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Integrating an interprofessional educational exercise into required medical student clerkships – a quantitative analysis

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Abstract

Purpose Medical students are integrated into an interprofessional team to help them learn how to provide effective, patient-centered care. Indiana University School of Medicine (IUSM) introduced a unique, easy-to-implement interprofessional exercise into each clerkship to improve students' understanding of each professional's contribution to patient care.

Methods Between 2022 and 2023, IUSM medical students interviewed a variety of healthcare professionals engaged in the care of mutual patients using a template of questions; they wrote a brief report and evaluated the experience. Students interviewed a different professional in each clerkship to broaden their exposure.

Results 3088 encounters occurred, 68% at the Indianapolis campus and 32% at regional campuses. More than 82% of students agreed or strongly agreed to each of the following prompts regarding the exercise: aided their understanding of the benefits of an interprofessional team to patient care, better understood when participation of the specific healthcare professional would benefit their patient, the experience contributed to their understanding of the role of that profession within the healthcare team, their confidence in engaging other healthcare professionals on the health care team improved, and the experience aided in understanding of their own role as a member of the health care team.

Conclusion This exercise was easy to implement across a multi-campus system and improved student comprehension of the interprofessional team and indications for their engagement in patient care.

Keywords Interprofessional, education, IPE, clerkship, clinical rotation, medical education, med ed, medical student

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Introduction

Medical education's three-legged stool includes the classic foundational and clinical science curricula, and health systems science. Effective and successful physicians must be able to function within complicated healthcare systems as members of a health care team. Thus, preparation for that role with high quality interprofessional education (IPE) is of increasing importance. No matter what clinical context is considered, there are many interactions and handoffs between members of various healthcare professions that occur in the care of the individual patient [1]. To facilitate effective patient-centered care, healthcare team members must understand the roles and responsibilities of other professions. Enabling the creation of highly functioning collaborative health care teams built on mutual understanding, trust, and respect, may yield improved health care outcomes for individuals and communities [2–6].

Background

In US schools of medicine, IPE has classically been taught in the foundational curricula through classroom interactions and simulations. These exercises foster interprofessional familiarity and some understanding of team learning and collaboration. They are administratively challenging because of differences in daily schedules, academic calendars, and curricular structures among different health professions programs. The careful coordination and staffing needed may be costly [4, 6–13]. Additionally, these events in isolation may result in the perception that IPE only occurs in these artificial settings, rather than organically in clinical environments. Other strategies utilized have included shadowing experiences for pre-clerkship students so that they can witness the scope of practice while engaged in clinical care. Within the clerkship environment, isolated exercises have been created within select rotations. Rarely do these experiences span the entire clerkship year in a longitudinal fashion [3, 14–23]. During the past 15 years as faculty worked to introduce and optimize IPE in medical schools, medical student satisfaction has been mixed. Early on, they expressed dissatisfaction with lectures and large-scale "one-off" activities that were outside the core medical education curriculum and were seen as artificial [24]. In the last five years, student satisfaction has improved with the introduction of active learning, hybrid models, and small group activities, in particular those at the bedside with other health professions students or professionals [5, 25, 26]. Our literature review did not reveal a simple, low-cost, patient-centric interprofessional education exercise similar to the one reported in this paper.

Indiana University School of Medicine (IUSM) is a 9-campus system with approximately 365 students per class, the largest allopathic medical school in the United States. All four years of the medical school curriculum are offered at all campuses. The IUSM IPE curriculum has been a cornerstone of the foundational years' curriculum, including an immersive experience immediately prior to the clerkship phase, working with students from a variety of disciplines and incorporating the core Interprofessional Education Collaborative (IPEC) competencies. Medical students meet with their student colleagues from other health professions to collectively discharge a standardized patient. However, the coordination of the event is arduous across a multi-campus system and necessitates individualization at each campus to align with available healthcare professions or students. The core curriculum previously did not provide a formal IPE exercise within the clerkships, although students were exposed to multiple healthcare professions while performing their clinical duties.

The third-year clerkship phase of training at IUSM includes the following eight required rotations: Family Medicine; Internal Medicine; Neurology; Obstetrics and Gynecology; Pediatrics; Psychiatry; Surgery; and Anesthesiology. The fourth-year program includes an Emergency Medicine clerkship. IUSM undertook a pilot IPE exercise that could be integrated into each clerkship for all the students. With the integration across core clinical experiences, IUSM hoped to provide a deeper appreciation and understanding of interprofessional care.

The specific goals were to expose students to multiple different healthcare professionals, to foster an understanding of the roles of each professional's contribution to patient care, to increase comprehension of the benefits of an interprofessional care team to patient care, to improve the student's confidence in engaging with other professionals on the healthcare team, and to foster understanding of the medical student role on the team. The exercise would feature patients for whom the student and other healthcare professionals provided care during each rotation.

Methods

An interprofessional exercise was adopted for a pilot program at IUSM that had been previously developed and piloted by two of the authors at another medical school, serving as Associate Dean for Curriculum (RP) and Vice Dean for Academic Affairs (PMW). Both were involved in pilot creation, planning, survey development, and implementation at the prior institution. The results of that pilot were not published. The specific program objectives were modified to align with the institutional learning objectives of IUSM and to reflect the multiple professions integrated into the healthcare teams at the various healthcare centers throughout IUSM. To capture campus and clerkship specificity, these questions were added to the exercise (Supplementary file).

All students were required to complete the IPE exercise in each of the year 3 and 4 clerkships. The students were instructed to interview a healthcare team member who was actively involved in the care of one of the student's patients during clerkship. The interview was organized into two components, with guided questions provided to facilitate the conversation. The students first asked about the shared patient, including determining the most important issues from the other healthcare professional's perspective as well as the findings and recommendations made for the patient. The second component focused on fostering further understanding of the profession such as the healthcare professional's motivation for career selection, the educational requirements and scope of practice. Students were asked to interview an individual from a different healthcare profession during each clerkship to ensure a greater breadth of learning.

Following the interview, students answered nine questions documenting the discussion and then six multiple choice questions to evaluate the exercise (Table 1).

They also completed a brief reflection to the following prompt: *How do you think this healthcare professional improved patient care, the patient experience, and/or potentially patient outcomes?* The estimated time to complete the written assignment was 10 min. The assignment was placed on the Canvas Learning Management System® within each clerkship's specific site. It was listed as a mandatory element and delivered through the quiz feature so that student responses could be collated and analyzed.

With the approval of the school's curriculum committee, the IPE exercise was initiated in all clerkships on May 8, 2022, at the beginning of the 2022–2023 academic year as a required component of the curriculum. The assignment data analyzed consisted of results from May 8, 2022, through April 25, 2023. All submissions during that period were included in the data analysis.

The assignment data was extracted and de-identified from each clerkship's specific site from the Canvas Learning Management System® and was imported into JMP Statistical Software® and Microsoft Power BI® and analyzed. Because this study used only de-identified educational data, consent was not required by the Indiana University Human Subjects Protection Program.

Results

From May 8, 2022, through April 25, 2023, 3088 submissions across the Year 3 and Year 4 clerkships were collected. The average number of submissions per clerkship was 343 (range: 293–362) with differences attributable to scheduled student enrollment. 68% of the submitted experiences were in Indianapolis (the "main" campus) and 32% were at regional campuses.

The majority of student interactions with health professionals occurred in an inpatient setting with 2121 encounters (69%) compared to 967 (31%) encounters in an outpatient setting. Students most frequently interacted with registered nurses and licensed practical nurses with 668 encounters (22%) followed by pharmacists with 291 encounters (9%). The third most encounters were with nurse practitioners and medical assistants. Interestingly, social workers were the fourth most encounters. The "Other" category was selected in 199 (6.4%) encounters. "Other" included administrators and any healthcare professionals not listed below. It is interesting to note that in contrast to other professionals, medical assistants and genetic counselors were more frequently encountered in the outpatient environment. (Table 2)

Table 1 IPE Exercise Assignment Questions and Student Evaluation Questionnaire

Please indicate the date the conversation was held with the other healthcare professional/health profession student.
Please select which Clerkship you were rotating on when this conversation was held:
Please select which Campus you completed this activity.
What was the diagnosis of the patient you and the other healthcare professional/health profession student cared for?
What was the care setting? (outpatient, inpatient)
Which type of health care professional/health profession student did you interview?
If "Other" was selected for the question above, please indicate which type of health care professional/health profession student was interviewed.
Did you interact with a student studying that profession or a healthcare professional?
Reflection: How do you think this healthcare professional improved patient care, the patient experience, and/or potentially patient outcomes? (Minimum 1–2 paragraph response required)
Scope of IPE Team: Please recall all the health care professionals who were involved in the care of your patient (identify as many as you can recall).
For each of the following items, indicate your agreement using the 5-point Likert scale (strongly disagree to strongly agree)
This experience has contributed to my understanding of the role of this profession as part of the health care team.
I understand when participation by this health professional would potentially benefit my patient.
This experience aided my understanding of the benefits of an interprofessional care team to patient care.
As a result of this experience, my confidence in engaging other professionals on the health care team improved.
This experience aided in my understanding of my role as a member of the health care team.
This experience was centered on the care of at least one of my patients.

Table 2 This figure shows the number and percentage of interactions for each type of healthcare professional in each the inpatient and outpatient settings. The first two columns show the number and percentage of inpatient and outpatient encounters, respectively. The third column shows the number and percentage of total inpatient and outpatient encounters combined

Type of healthcare professional/health profession student	Inpatient Setting Interactions (Number/%)	Outpatient Setting Interactions (Number/%)	Total Interactions (Number/%) Percentages reflect the portion of total interactions with each particular profession out of the total number of reported interactions
	Percentages reflect the portion of interactions with each particular profession that occurred in the inpatient vs. outpatient settings		
Nurse – LPN or RN	**481** (72%)	**187** (28%)	**668** (22%)
Pharmacist	**237** (82%)	**54** (19%)	**291** (9%)
Nurse Practitioner (NP)	**155** (56%)	**122** (44%)	**277** (9%)
Medical Assistant (MA)	**7** (3%)	**269** (97%)	**276** (9%)
Social Worker	**228** (87%)	**33** (13%)	**261** (8%)
Other	**123** (61.8%)	**76** (38.2%)	**199** (6.4%)
Surgical Scrub Technician	**156** (82%)	**35** (18%)	**191** (6%)
Physician's Assistant (PA)	**123** (69%)	**56** (31%)	**179** (6%)
Anesthetist – CAA or CRNA	**142** (85%)	**25** (15%)	**167** (5%)
Dietician	**74** (83%)	**15** (17%)	**89** (3%)
Respiratory Therapist	**76** (92%)	**7** (8%)	**83** (3%)
Physical Therapist	**62** (91.2%)	**6** (8.8%)	**68** (2.2%)
Midwife	**44** (88%)	**6** (12%)	**50** (2%)
Speech Pathologist	**40** (89%)	**5** (11%)	**45** (1%)
Behavioral Therapist	**33** (79%)	**9** (21%)	**42** (1%)
Psychologist	**22** (58%)	**16** (42%)	**38** (1%)
Chaplain	**30** (88%)	**4** (12%)	**34** (1%)
ORA – operating room assistant	**26** (93%)	**2** (7%)	**28** (1%)
Genetic Counselor	**3** (12%)	**23** (88%)	**26** (1%)
Lactation Consultant	**21** (88%)	**3** (12%)	**24** (1%)
Emergency Medical Technician	**16** (84%)	**3** (16%)	**19** (1%)
Dentist	**10** (53%)	**9** (48%)	**19** (1%)
PCA – patient care assistant	**12** (86%)	**2** (14%)	**14** (0.5%)
Total	**2121** (69%)	**967** (31%)	**3088**

There was a fair amount of variability in the top three healthcare professions that students interacted with in each clerkship as shown in Table 3 below. Of note, in Obstetrics and Gynecology and in Neurology, the “Other” designation was the third most encountered group. The main identified professions for “Other” in Obstetrics and Gynecology included administrators, doulas, child life specialists, medical interpreters, and ultrasound technicians. The main identified professions of “Other” for Neurology consisted of occupational therapists, technicians, administrators, medical scribes, and art therapists. This reinforces that many health professionals are involved in the care of patients, and emphasizes the importance of interprofessional education, and ultimately, interprofessional patient-centered care.

Students performed this exercise in both the inpatient and outpatient settings and evaluated the program very highly. As shown in Figs. 1 and 85% agreed or strongly agreed that the experience aided their understanding of the benefits of an interprofessional team to patient care. 94% agreed or strongly agreed that they understood when participation of the specific health care professional would benefit their patient. 86% of students agreed or strongly agreed that the experience contributed to their understanding of the role of that profession within the healthcare team. 83% agreed or strongly agreed that their confidence in engaging other healthcare professionals on the health care team improved. 83% agreed or strongly agreed that the experience aided in their understanding of the medical student role as a member of the health care team. Confirming that students followed instructions most of the time regarding a discussion surrounding one of their actual patients, 94% agreed or strongly agreed that the experience was centered on the care of at least one of the student’s patients. 88% of the encounters were with health care professionals, 4% occurred with students in other healthcare professions, and 8% involved both a professional and a student.

Discussion

Interprofessional Education is a cornerstone of patient-centered care. Many educational exercises utilize simulated activities during the pre-clinical years of instruction, often with students of other healthcare professions rather than practicing professionals [5, 10, 14, 27–29]. Our goal was to engage students in an activity that centered around patients in their clinical rotations, giving them first-hand experience. We thought this approach would be more authentic than a simulation, for example, since students prefer this type of learning [30–32]. Also, we hoped that this approach would deepen the understanding of colleagues in other health professions in a patient-centered framework.

If we consider medical students as adult learners, the success of this pilot is consistent with adult learning theory that says adults are self-directed and autonomous learners who want and do take responsibility for their own learning and growth [33]. Other tenants of adult learning are addressed in this exercise, including its direct relevance to their learning. It also calls on students

Table 3 Top 3 interactions with healthcare professionals/health profession students per Clerkship. The number of students (N) and the % total are indicated for each healthcare professional/health profession student. “Other” for Neurology consisted of a variety of professionals including occupational therapists, technicians, administrators, sales representatives, medical scribes, and art therapists. “Other“ for OB/GYN consisted of a variety of professionals including administrators, doulas, child life specialists, medical interpreters, and ultrasound technicians

Clerkship	Professional with Highest Interaction	Professional with Second Highest Interaction	Professional with Third Highest Interaction
Anesthesia	Anesthetist – CAA or CRNA (N = 136; 38%)	Nurse – LPN or RN (N = 92; 26%)	Surgical Scrub Technician (N = 54; 15%)
Family Medicine	Medical Assistant (MA) (N = 197; 55%)	Nurse – LPN or RN (N = 59; 17%)	Pharmacist (N = 29; 8%)
Internal Medicine	Pharmacist (N = 131; 38%)	Nurse – LPN or RN (N = 62; 18%)	Social Worker (N = 33; 10%)
Neurology	Nurse Practitioner (NP) (N = 96; 27%)	Nurse – LPN or RN (N = 77; 22%)	Other (N = 35; 10%)
Obstetrics and Gynecology	Nurse – LPN or RN (N = 85; 29%)	Midwife (N = 49; 17%)	Other (N = 38; 13%)
Pediatrics	Dietician (N = 70; 20%)	Pharmacist (N = 63; 18%)	Nurse – LPN or RN (N = 58; 17%)
Psychiatry	Social Worker (N = 158; 44%)	Physician’s Assistant (PA) (N = 38; 11%)	Behavioral Therapist (N = 36; 10%)
Surgery	Surgical scrub technician (N = 103; 33%)	Nurse Practitioner (NP) (N = 53; 17%)	Nurse – LPN or RN (N = 45; 14%)
Emergency Medicine	Nurse – LPN or RN (N = 156; 43%)	Physician’s Assistant (PA) (N = 46; 13%)	Pharmacist (N = 36; 10%)

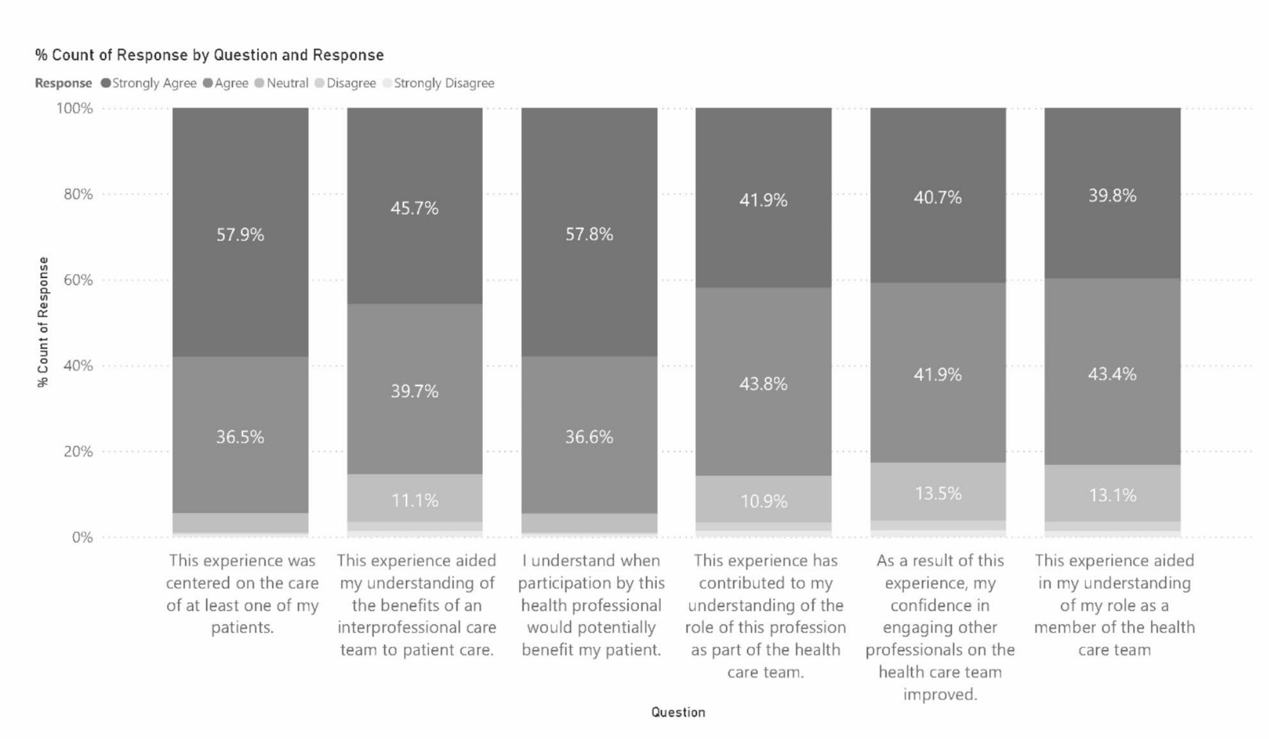

Fig. 1 **1**. This experience was centered on the care of at least one of my patients (Overall *N* = 3,088; Strongly Agree 57.9%, *N* = 1, 789; Agree 36.5%, *N* = 1,127; Neutral 4.5%, *N* = 140; Disagree 0.3%, *N* = 9; Strongly Disagree 0.7%, *N* = 23). **2**. This experience aided my understanding of the benefits of an interprofessional care team to patient care (Overall *N* = 3,087; Strongly Agree 45.7%, *N* = 1,410; Agree 39.7%, *N* = 1,225; Neutral 11.1%, *N* = 342; Disagree 2.1%, *N* = 66; Strongly Disagree 1.4%, *N* = 44). **3**. I understand when participation by this health professional would potentially benefit my patient (Overall *N* = 3,086; Strongly Agree 57.8%, *N* = 1,785; Agree 36.6%, *N* = 1,131; Neutral 4.5%, *N* = 139; Disagree 0.3%, *N* = 9; Strongly Disagree 0.7%, *N* = 22). **4**. This experience has contributed to my understanding of the role of this profession as part of the health care team (Overall *N* = 3,086; Strongly Agree 41.9%, *N* = 1,293; Agree 43.8%, *N* = 1,351; Neutral 10.9%, *N* = 337; Disagree 1.9%, *N* = 59; Strongly Disagree 1.5%, *N* = 46). **5**. As a result of this experience, my confidence in engaging other professionals on the health care team improved (Overall *N* = 3,085; Strongly Agree 40.7%, *N* = 1,255; Agree 41.9%, *N* = 1,293; Neutral 13.5%, *N* = 416; Disagree 2.3%, *N* = 73; Strongly Disagree 1.6%, *N* = 48). **6**. This experience aided in my understanding of my role as a member of the health care team (Overall *N* = 3,084; Strongly Agree 39.8%, *N* = 1,226; Agree 43.4%, *N* = 1,339; Neutral 13.1%, *N* = 405; Disagree 2.3%, *N* = 72; Strongly Disagree 1.4%, *N* = 42)

to draw on their past experiences and use them in the learning process.

Experiencing the exercise in each clerkship permitted medical students to see the types of interprofessional teams across different specialties and the breadth of expertise needed to successfully care for patients. Our study is the first to demonstrate the types of interprofessional encounters across clerkships and shows the expansive list of professions with whom students engage on a regular basis [3, 34–37].

Our data indicate that the exercise was successful in meeting its goals. Most students reported that their understanding of how an interprofessional team benefits patients had improved. But perhaps more importantly, they understood when the participation of the specific healthcare professional would potentially benefit their patient. We hypothesize that this will lead to better integration of the interprofessional team in the future and facilitating their selection of the appropriate team member for their specific patient. Their self-perceived confidence in engaging the IPE team also improved as did their understanding of their own role in the healthcare team. We surmise that this is potentially meaningful at this stage, given that their consultation skills are at the novice level. Additionally, because the definition of their role within the traditional third and fourth years of medical school is one that is continuously evolving over time, this exercise appears to have enhanced their comprehension of their role and contribution to patient care. Further study would be needed to conclude whether this exercise actually solidified students' comprehension of their role and contribution to patient care. It would also be beneficial to study whether perceptions are sustained over the course of future training.

Conclusion

This interprofessional exercise was easy to integrate across a large 9-campus system and required limited resources. It was simple to implement during clinical duties in both inpatient and outpatient settings. The assignment was not burdensome to faculty or clerkship staff as they did not have to do anything for implementation. We did not survey those interviewed; however, we surmise from student comments and their responses that this exercise was well received. We did not receive any comments that professionals interviewed felt burdened, that they disliked the activity or that they had declined to participate. Based on other student exercises at our school, we believe that if this was the case, we would have heard directly from faculty, from our students or in the student comments. In fact, students reported that they received useful information and that the exercise was meaningful. We believe this would not have been the case without buy-in from the healthcare professionals with whom the students interacted.

This is a novel IPE clinical learning experience that positively impacted students and furthered their understanding of multiple healthcare professions across different clerkships. This was achieved within the context of daily clinical care. Further data analysis of the qualitative content will be needed to glean the common themes within their reflections. Additional data analysis across multiple regional campuses will also be undertaken.

These students engaged with multiple healthcare professionals within the mandatory clerkship experiences spanning their third and fourth year. The increased exposure through this exercise has been impactful in furthering medical students' understanding of the importance of patient-centered interprofessional care.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12909-024-06499-4.

Supplementary Material 1

Author contributions

All authors except DB contributed to the conceptualization of the study, and all contributed to the review and editing of the manuscript. SF and NS completed the data collection and SF completed the initial analysis and interpretation of the data. JS, SF and DB wrote the main manuscript with contributions from PK, MC and PW.

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Data availability

Data is provided within the manuscript or supplementary information files.

Declarations

Ethics approval and consent to participate

Protocol #24554 was reviewed by Indiana University's Human Research Protection Program, which oversees the IRB, and determined this project is not human subjects research and does not require IRB review nor consent. All the data used was de-identified, existing educational data.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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