful indicates that they recognise the value of the ICS for their learning and their future practice working alongside colleagues from other health professions. As such, the data collected over four years presented here suggest that this type of IPE intervention is likely to have a tangible positive impact on future interprofessional collaboration and quality of care.

Conclusions

In conclusion, data collected from medical students' annual evaluations over four consecutive years show an overall and consistently high satisfaction with the ICS as a vehicle for IPE.

Medical students believed that these sessions would help them prepare for their future practice, as well as their clinical assessments. The clinically authentic, OSCE-style simulations format was preferred to earlier classroom-based IPE activities. The ICS helped them clarify their role, the boundaries of their profession and what other professions can contribute in terms of skills needed to provide holistic and safe care. The main challenge reported by students was a perceived lack of contribution by the other profession at times. But, as was intended during its development, the feedback indicates that the ICS is supporting the medical students in developing a variety of collaborative working skills alongside other student health professionals at UEA and is providing a valuable opportunity to practice delivery of care in their roles as both doctor and as member of a multi-disciplinary team.

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Ethical approval: As outlined in the Sample sub-section of the Methods section, use of the students' course evaluation data for publication purposes was approved by the Faculty's research ethics committee. This study has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. As further outlined, all students gave their explicit opt-in informed consent prior to inclusion of their data in this study.

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Table 1. Demographic details of the sample consenting for their data to be used for publication purposes (*data collected in Year 1: 23 students did not provide their age or gender at that time*)

		Year 4	Year 5	Both Year Groups
Academic Year	2013-14	123 (23%)	131 (27%)	254 (25%)
	2014-15	138 (26%)	123 (25%)	261 (25%)
	2015-16	145 (27%)	116 (24%)	261 (25%)
	2016-17	131 (24%)	123 (25%)	254 (25%)
	<i>TOTAL</i>	<i>537</i>	<i>493</i>	<i>1030</i>
Age	≤ 18 years	225 (42%)	171 (35%)	396 (38%)
	19-21 years	195 (36%)	172 (35%)	367 (36%)
	≥ 22 years	100 (19%)	144 (29%)	244 (24%)
	Unknown	17 (3%)	6 (1%)	23 (2%)
Gender	Male	197 (37%)	191 (39%)	388 (38%)
	Female	323 (60%)	296 (60%)	619 (60%)
	Unknown	17 (3%)	6 (1%)	23 (2%)

Table 2: Number (and percentage of respondents answering that question) of students who Agreed or Strongly Agreed with each statement.

Statement	Year 4	Year 5	Overall	Chi square (df)
Learn about own and other's roles and responsibilities <i>(question asked in 2013-14 only)</i>	74 (68%)	100 (83%)	174 (76%)	7.506 (2), not significant
Develop own interprofessional teamworking skills <i>(question asked in 2013-14 only)</i>	84 (78%)	102 (86%)	186 (82%)	3.055 (2), not significant
Learn how the two professions complement each other <i>(question asked in 2013-14 only)</i>	75 (69%)	104 (87%)	179 (78%)	10.876 (2), $p < 0.004$
Effective way of learning about prescribing (Year 4) / clinical (Year 5) skills <i>(question asked in 2013-14 only)</i>	95 (87%)	101 (86%)	196 (86%)	0.118 (2), not significant
Overall satisfaction with ICS session <i>(question asked in all academic years)</i>	330 (67%)	349 (76%)	679 (71%)	10.854 (2), $p < 0.004$