



Leadership Training in Undergraduate Medical Education: A Scoping Review

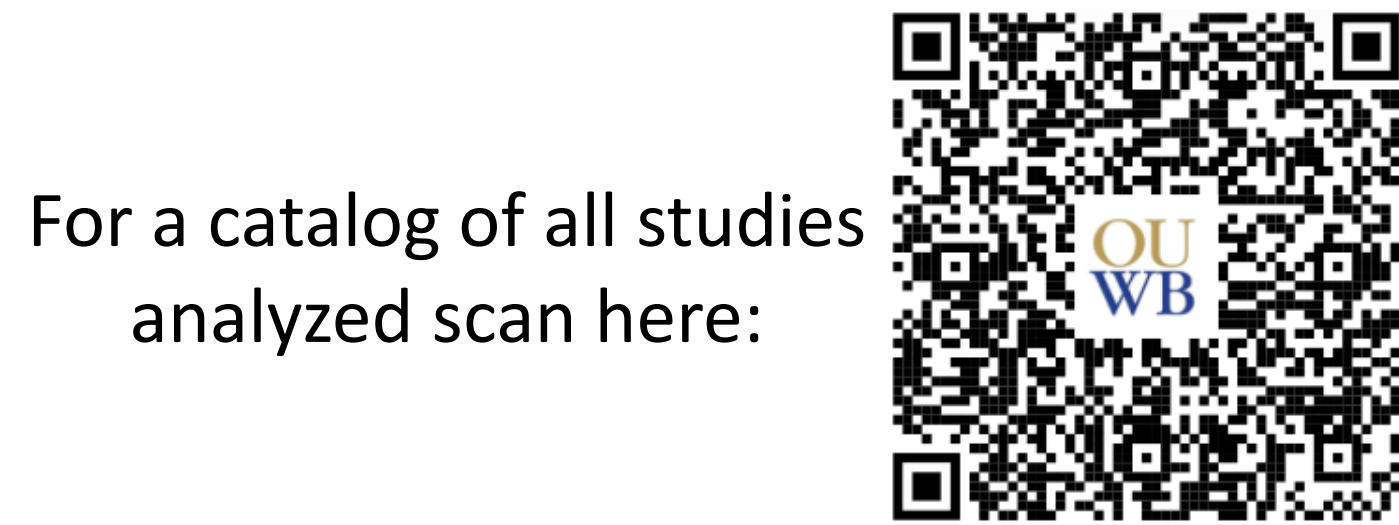
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Introduction

There has been an increased consideration as to the role physicians fill in regard to leadership and management specifically, in both formal and informal roles¹. Of course, this has also been exacerbated by the recent SARS-CoV-2 pandemic and the role physicians have, and are filling in regard to public education, public health, clinical care, and research. However, medical students do not feel they have the skills needed to be effective leaders². In a previous literature review in 2011, one conclusion stated was the need for continued research on the topic³. In another, review of 11 studies from 2018, authors again concluded there is limited evidence of effectiveness in the studies they examined ranging from 2000-2014, further they summarized a lack of objective and long term outcomes, as well as a standard framework for evaluation⁴.

Aims and Objectives

The purpose of this scoping review is to begin identifying and filling the gap in understanding the status of intervention-based studies of leadership training in undergraduate medical education. This review seeks to characterize current leadership interventions based on their curricular content, method of training leadership, the teaching timeframe, and the evaluation methods used to assess the intervention.



For a catalog of all studies analyzed scan here:

Methods

Both the PubMed and ERIC databases were searched for a retrieval of 147 English articles published between 2015- 2020. Articles were included for the review if they focused on instructional interventions on leadership in undergraduate medical education. A summary of the selection process is identified in Figure 1. Curricular content was evaluated using categories outlined by Mangrulkar et al.⁵: leadership, change agency, teamwork, interprofessionalism, evidence-based medicine and practice, and professionalism and ethics. The methods of teaching and learning outcome evaluation tools were categorized and assessed as well.

Results

The curricular content coverage can be visualized in Figure 2. By far, the most frequent methods of training were interactive sessions, followed by assessments and projects, with other methods found in Figure 3. Most often, teaching occurred in the first two preclinical years, although other periods are shown in Table 1. The most frequent evaluation tool was an In-House survey, followed by existing or validated tools, shown in Table 2.

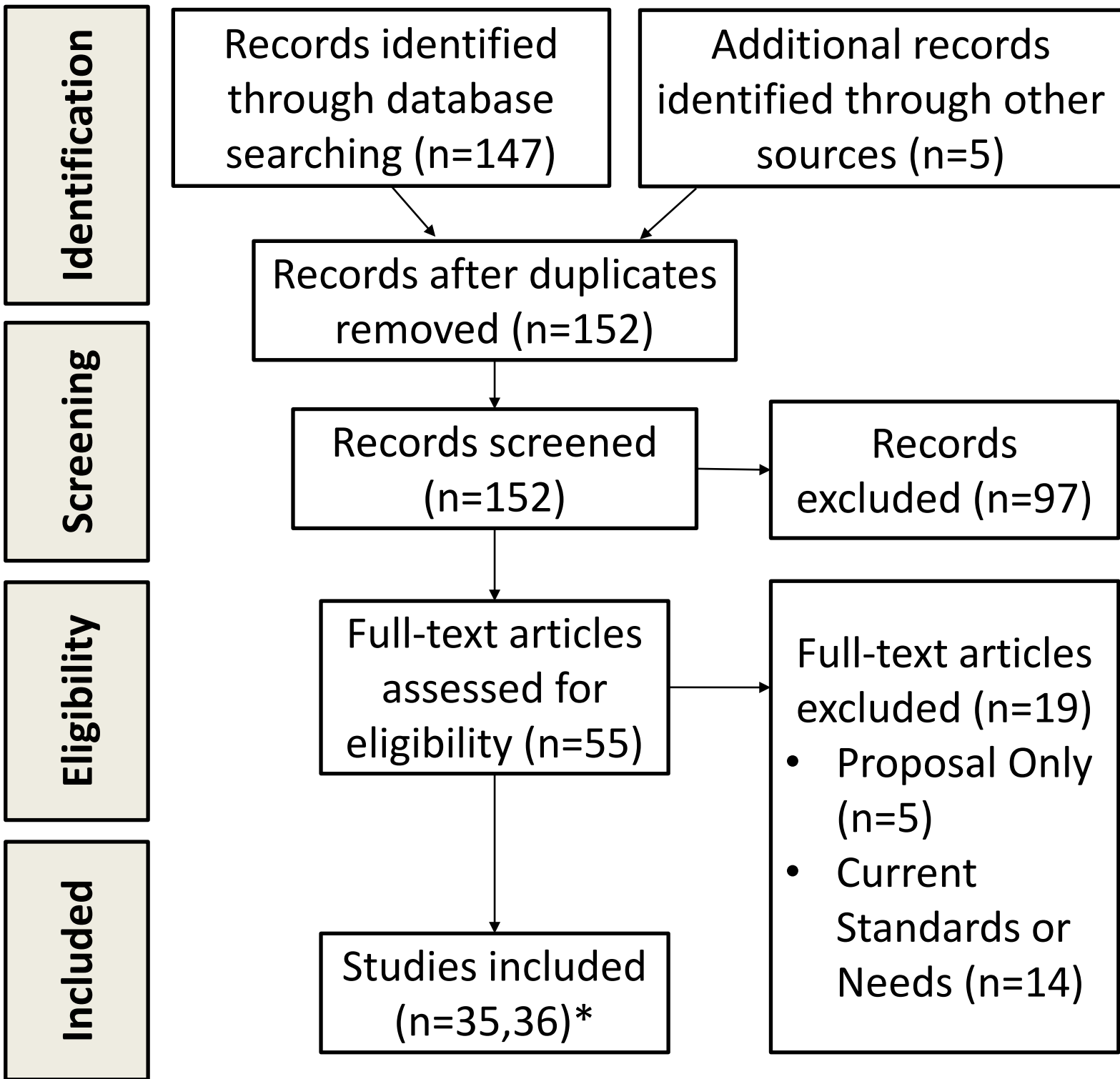
Table 1. Teaching Timeframe

Timeframe	n	%
Pre-Clinical	14	40.00
Longitudinal (≥3 years)	10	28.57
Clinical	6	17.14
Attending Physicians	3	8.57
Residents/Students	2	5.71

Table 2. Most Frequent Evaluation Methods

Method	n
In-House Survey	18
Existing or Validated Tools	11
Verbal Evaluation	4
Formal Evaluation	4

Figure 1. Article Selection Diagram



*One Study had a repeated methodology, but separate publications with different outcome measurements. That intervention was only included once except for the consideration of evaluation measures which varied between the two publications.

Figure 2. Curricular Content

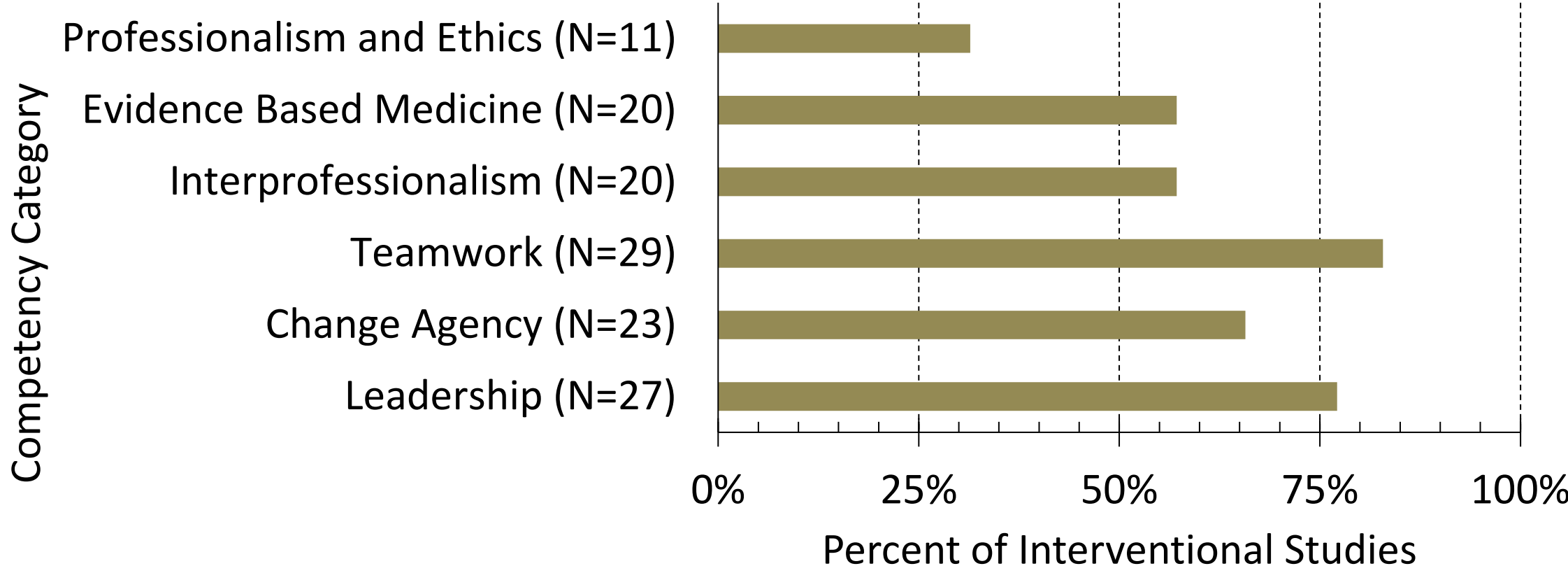
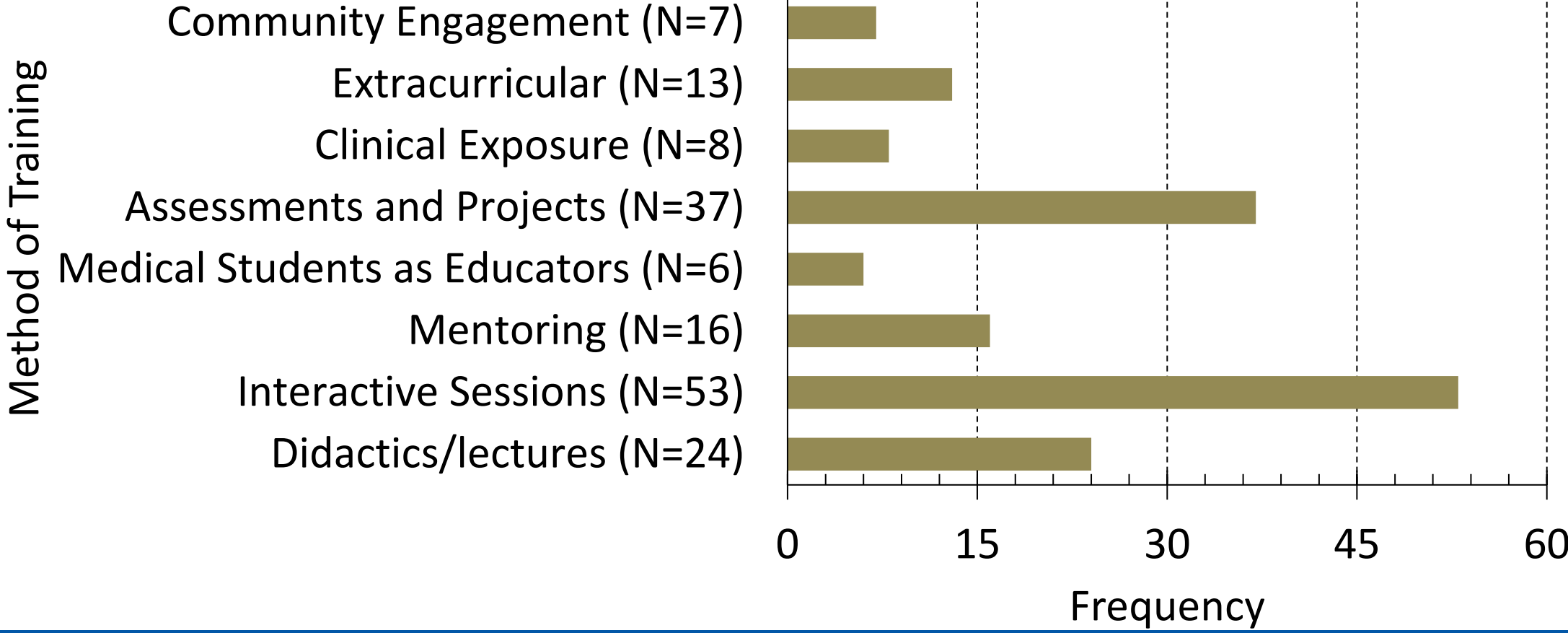


Figure 3. Method of Training



Conclusions

Moving forward, based on the existing literature further exploration into leadership training in undergraduate medical education would be best served by focusing on evaluating longer term outcomes by measure with a validated tool as opposed to in-house survey methodology. There are limited curricular interventions focusing on the leadership domains relating to ethics, evidence based practice, and interprofessionalism, so developing training in those domains would fill that gap.

Discussion

As a scoping review, this review was limited in its scope in regard to the literature search process including potential selection bias, as well as limited assessment of the quality of the included studies, a structural issue, identified by Grant et al⁶. There were difficulties as it related to considering the curricular coverage because there has not been a consensus curriculum developed yet for undergraduate leadership skills. The next step of this project is to more explicitly explore the gaps identified and complete a systematic review in those domains.

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COVID-19 Vaccine Hesitancy Among Medical and Dental Students

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Introduction

- Medical (MS) and dental students (DS) are exposed to COVID-19 patients.
- They will also be entrusted with advocating for the COVID-19 vaccine and counseling vaccine hesitant patients.
- Dentists are at a higher risk of acquiring COVID-19 infection due to their exposure to aerosolizing procedures.¹
- It is therefore important to achieve high COVID-19 vaccination coverage rates in both these groups.

Aims and Objectives

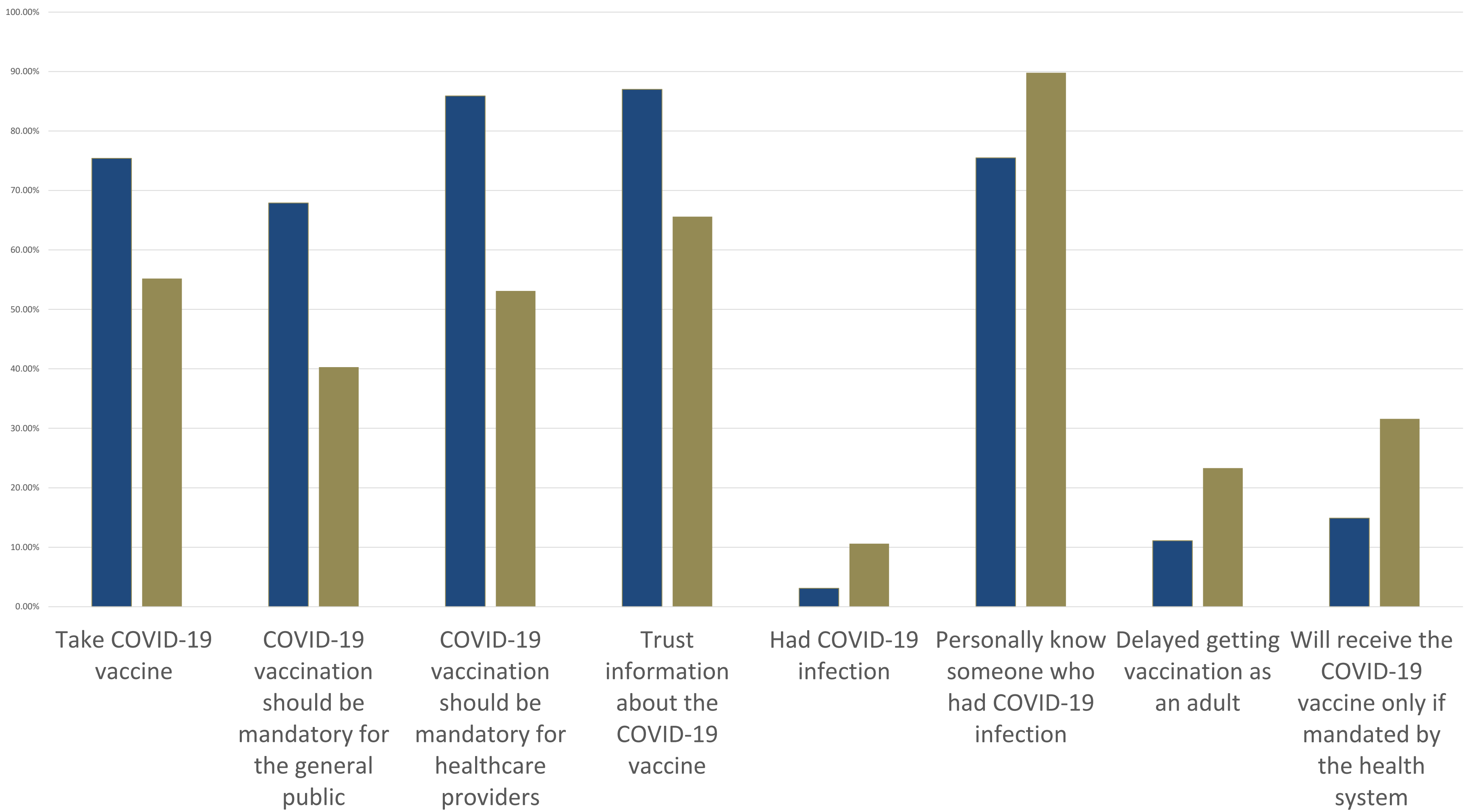
- 1:** To assess the attitudes of medical and dental students to COVID-19 vaccines.
- 2:** To assess the prevalence of vaccine hesitancy and factors impacting vaccine acceptance amongst medical and dental students.

Methods

- The study was conducted at 3 dental schools in Michigan, Florida and Utah as well as an allopathic medical school in Michigan.
- An anonymous online survey was developed based on past research involving attitudes and behaviors about vaccination.²⁻⁴ All authors reviewed free-text comments for emerging themes and patterns.
- The survey assessed:
 - previous immunization behavior
 - attitudes and perception of COVID-19 vaccines
 - personal experience with COVID-19 infection.
- Likert scale items were recategorized as strongly agree/agree and strongly disagree/disagree.
- This project received IRB approval.

Results

Table 1: Survey results **MS (Blue)** vs. **DS(Gold)**



Theme	Concern/Recommendation
Personal concern about vaccine safety/efficacy Rapid development/implementation of vaccine Politicization	Hesitancy to receive a vaccine whose safety was not clearly known. Indicated preference to delay for further availability of information. Skeptical about the vaccine trials being rushed, missing critical steps and possibility that the vaccine may not be safe.
Trust in regulatory agencies	Concern that politics may have played a role in both the downplaying of the severity of the disease as well pressurizing responsible agencies resulting in premature authorization of vaccine.
Education for public	Concern that information released by CDC may not be trustworthy. Need for development of easy to understand informational materials for the general public with links to reputable sources and ability to share these easily though social media.

Conclusions

- One-quarter of MS and half of DS were hesitant to receive the COVID-19 vaccine.
- Although more DS had personal experience with COVID-19 infection:
 - They were less trusting of public health experts
 - They disagreed with a vaccine mandate.

Discussion

- Not being directly involved with care of SARS-Cov-2 positive patients and lower risk perception may be responsible for this hesitancy as has been previously reported.⁵⁻⁶
- The results highlight the need for profession specific curriculum designed to enhance student knowledge about the COVID-19 vaccine.
- MS and DS need formal education to improve their knowledge and attitudes and training on performing vaccine counseling.⁷
- It is the responsibility of health care organizations to train these future professionals to make strong vaccine recommendations and respond effectively to vaccine-hesitant persons.

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How Does Telementoring Impact Medical Education Within the Surgical Field? A Rapid Review

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Introduction

- Surgical education strongly involves the use of mentorship to improve the confidence and efficiency of trainees.
- Medical telementoring is a technique in which an expert physician guides another individual at a different geographical location.¹
- Social distancing due to the COVID-19 pandemic may serve as a catalyst to promote the use of telementoring and other remote learning opportunities in medical education, offering an affordable and geographically accessible alternative to on-site trainee mentoring.
- The purpose of this rapid review was to identify various modalities of telementoring and to evaluate their impact on surgical education.

Methods

- Screened articles from five sources (PubMed, Embase, Web Of Science, Scopus, and Cochrane Library).
- Utilized combinations of subject headings/MeSH terms and text words representing telementoring and surgical education
- Articles were screened and charted independently in duplicates, with disagreements resolved through discussion

Results

- Out of 813 citations retrieved, 25 articles were selected for the review (Figure 1).
- 56% of studies took place within the United States.
- Studies primarily occurred in clinical settings (13) and simulation labs (11).
- 20% of studies had resident-surgeon relationships; 48% had surgeon-surgeon relationships; and 8% had surgeon-medical student relationships.
- Specialties utilizing telementoring included General Surgery (8), Orthopedics (3), Urology (3), and Other (6).
- Types of technologies used in telementoring, evaluation methods, and primary outcomes reported are illustrated in Figures 2, 3, and 4.

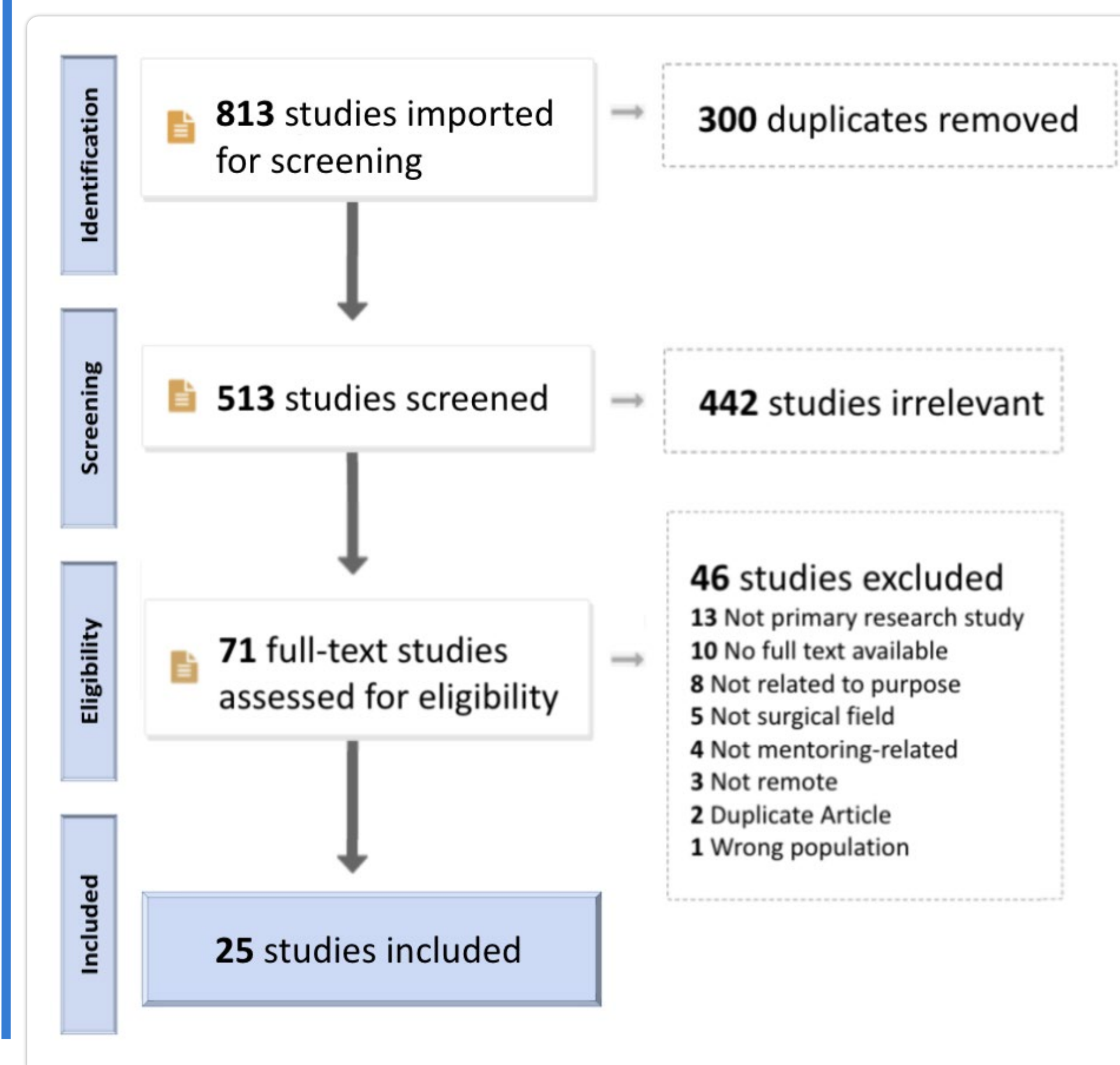


Figure 1: PRISMA Article Screening Diagram

Telementoring Evaluation Techniques

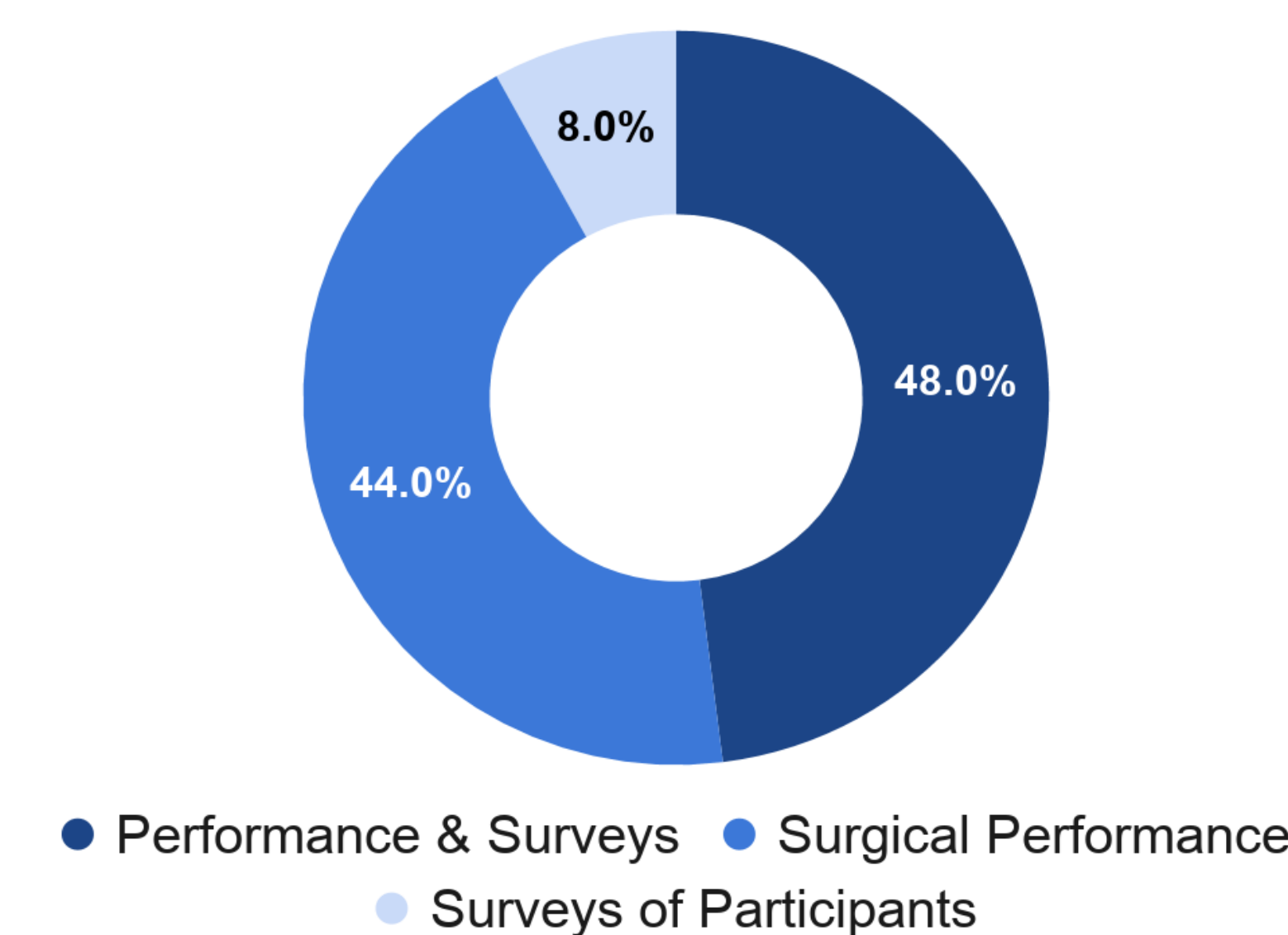


Figure 2: Evaluation Methods/Techniques within Studies

Technology Used

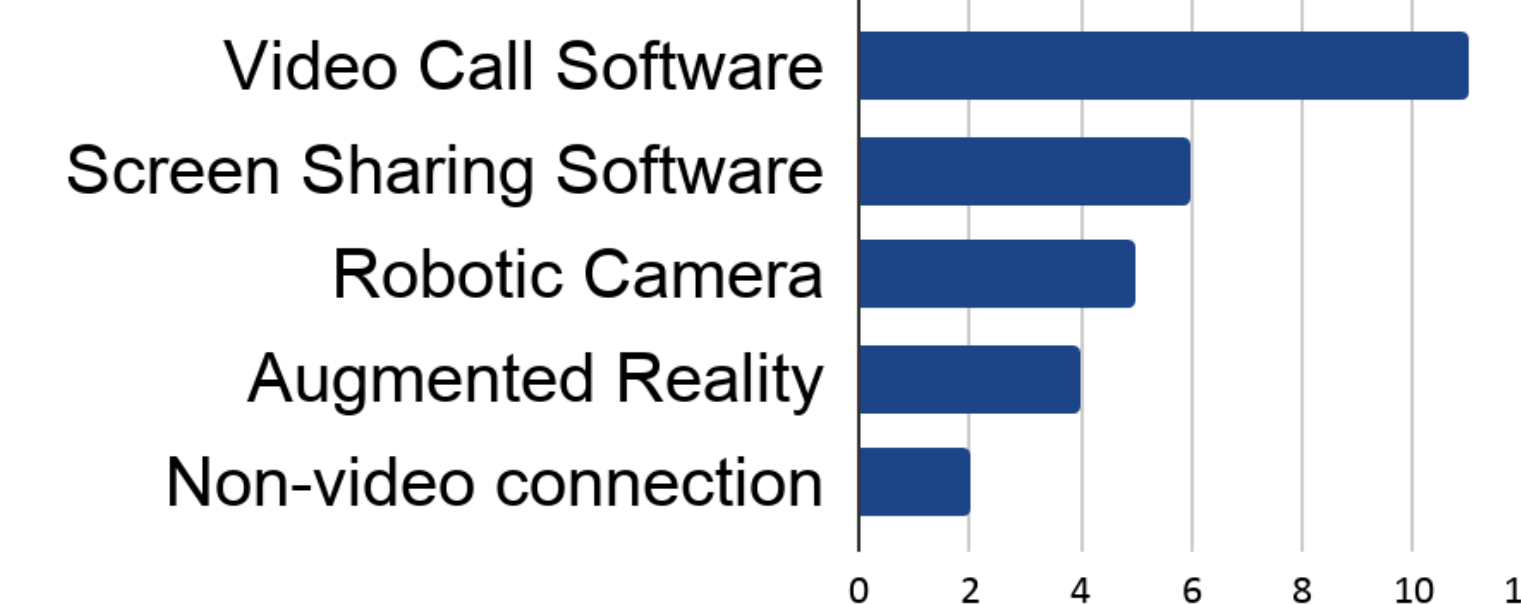


Figure 3: Technologies Used for Telementoring

Outcomes Reported

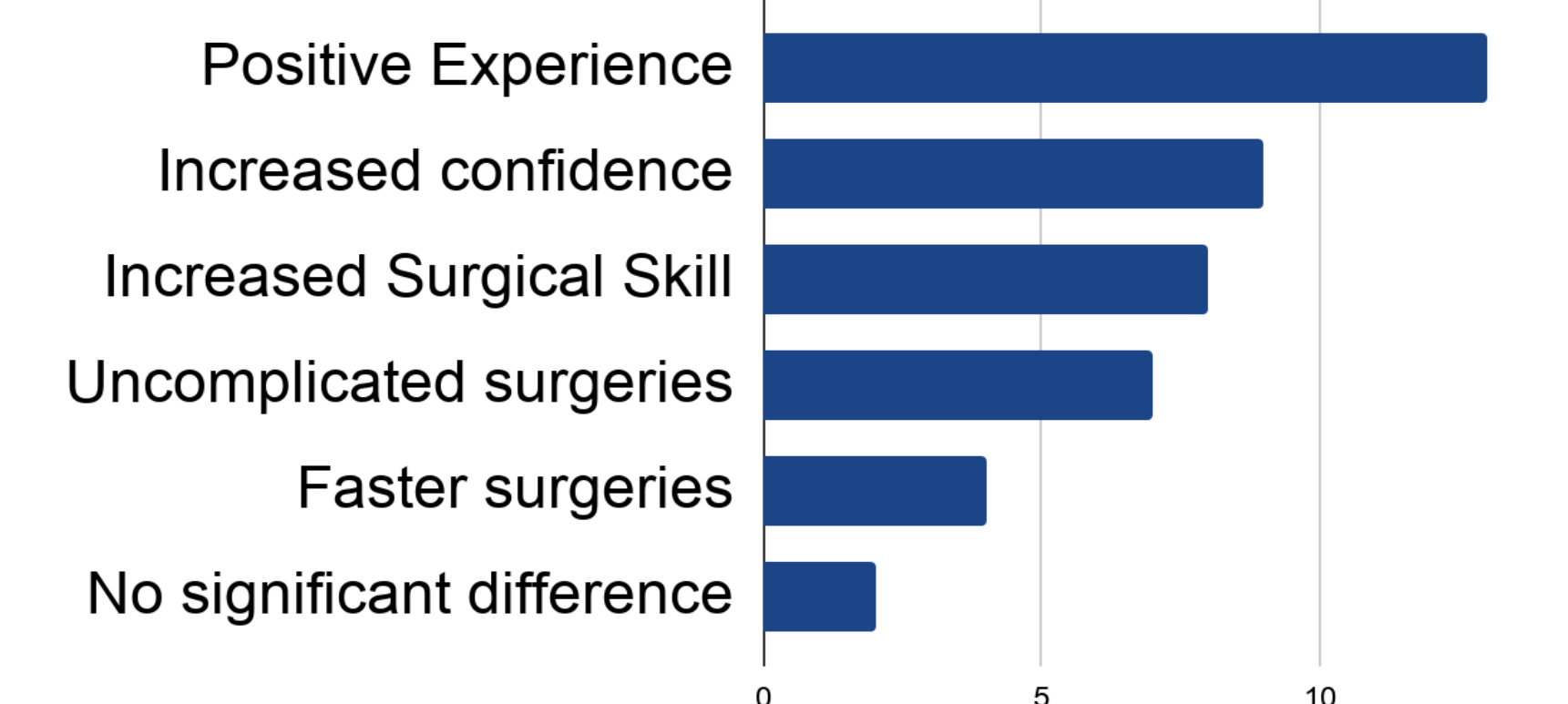


Figure 4: Outcomes from Implementation of Telementoring

Discussion

- Evaluation of efficacy is recommended to be two-fold, (1) surveys to both the mentor and mentee participants and (2) performance based metrics.
- The positive outcomes of telementoring included improved surgical performance (8), shorter operating times (4), uncomplicated surgeries (6), or adequate comparison to in-person mentoring (2).
- All nine (9) studies that surveyed mentee confidence reported an increase in confidence and all thirteen (13) studies that measured participant satisfaction revealed positive experiences with telementoring.

Conclusion

- Telementoring can be a useful technique for mentees of all expertise levels to improve their surgical skills and knowledge while reducing cost, time, location, and potential geographical constraints.
- We recommend adoption of telementoring practices at Beaumont hospitals by implementing two-way video conferencing. Telementoring participants could use mixed evaluation methods including a survey and surgical performance to assess attitudinal and technical skill changes in mentees.

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The effects of APM on medical student feelings of autonomy, competence, and relatedness

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Introduction

Intrinsic motivation positively correlates with a higher quality of life and academic achievement in medical students.^{1,2} Self-Determination Theory (SDT) posits that individual's needs for autonomy, relatedness, and competence create their intrinsic motivation.³ The Art and Practice of Medicine (APM) course at Oakland University William Beaumont teaches medical students to interact with patients (relatedness), refine clinical skills (competence), and develop towards independent practice (autonomy). Thus, APM classes appeal to feelings of autonomy, competence, and relatedness, thereby improving intrinsic motivation.

Aims and Objectives

- Investigate if APM classes improve motivation in MS-1 and MS-2 medical students.
- Investigate which aspect of the SDT (relatedness, competence, and autonomy) is most strongly associated with APM classes.

Methods

An experience sampling methodology was used to examine changes in intrinsic motivation over the course of multiple APM classes. Beginning in August 2020, MS-1 and MS-2 students were emailed the Work-Related Basic Need Satisfaction Scale (WBNS) adapted to medical students on Mondays prior to select APM classes (non-examination classes involving standardized patient interviews or physical exam practice) (Fig. 1).⁴ The same survey was emailed immediately after the class ended (Fig. 1).

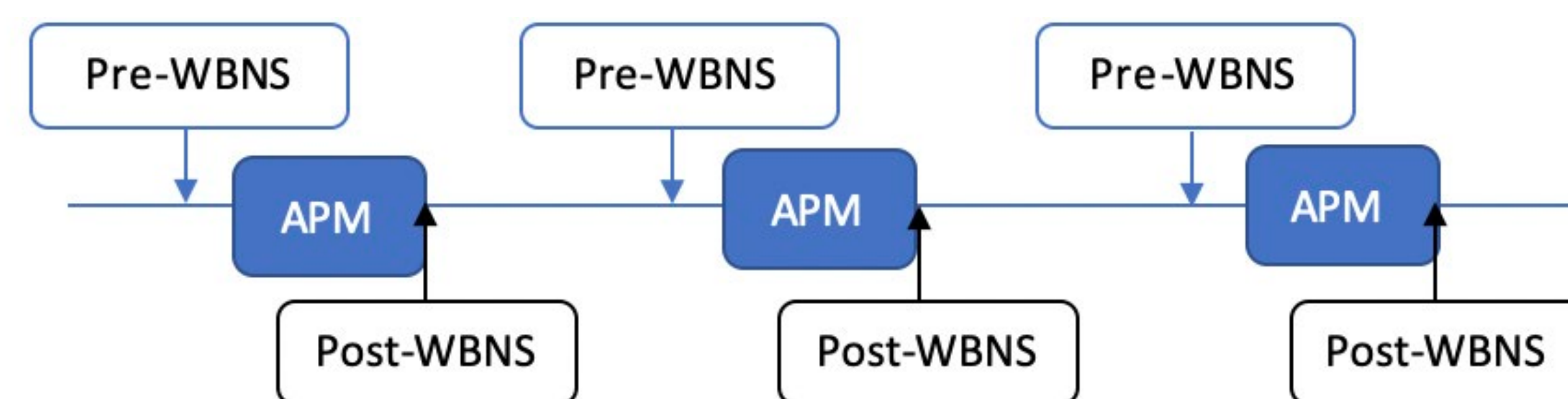


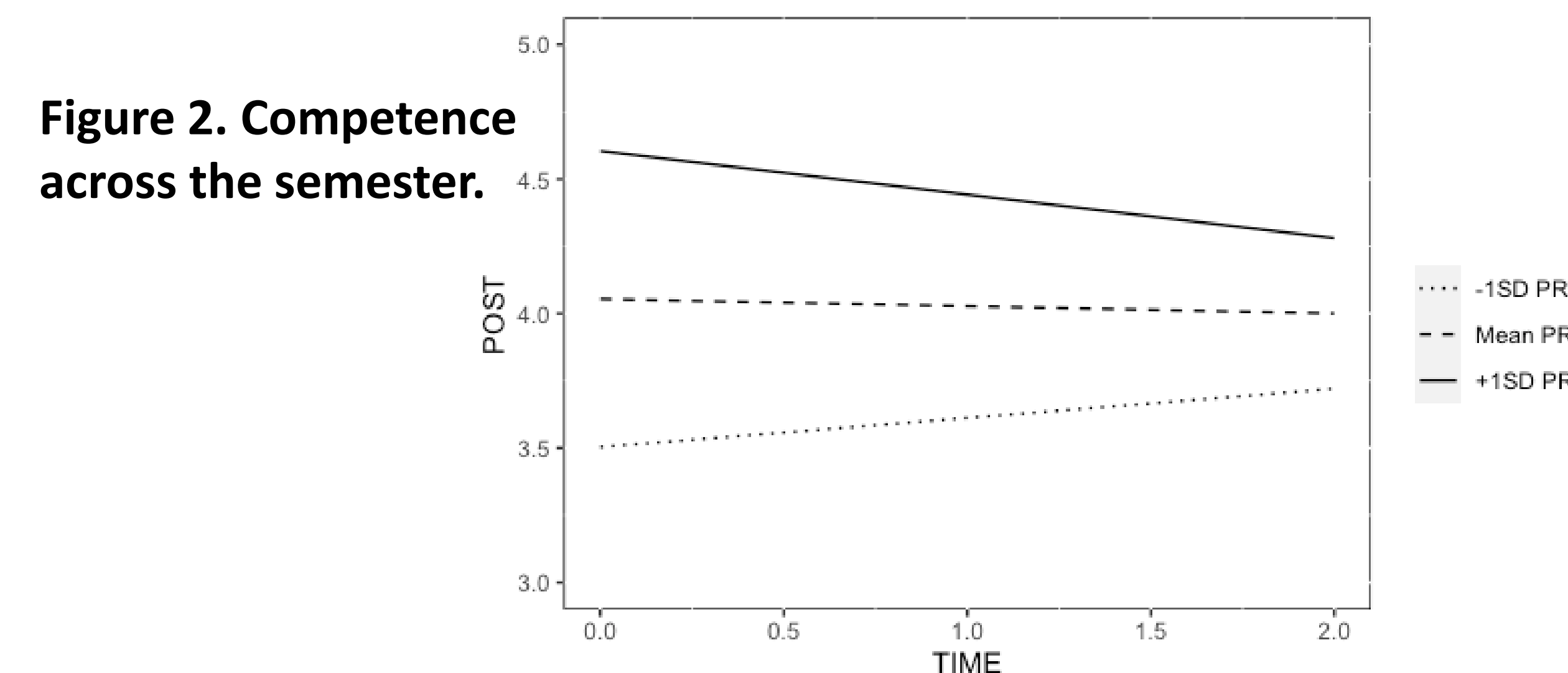
Figure 1. Survey Distribution Timeline

This resulted in a sample of 49 participants who completed a total of 67 pre-surveys and 89 post-surveys across three APM events. A lagged endogenous change model and paired t-tests were used to analyze the findings. This study was been approved by the Oakland University IRB.

Results

	Autonomy		Competence		Relatedness	
	Estimate	SE	Estimate	SE	Estimate	SE
Pre-scores	0.61*	0.11	0.80*	0.08	0.60*	0.11
APM class	-0.62	0.49	0.75**	0.39	-0.11	0.31
APM class* Pre-Scores	0.16	0.14	-0.19*	0.09	0.04	0.10

Table 1. Lagged endogenous change model across the semester. Results of the affect that Pre-Scores, the APM class, and the interaction between APM class and Pre-scores had on Post-Scores. Note: *p<0.05, **p<0.1



	autonomy	competence	relatedness
APM 1	t(21) = 1.27, p = 0.21	t(21) = 1.48, p = 0.15	t(21) = 1.08, p = 0.28
APM 2	t(16) = 2.51, p = 0.02*	t(16) = 0.83, p = 0.41	t(16) = 0.15, p = 0.87
APM 3	t(9) = -1.71, p = 0.12	t(9) = -0.64, p = 0.53	t(9) = -1.07, p = 0.30

Table 2. t-tests of individual APM classes. Note: *p<0.05

Conclusions

Controlling for pre-scores, APM classes had a positive effect on post-scores of competence, especially for students with lower pre-scores of competence as depicted in Table 1 and Fig 2. The 2nd APM session had a significant, positive relationship with autonomy as depicted in Table 2.

Discussion

A significant increase for an isolated APM event was only seen in autonomy at time two. However, considering a lagged endogenous change model, we do see a general compounding increase in competence due to APM events across the semester. This affect was especially true for students with lower pre-ratings of competence. This could imply that APM classes are more effective at increasing medical student intrinsic motivation if the students feel less competent. This knowledge could be used to tailor APM classes to best benefit individual student learning and intrinsic motivation. COVID-19 regulations and online classes could also have moderated the relationship between APM classes and intrinsic motivation as the study was originally intended to investigate the effects of in-person APM classes.

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Developing a 2-Week Surgery Bootcamp: Guided by a Needs Assessment of Aspiring General Surgeons

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Introduction

- Concern from program directors and graduating students over lack of preparation for internship^{1,2}
- Bootcamp programs improve student confidence and performance^{3,4}
- The ACS/APDS/ASE Resident Prep Curriculum (RPC) published programming for bootcamp development⁵
 - Institutions must prioritize programming given personnel, facilities, finances, and time resources

Aims and Objectives

- To determine whether a needs assessment comparing incoming interns to graduating residents could identify disparities in preparation
- To identify areas of deficiency for prioritizing educational sessions

Methods

- Participants: OUWB graduating medical students, Beaumont incoming interns
- Surveys asking participants to rate RPC objectives based on a 7-point Likert scale

IRB exempt (#2020-050)



Medical Knowledge and Patient care
Professionalism
Interpersonal Skills and Communication
System-Based Practice
Practice-Based Learning and Improvement
Procedural Skills

64 RPC objectives in 6 Competencies

Results

- 14/15 graduating students and 5/5 incoming interns responded (response rate: 95%)
- Students most prepared in Practice-Based Learning and Improvement (mean 4.8 ± 0.8) and least in System-Based Practice (3.4 ± 1.0)
- ★ Students least comfortable with: billing, performing death certifications, interacting with discharge planners, performing colonoscopy, and dictating/writing notes

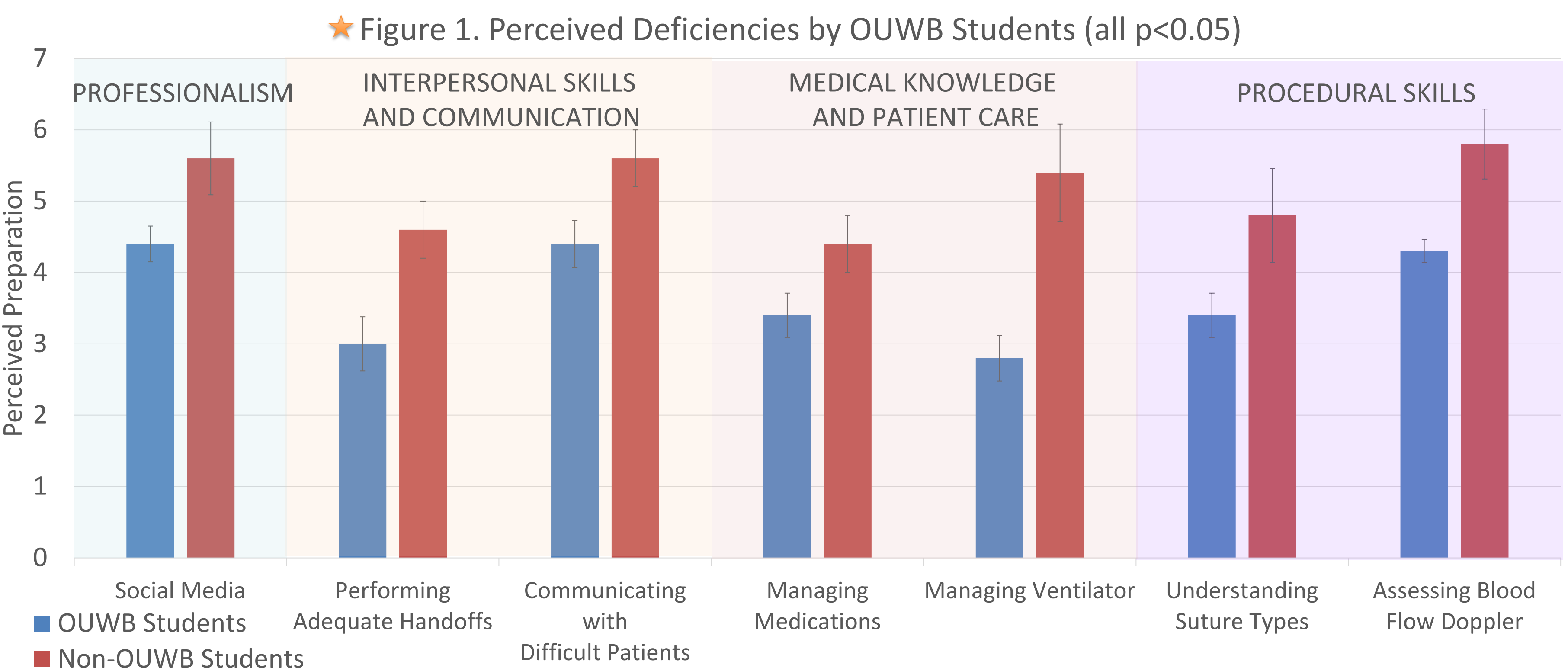
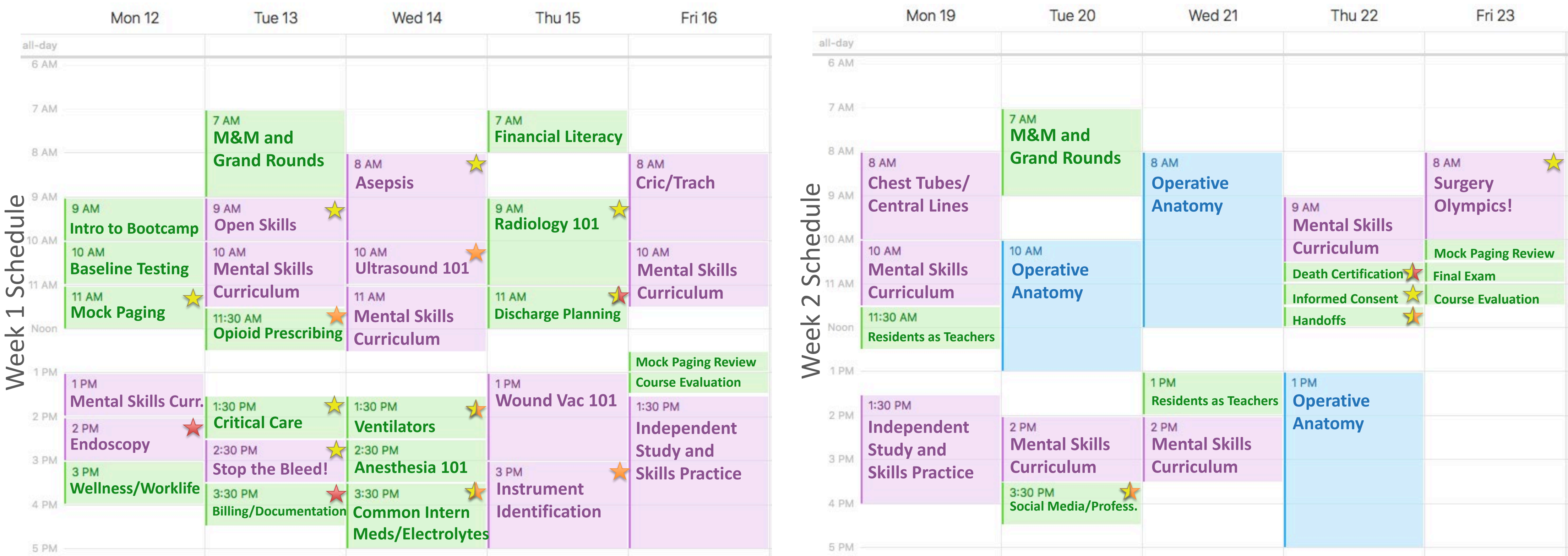


Figure 2. 2-Week Bootcamp Schedule Highlighting Target Areas



SCHEDULE LEGEND

Type of Session:

- Simulation/Technical Skills
- Lecture
- Anatomy

Session addresses:

- ★ Areas of least comfort
- ★ Areas of perceived deficiency
- ★ RPC "Essential" Modules

Conclusions

- Needs assessment revealed areas of perceived poor preparation and significant differences between our graduates and incoming interns.
- Areas were emphasized in Bootcamp program development.

Discussion

- Bootcamps should address:
 - Areas of decreased comfort
 - Areas of perceived relative deficiency
 - Essential RPC modules
- Future evaluations will assess the effectiveness of this programming at improving disparities.

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Viewing Inguinal Anatomy Through a Different Lens: Its Relevance in an Integrated Curriculum

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Introduction

- Anatomy is the cornerstone for clinical education where dissection and didactic lectures were its sole pedagogy.
- Inguinal hernia is a very common anatomical topic taught to medical students in the M1 and M2 years and for the past few decades, inguinal anatomy depicted in textbooks is being delivered to students using a traditional anterior approach.
- With the advent of laparoscopic surgery, the 3-dimensional view of anatomy has changed entirely with newer terminologies and structures becoming more relevant.
- In a competency-based curriculum, it is imperative that learning outcomes and competencies are part of a dynamic process based upon evidence-based findings²
- To match the learning outcomes and competencies, it is imperative that anatomical essentials must be updated to match the current trends needed for clinical practice.
- It is important for the students to be acquainted with the present-day anatomical concepts, which utilize a posterior viewing approach of the inguinal region.
- Hence in this presentation, using illustrations, radiographs, and operative images, the clinically relevant posterior view of the inguinal region is emphasized.
- In addition, we offer suggestions as to where in the curriculum these should be introduced, within the timeline of medical school.

Aims and Objectives

- To create anatomical illustrations which correlate with laparoscopic operative views.
- To address the challenges of introducing these new concepts in different phases of medical school curriculum.
- To evaluate the inguinal anatomy module in different phases of the curriculum

Approach/Process/Results

We have created illustrations of pertinent anatomical structures from posterior, medial, superior and anterior views of the inguinal region. Additionally, operative surgical images and radiographs have been acquired for comparison.

Anatomical Term	Clinical Relevance
Myopectineal Orifice (MPO) Fig. 1	Repair of the MPO can completely close the anatomical weak sites of inguinal and femoral hernias.
Transversalis Fascia (TF) Fig. 2	An understanding of this space is important for medical students to get a grasp of the foundational knowledge of hernia repair needed for clinical years.
Iliopubic Tract (IPT) Fig. 2 & 3	During dissections, medical students must note that the inguinal ligament is a modification of the external oblique aponeurosis whereas the IPT is the thickened part of the TF. In the posterior approach of laparoscopic surgery, the IPT forms the posterior wall of the inguinal canal.
Triangles of Pain (TP) and Doom (TD) Fig. 3 & 4	The TP has important nerves such as the femoral, lateral femoral cutaneous and femoral branch of genitofemoral ³ . These nerves are located deep to the endo-abdominal fascia and, hence, vulnerable to injuries during herniorrhaphy. This results in the chronic pain experienced after surgery. The presence of the external iliac vessels located in the TD can cause extensive hemorrhage during fixation of mesh during hernia repair ³ .
Corona Mortis Fig. 5	The Corona Mortis is the “Crown of death” and is a common variant vascular anastomosis between the external iliac or the inferior epigastric artery with the obturator artery ¹ . This is a critical area for surgeons as it may be endangered during pelvic and inguinal laparoscopic surgeries.

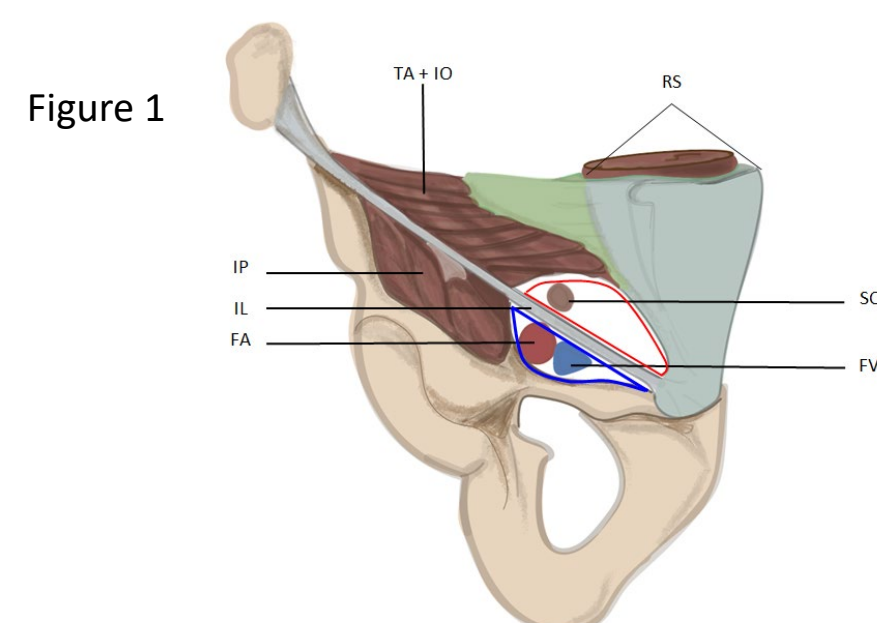


Figure 1. Illustration of MPO and surrounding structures. Transversus Abdominis and Internal Oblique muscles (TA + IO), Rectus Sheath (RS), Iliopsoas Muscle (IP), Femoral Vein (FV), Femoral Artery (FA), Spermatic Cord (SC), Inguinal Ligament (IL), Supra-inguinal Region (Red enclosure), Infra-inguinal Region (Blue enclosure).

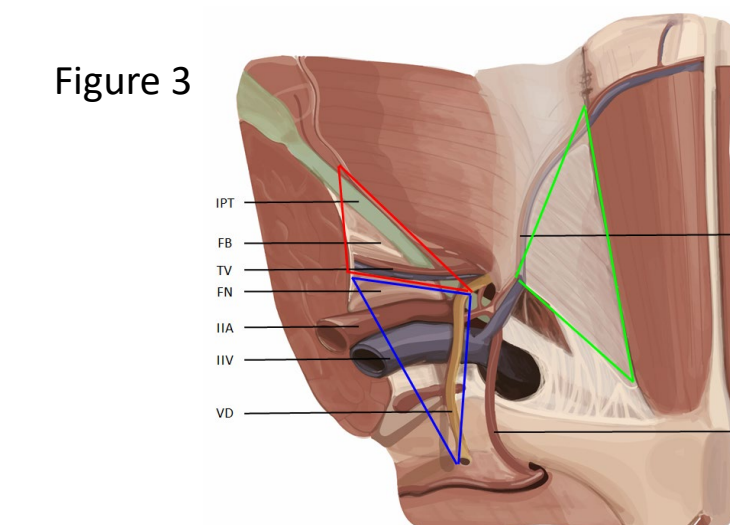


Figure 3. Illustration of posterior view of inguinal region. IPT, Femoral Branch of Genitofemoral Nerve (FB), Testicular Vessels (TV), Femoral Nerve (FN), Internal Iliac Artery (IIA), Internal Iliac Vein (IIV), Vas Deferens (VD), Inferior Epigastric Vessels (IEV), Obturator Artery (OA), Triangle of Pain (Red), Triangle of Doom (Blue), Inguinal Triangle (Green)



Figure 5. Radiographic images exemplifying aberrant obturator artery in the area of Corona Mortis

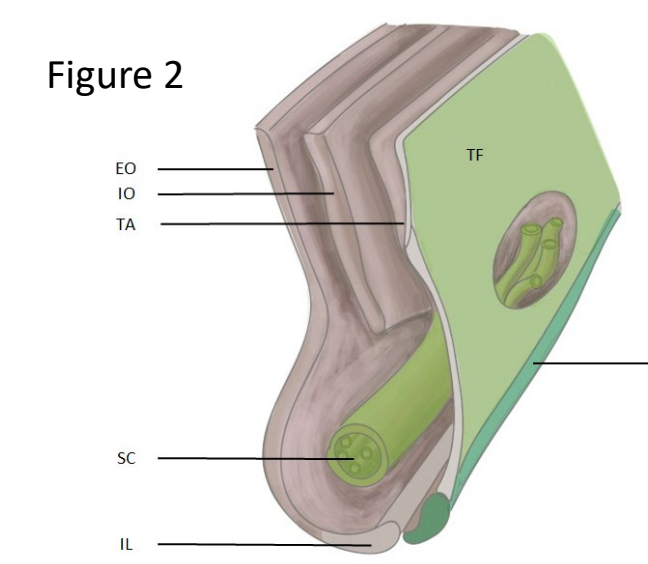


Figure 2. Illustration of the inguinal canal from a medial view in a sagittal cut. External Oblique (EO), Internal Oblique (IO), Transversus Abdominis (TA), Transversalis Fascia (TF), Spermatic Cord (SC), Inguinal Ligament (IL), Ilio-pubic Tract (IPT)

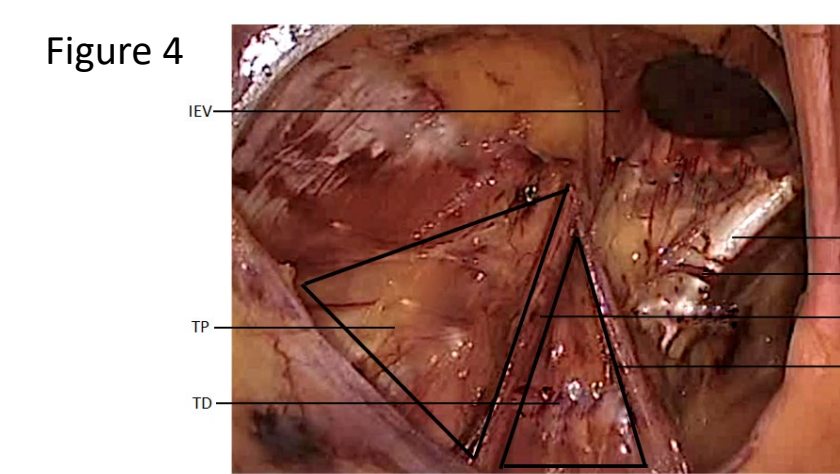


Figure 4. Operative Image of left inguinal region from a laparoscopic view highlighting -Triangle of Pain (TP), Triangle of Doom (TD), Inferior Epigastric vessels (IEV), Gonadal vessels (GV), Vas Deferens (VD), Cooper's Ligament (CL), Aberrant Obturator artery (AOA)

Figure 5. Left: Aberrant obturator artery (Blue arrow) arising from right external iliac artery (yellow arrow) with active arterial contrast extravasation and hematoma in obturator internus muscle (Red outline). Right: Aberrant origin of obturator artery (Blue arrow) with active contrast extravasation (Red arrow). Note is made of normal origin of circumflex iliac (Yellow arrow) and inferior epigastric artery (Green arrow).

Discussion

Challenge	What should students learn in an integrated curriculum?	When should students learn clinically relevant anatomy?	How should students learn clinically relevant anatomy?
Solution	Determination of learning outcomes should be a continuous and dynamic process because what was learned several decades ago may not be relevant to medicine today. With technological advances, one needs to be cognizant of the expected outcomes and evolve accordingly.	The novel anatomical terms can be introduced in the M1 year when students learn basics of anatomy. Further in M2 years, clinical integration can occur through case-based learning facilitated by clinicians and anatomists. Similarly, this learning can be further enhanced during M4 electives where students who have witnessed a laparoscopic repair can practically visualize the structures using a cadaver.	All these newer concepts and visualizations can be introduced using illustrations, 3-D technology, simulation, and self-paced modules using a variety of educational strategies including dissections, TBLs, case based learning activities, etc.

- ❖ As facilitators of the integrated curriculum, it is imperative to update the anatomical concepts that match with current surgical trends.
- ❖ It is important that early in the curriculum medical students learn the same anatomical structures and terminology that will be used in clinical years to facilitate the most effective learning.
- ❖ While laparoscopic hernia repair need not be taught explicitly, an introduction to the anatomical structures relevant to it could greatly improve the learning curve faced by residents and surgeons alike.
- ❖ Future research should incorporate these illustrations into lecture material and lab reference material to investigate its effect on broadening students' understanding of the inguinal region from a posterior (laparoscopic) approach.
- ❖ The specified learning outcomes would ideally update curriculum competencies to match the evidence-based clinical practice.

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- Prof Seenu Vuthaluru Surgeon, AIIMS, New Delhi, India for providing operative images

Integration and Evaluation Plan

Phase I: Introduction to pertinent terminology and illustrations during AFCP using inguinal region module

- Objective evaluation: Incorporate these concepts into TBL RAT and application exercises
- Subjective evaluation: Administer satisfaction survey after module

Phase II: Facilitate deeper understanding of inguinal region through case based learning in M2 year that utilizes illustrations correlated with operative/ radiographic images

- Evaluation: administer formative pre and post quizzes (before and after case based learning) to assess student understanding of clinical correlates

Phase III: Application of knowledge during M3/M4 clinical rotations where students will likely encounter laparoscopic procedures

- Evaluation: Evaluate students practical skills during the optional integrated clinical elective in M4 year



Promoting Wellness and Learning during the COVID-19 Pandemic: Development of a Virtual Summer Anatomy Program between a Medical School and the Latinx Youth Community

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Introduction

- The COVID-19 pandemic has placed significant strain on community partnerships and programs, especially efforts geared toward historically underserved populations.¹
- The challenges and restrictions surrounding the pandemic extended to an established summer anatomy program between the LMSA chapter at Oakland University William Beaumont School of Medicine (OUWB) and Hispanic Newcomer Outreach of Catholic Charities of Southeast Michigan (CCSEM-HNO).
- In an effort to sustain this initiative during a global health crisis, the OUWB-HNO Summer Anatomy Program was transitioned from an in-person to a virtual community service model.

Aims and Objectives

- To teach Latinx youth about health and wellness through exposure to various organ systems and encourage interest in STEM fields.
- To help medical/undergraduate students learn how to effectively communicate with and teach health-related topics to children.
- To transition the program to an online platform while preserving or enhancing the quality of learning and student-teacher interactions.

Methods

- The three-week virtual summer anatomy program was designed for Latino children between the ages of 7 and 13. It consisted of 6 educational sessions in total, each focusing on a different organ system (brain/memory, eye/visual, cardiovascular, respiratory, musculoskeletal, and gastrointestinal/nutrition).
- The instructor’s manual from previous years, containing all lesson plans and objectives, was adapted for a virtual classroom through incorporation of interactive games, virtual anatomical models, and art projects.
- Surveys and formative assessments (multiple-choice and practical/fill-in-the-blank questions) were distributed to 29 Latino children to evaluate overall student satisfaction and the effectiveness of the medical student-delivered educational sessions.
- Paired T-tests were used to determine whether statistically significant differences exist between the sample means of the pre- and post-assessments.

Results

Program Satisfaction

Satisfaction Survey	Average (STD)
Overall Satisfaction with the Summer Anatomy Program	5.17 (1.00)
Content Presentation	5.00 (1.02)
Teamwork	5.00 (0.99)
Clarity of Expectations and Directions	5.00 (0.86)
Encouragement of Student Questions and Participation	5.18 (0.82)
Teaching Effectiveness	5.21 (0.98)
Helpfulness/Availability	5.21 (0.82)
General Content Knowledge	5.28 (0.70)
Knowledge about COVID-19 Pandemic	5.07 (1.11)
Communication Abilities about COVID-19 Pandemic	4.86 (1.11)

Table 1. Satisfaction Survey Results. Latino student participants completed the satisfaction surveys, which used a Likert scale of 1:Strongly Disagree to 6:Strongly Agree, to evaluate overall program satisfaction.

Conclusions

We have successfully developed a virtual summer anatomy program between the OUWB-LMSA chapter and the surrounding Latinx youth community, in response to the challenges and restrictions of the COVID-19 pandemic. The program has effectively improved overall knowledge of anatomy, health, and wellness in Latinx youth. It has also demonstrated the positive effects of online community engagement between medical students and local Latinx youth to promote health and learning. Thus, our experience with developing a virtual community service model could serve as a guiding framework for other partnerships and programs to follow.

Discussion

- The OUWB-HNO Summer Anatomy Program was successfully sustained during the COVID-19 pandemic through shifting from an in-person classroom to an online platform.
- It was found that the student participants were highly satisfied with the virtual program. In particular, they rated the program highly with respect to encouraging student questions and participation, teaching effectively, learning the general content, and learning content specific to the COVID-19 pandemic.
- The data shows particular room for improvement in how the program develops the student participants’ communication abilities about the COVID-19 pandemic.
- There was a 24.9 percentage point-increase in the mean scores between the pre- and post-assessments across all twelve sections.
- There was overall improvement in the student participants’ knowledge of human anatomy and physiology, as shown by the statistically significant differences between the sample means ($p<0.05$) of the pre- and post-assessments in five out of six multiple-choice sections and in six out of six practical sections.

References

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Overall Effectiveness of Educational Sessions

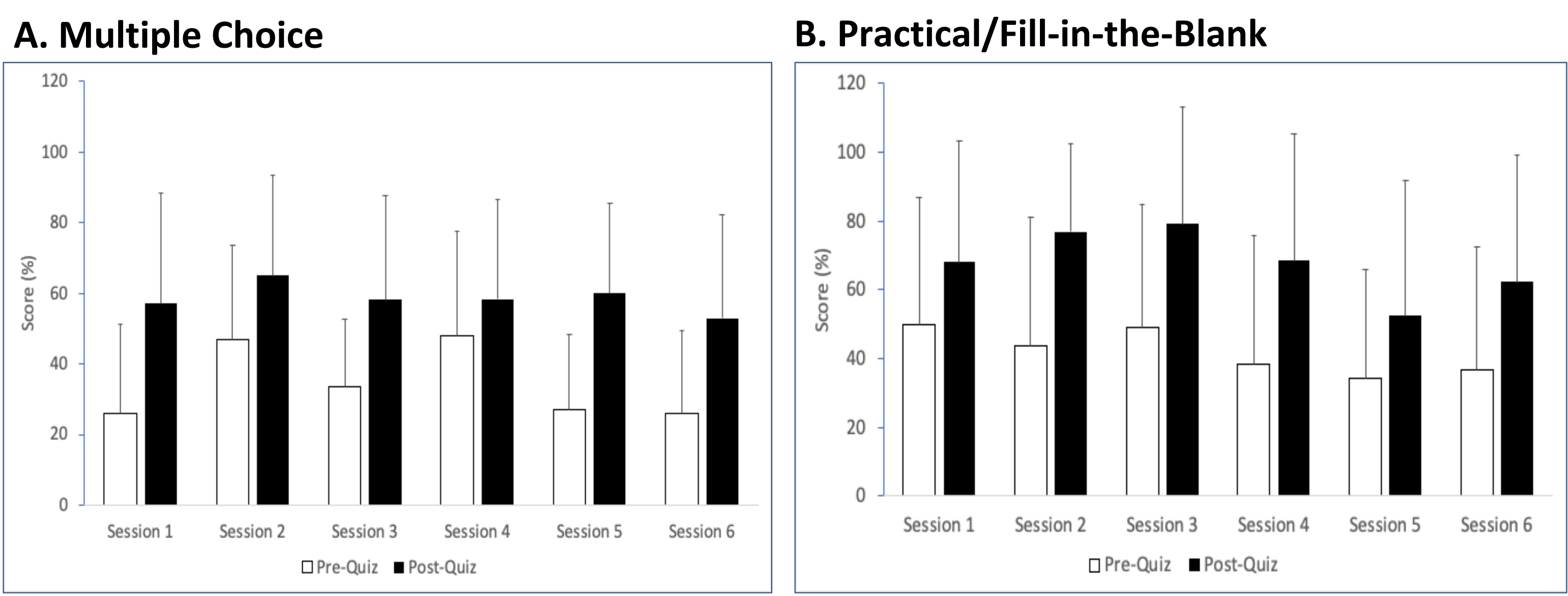


Figure 1. Overall effectiveness of the educational sessions, by type of formal assessment. Paired T-tests were used to determine whether statistically significant differences exist between the sample means ($p<0.05$) of the pre- and post-assessments.

A Look into Medical Students' Knowledge on Adverse Childhood Experiences

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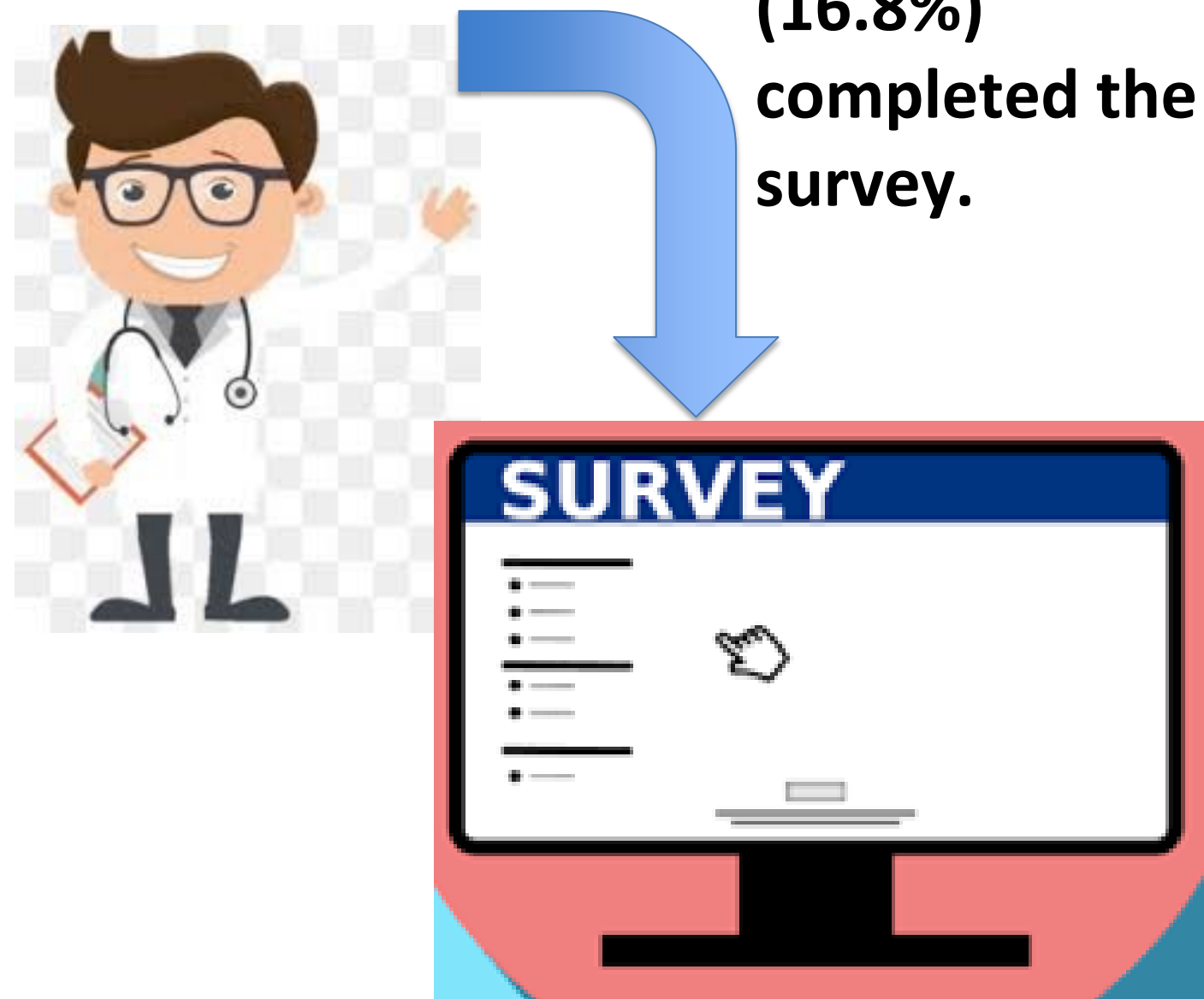
Introduction

- Adverse childhood experiences (ACEs) are defined by the Center for Disease Control and Prevention as traumatic events that occur from birth to 17 years old that involve abuse, neglect, and household violence¹.
- Literature has shown that ACEs are linked to various mental and physical health consequences.
- Currently, training on ACEs is lacking in most medical school curricula^{2&4}.

Aims

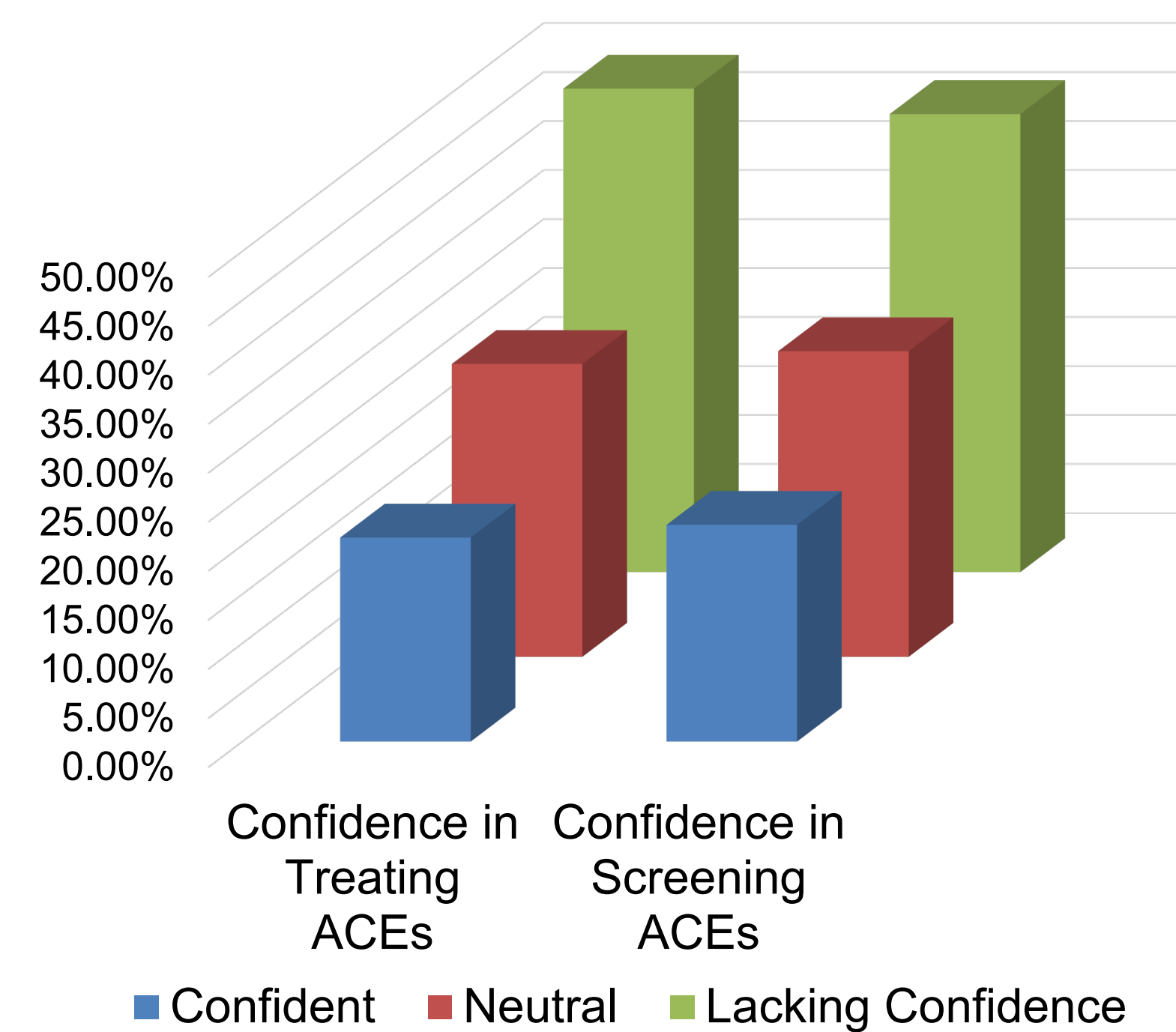
The aims of this study were to assess medical student knowledge of ACEs and confidence in caring for patients with them

Methods

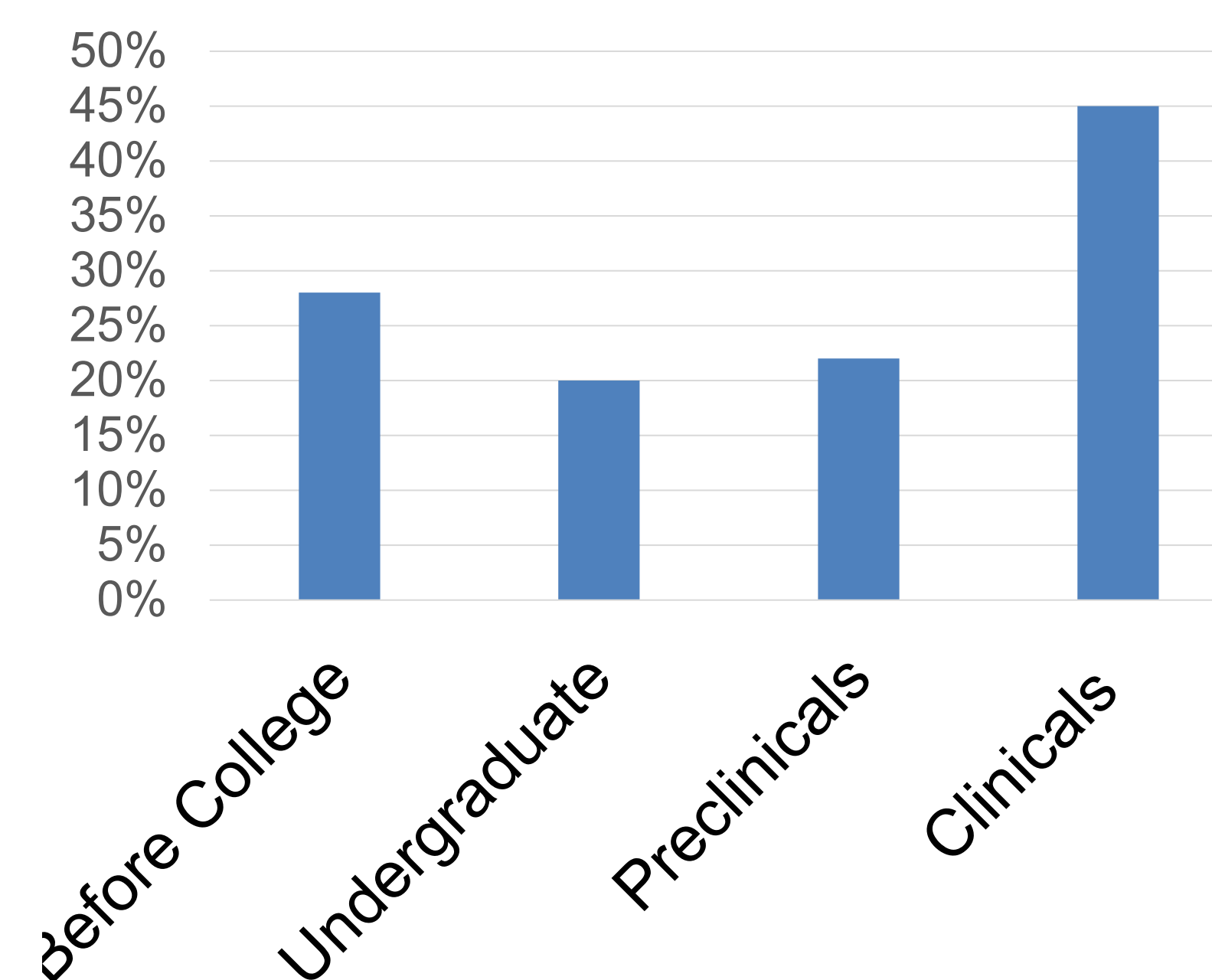


Results

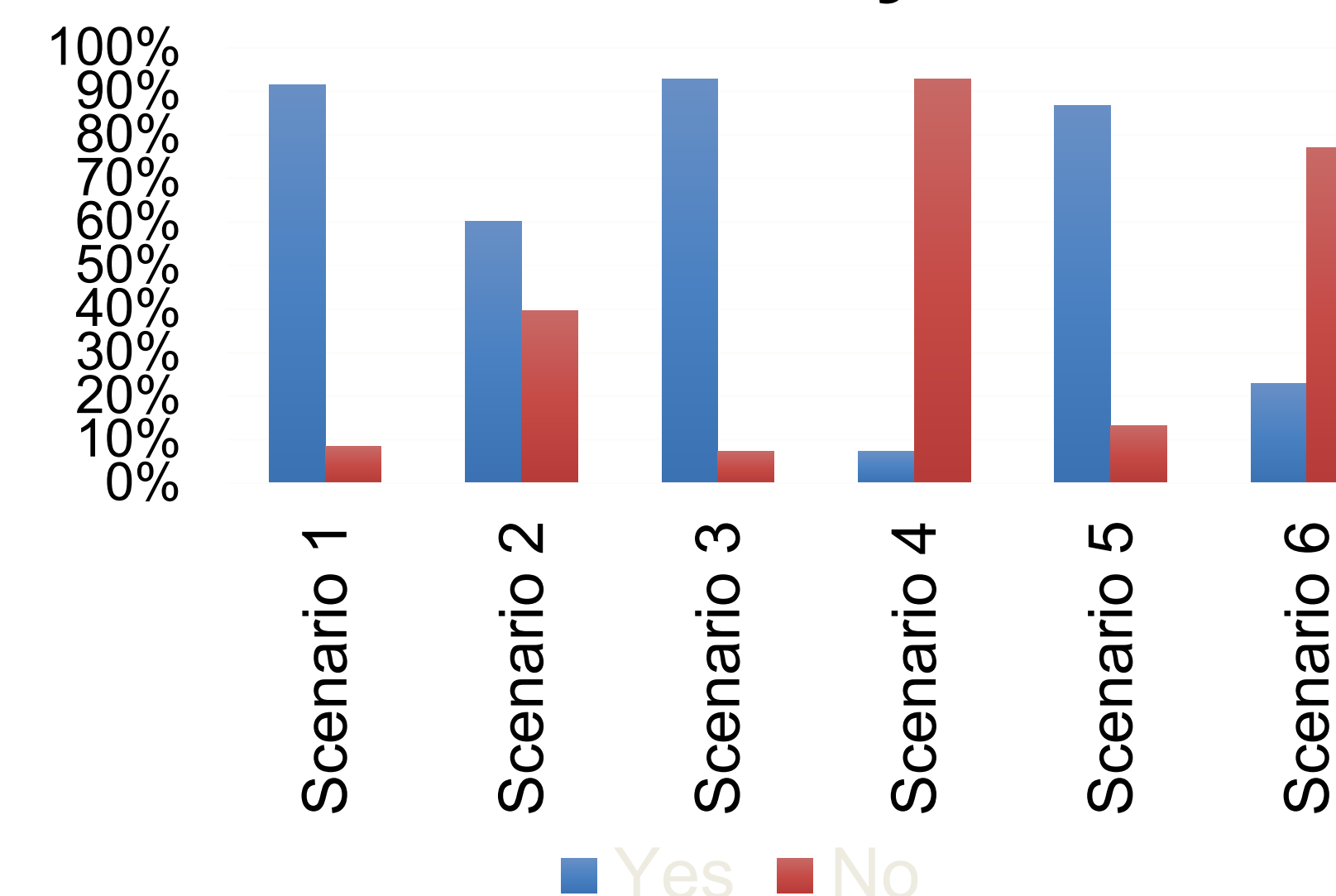
Graph 1: Confidence with ACEs



Graph 2: Student Experience with ACEs



Graph 3: Percentage of ACE Scenarios Identified Correctly



11/83 (13.3%) correctly identified all 5 ACE scenarios, which included scenarios 1, 2, 3, 5, and 6.

Table 1: Scenario Descriptions	
1	A 5-year-old child is neglected by his parents and sometimes misses dinner.
2	A 25-year-old male who was part of a custody battle during his parents' divorce at age 16.
3	A 7-year-old female is fondled by her uncle.
4	A 6-year-old gets put in time-out after refusing to clean up her toys.
5	A 10-year-old witnesses one of his mother's manic episodes.
6	A 17-year-old feels like her parents don't love her because she isn't smart enough to get into the University of Michigan.

Conclusions

- There is a lack of knowledge and confidence among students in regards to what ACEs are, what types of scenarios constitute ACEs, and how to treat patients with them.
- With the overwhelming evidence of future health complications associated with ACEs, it is of paramount importance for future physicians be taught to screen and care for patients with a history of ACEs.
- This study will encourage medical educators to incorporate teachings about ACEs early on in medical school.

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Use of Artificial Intelligence to Map Linkage Alignment in Medical Education

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Introduction

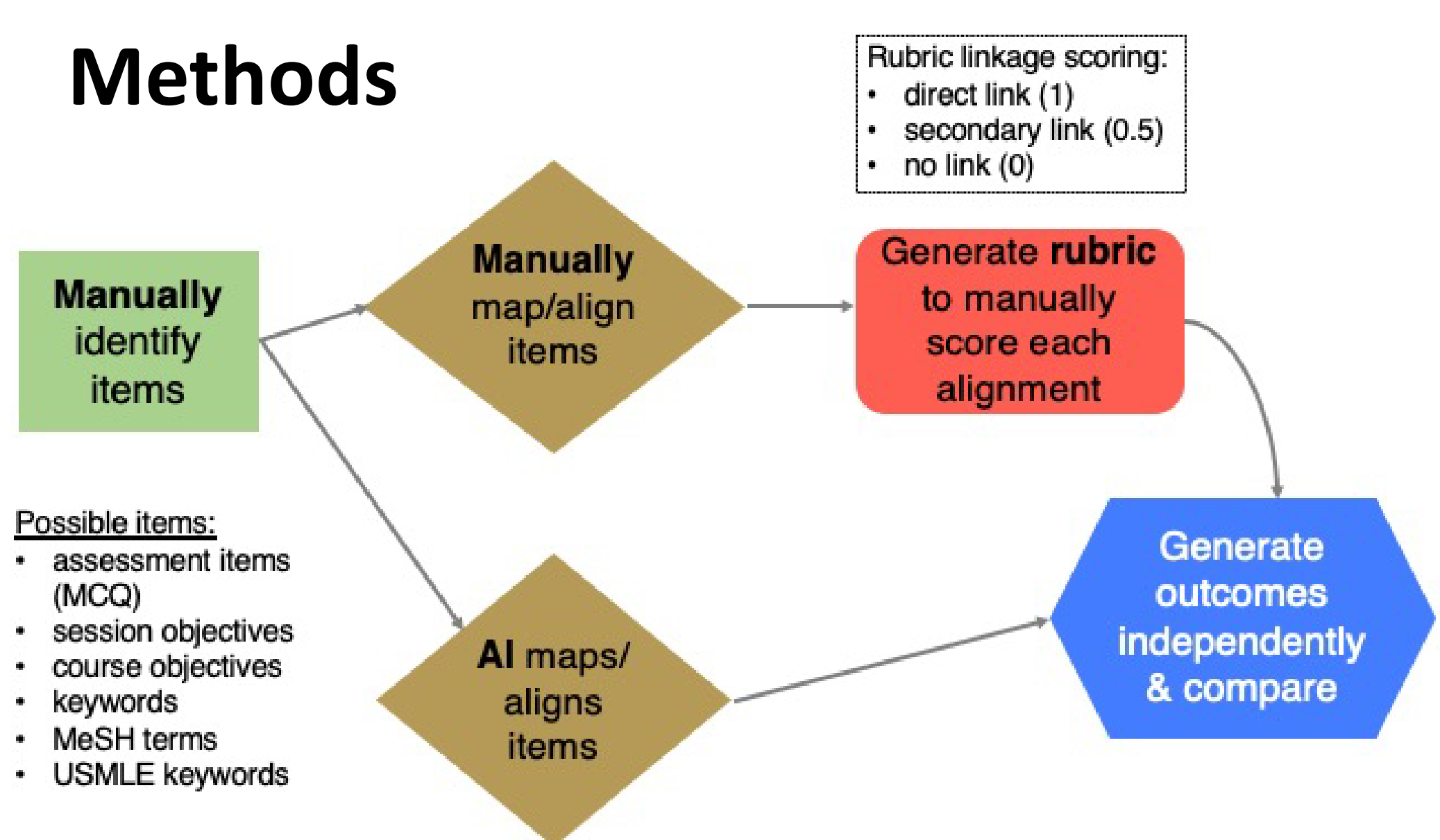
- Curriculum mapping helps align learning objectives, instruction, and assessment (1). An important facet of curriculum mapping is the linking of learning objectives to exam questions (MCQ).
- None of these approaches are fully automated, and all tend to rely on a decentralized approach. Mapping is time-consuming and labor-intensive.
- AI supports complex human activities and may become a time-saving innovation in curriculum mapping (2). The potential for big data and machine learning in medical education has been recognized for years (3).
- Despite the value of mapping, implementation burdens faculty & administrators, which may lead to incomplete and inaccurate maps.

Aims and Objectives

Our research question is: Can Artificial Intelligence (AI) be used to assist in mapping linkages between learning objectives and assessment items?

Major Aim: To assess the value of AI in improving curricular management, data reporting, & assessment validation.

Methods



Results

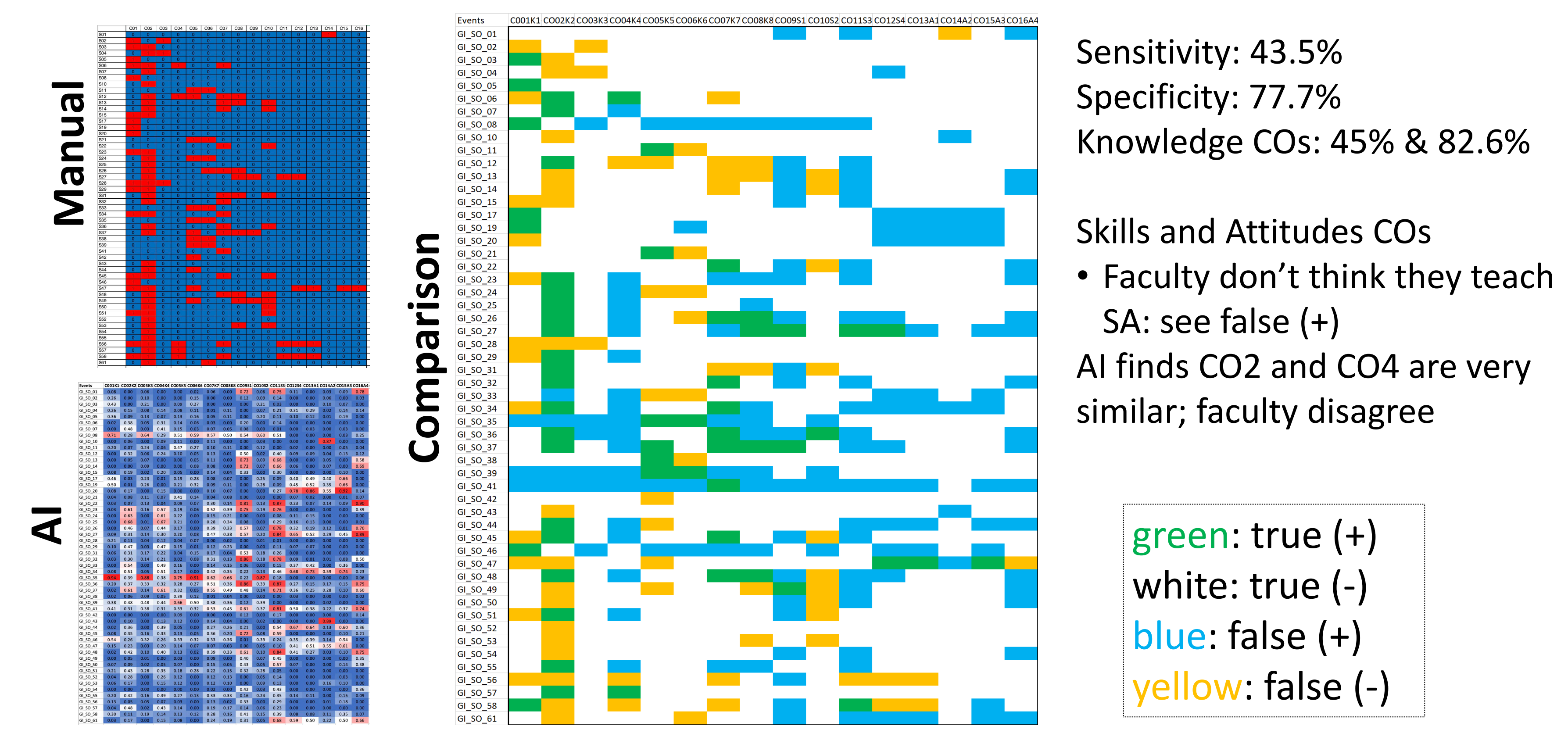


Figure 1: Mapping of Session (SO) (y axis) to Course Objectives (CO) (x axis)

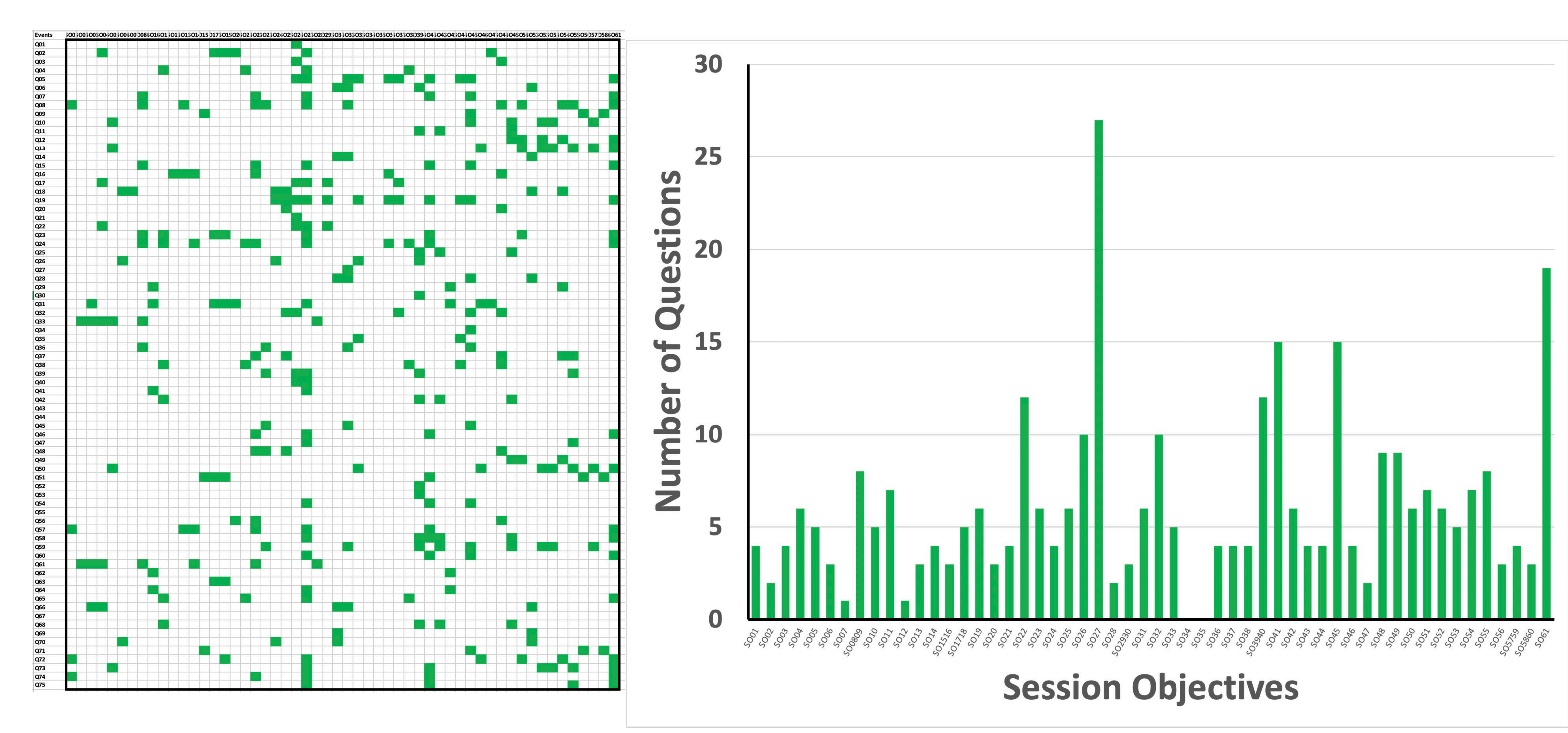


Figure 2: AI Map of Assessment (y axis) to Session Objectives (SO) (x axis)

**In progress: manual alignment and then comparisons*

Conclusions

- Mapping of course objectives to session objectives using AI approximates manual mapping (Figure 1)
- AI mapping results can facilitate thoughtful reflection of objectives and provide insight into coverage of learning objectives within a course or entire curriculum (Figure 2)

Discussion

AI can :

- increase data availability for effective evaluation of curricular mapping
- decrease faculty and staff workload in aligning learning objectives with assessments
- protect question bank integrity by reducing human participation in the mapping analysis

Future Directions:

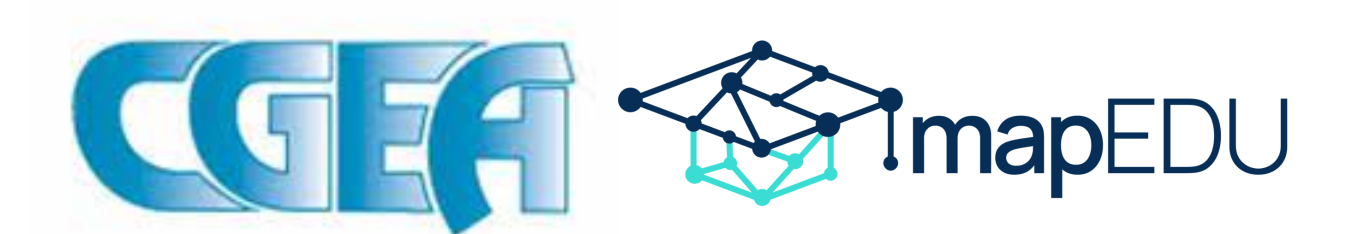
- manual mapping of assessment items to course and session objectives for comparison to AI mapping

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Acknowledgements

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Development of a Virtual Anatomy Program during the COVID-19 Pandemic: A Comparison Between In-Person and Online Community Service Models

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Introduction

- The COVID-19 pandemic has disrupted community service programs across the nation, including an established summer anatomy program between the LMSA chapter at OUWB and Hispanic Newcomer Outreach of Catholic Charities of Southeast Michigan (CCSEM-HNO).
- In 2018 and 2019, the OUWB-HNO Summer Anatomy Program was taught in person by undergraduate and medical students to Latinx youth in Pontiac, Michigan. In response to the impact of the COVID-19 pandemic, the program transitioned to a more sustainable virtual model via Zoom during the summer of 2020.

Aims and Objectives

- To teach Latinx youth about health and wellness through exposure to various organ systems
- To help undergraduate and medical students develop communication skills and teaching experience
- To create a sustainable virtual program that effectively preserves face-to-face teaching competencies and overall student satisfaction

Methods

- The OUWB-HNO Summer Anatomy Program is a three-week program consisting of six lessons: brain and memory, eye and visual system, cardiovascular system, respiratory system, musculoskeletal system, and gastrointestinal system and nutrition.
- Each lesson included didactic lectures, interactive games, and art projects, as well as formative pre- and post-assessments containing multiple-choice and practical (fill-in-the-blank) questions.
- A satisfaction survey was administered by the community partner for overall program evaluation each year.
- One-way ANOVA and unpaired T-tests were used to determine mean differences in percentage-point change (between pre- and post- assessments) and mean differences in satisfaction survey scores between in-person and virtual years of the program.

Results

Program Satisfaction

Satisfaction Survey Results	Mean (Standard Deviation)		
	2018	2019	2020
Overall Satisfaction	5.02 (0.70)	5.04 (1.36)	5.17 (1.00)
Content Presentation	5.19 (0.54)	5.17 (0.97)	5.00 (1.02)
Teamwork	5.20 (0.67)	5.13 (1.00)	5.00 (0.99)
Clarity of Expectations and Directions	5.28 (0.69)	5.52 (0.67)	5.00 (0.86)
Encouragement of Student Questions and Participation	5.35 (0.82)	5.29 (0.67)	5.18 (0.82)
Teaching Effectiveness	5.38 (0.75)	5.45 (0.71)	5.21 (0.98)
Helpfulness/Availability	5.44 (0.55)	5.48 (0.67)	5.21 (0.82)
Theory/Content Knowledge	5.25 (0.71)	5.48 (0.67)	5.28 (0.70)

Table 1. Satisfaction Survey Results. At the end of the program, the children completed a satisfaction survey which utilized a Likert scale of 1: Strongly Disagree to 6: Strongly Agree.

Conclusions

- The mean score for overall satisfaction was high in both the in-person and virtual settings. There were no statistically significant differences ($p<0.05$) between in-person and virtual years in overall satisfaction, content presentation, teamwork, encouragement of student questions and participation, teaching effectiveness, helpfulness/availability, and theory/content knowledge.
- Additionally, there were no statistically significant differences in ten out of twelve sections of the formative assessment. The lower mean percentage-point change in the virtual setting for the respiratory multiple-choice and musculoskeletal practical sections may demonstrate that there is room for improvement in virtual programming for both of these topics.

Discussion

- The COVID-19 pandemic posed significant challenges for sustaining an academia-sponsored community service initiative, but we were able to successfully transition to a virtual model and create a sustainable program.
- Overall, the results could suggest that the online format did not unfavorably impact overall student satisfaction and the effectiveness of the educational sessions.
- Our experience with developing a virtual community service model could lay the groundwork for other initiatives to improve the sustainability of their programs.¹

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Program Effectiveness

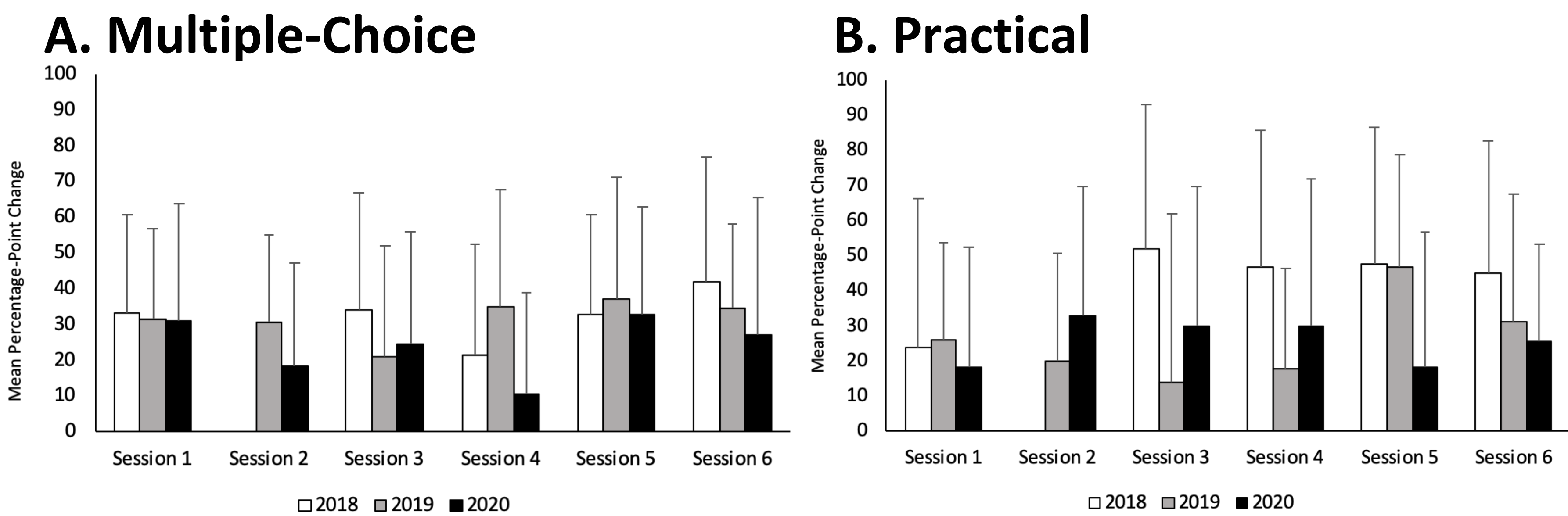


Figure 1. Formative Assessment Results. The mean percentage-point change between pre- and post-assessments was significantly lower ($p<0.05$) in the virtual setting in two sections: Session 4 (respiratory) multiple-choice ($F(2, 82)= 4.34232$, $p= 0.016124$) and Session 5 (musculoskeletal) practical ($F(2, 74)= 4.50697$, $p= 0.014223$).

Novel Decision Aid for Carpal Tunnel Patients: Exploring Patient Preferences between WALANT and Traditional Surgery

Majd T Faraj¹ B.S, Nikhil R Yedulla² B.S., Cade A Cantu³, Brooke G Garnica² B.S., Austin Meadows² B.S., WALANT Research Consortium in the U.S., Charles S Day, M.D., M.B.A.^{3,4}

1)Oakland University William Beaumont School of Medicine 2)Wayne State University School of Medicine 3)University of Michigan 4)Henry Ford Health System

Introduction

- Wide-Awake-Local- Anesthesia-No-Tourniquet (WALANT) is an alternative surgical method to traditional surgery performed in an operating room involving general anesthesia/sedation¹.
- As opposed to using anesthesia and a tourniquet, WALANT techniques involve administering a mixture of lidocaine and epinephrine into the operative area².
- WALANT provides several advantages including shorter hospital stays, fewer preoperative tests, and better post-operative recovery^{3,4,5}. Traditional surgery also has its own profile of advantages, however.
- We created a novel decision aid to help carpal tunnel patients learn about and decide between WALANT and traditional surgery.
- We hypothesize that the decision aid will facilitate patient decision making and will reveal patients' preferences towards WALANT surgery.

Materials and Methods

- Development of the decision aid adhered to the International Patient Decision Aid Standards (IPDAS)⁶.
- As part of the alpha testing, the content of the decision aid and its readability were screened by expert hand surgeons who have performed both WALANT and traditional carpal tunnel release procedures.
- The readability of the decision aid was also evaluated by carpal tunnel patients who were randomly recruited.
- Beta testing involved administering the decision aid.
- The administration of the decision aid involved five steps: an Orientation, Memory, and Concentration Test (OMCT)⁷, knowledge pre-test, decision aid table, knowledge post-test, post-decision aid questionnaire, and a Decisional Conflict Scale (DCS) assessment⁸. (Figure 1)



Figure 1: Schematic Representation of the Decision Aid Sequence

Aims and Objectives

- The decision aid created will be a validated patient-education tool for use in orthopedic hand surgery clinics for any average patient who needs help making an educated decision and participate in shared decision-making.

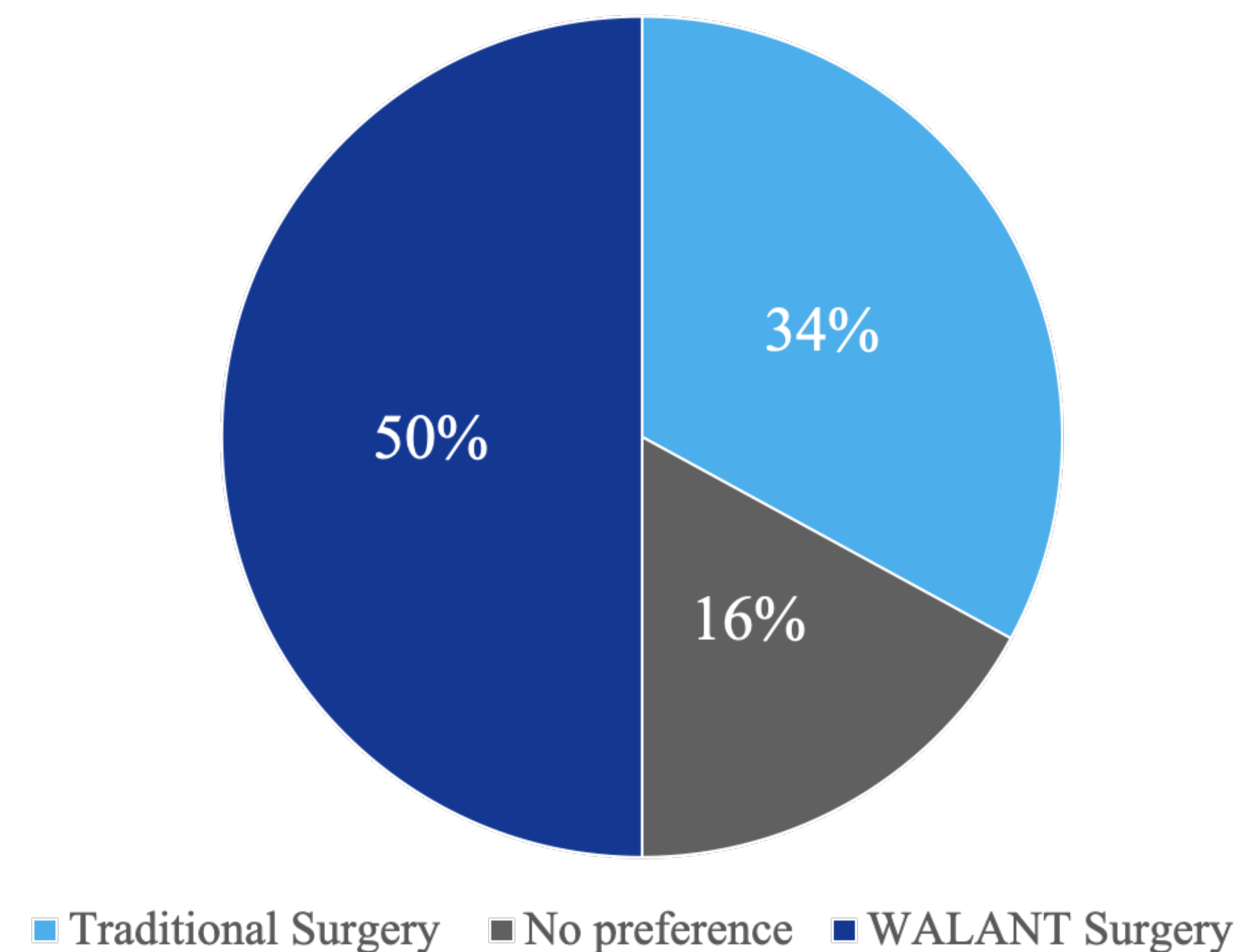


Figure 2: Pie Chart showcasing Patient Preferences Concerning Surgical Modalities

Results

- A total of hundred patients were enrolled. Patients scored significantly better on the knowledge tests after reading through the decision aid. ($p < 0.0001$).
- In terms of preferences, the majority of patients preferred WALANT surgery (50%) but over a third preferred traditional surgery (34%). (Figure 2)
- Patients are more likely to express no concern with WALANT surgery risks and not mind taking time off to recover postoperatively, being more agreeable to taking time off post-operatively, and being more likely to control their anxiety well ($p < 0.001$ each). No significant differences were noted for patient preferences between being sedated or awake. ($p = 0.154$)
- The average decisional conflict score for patients measuring their confidence in their decision was 6.82.

IRB Approval #13583

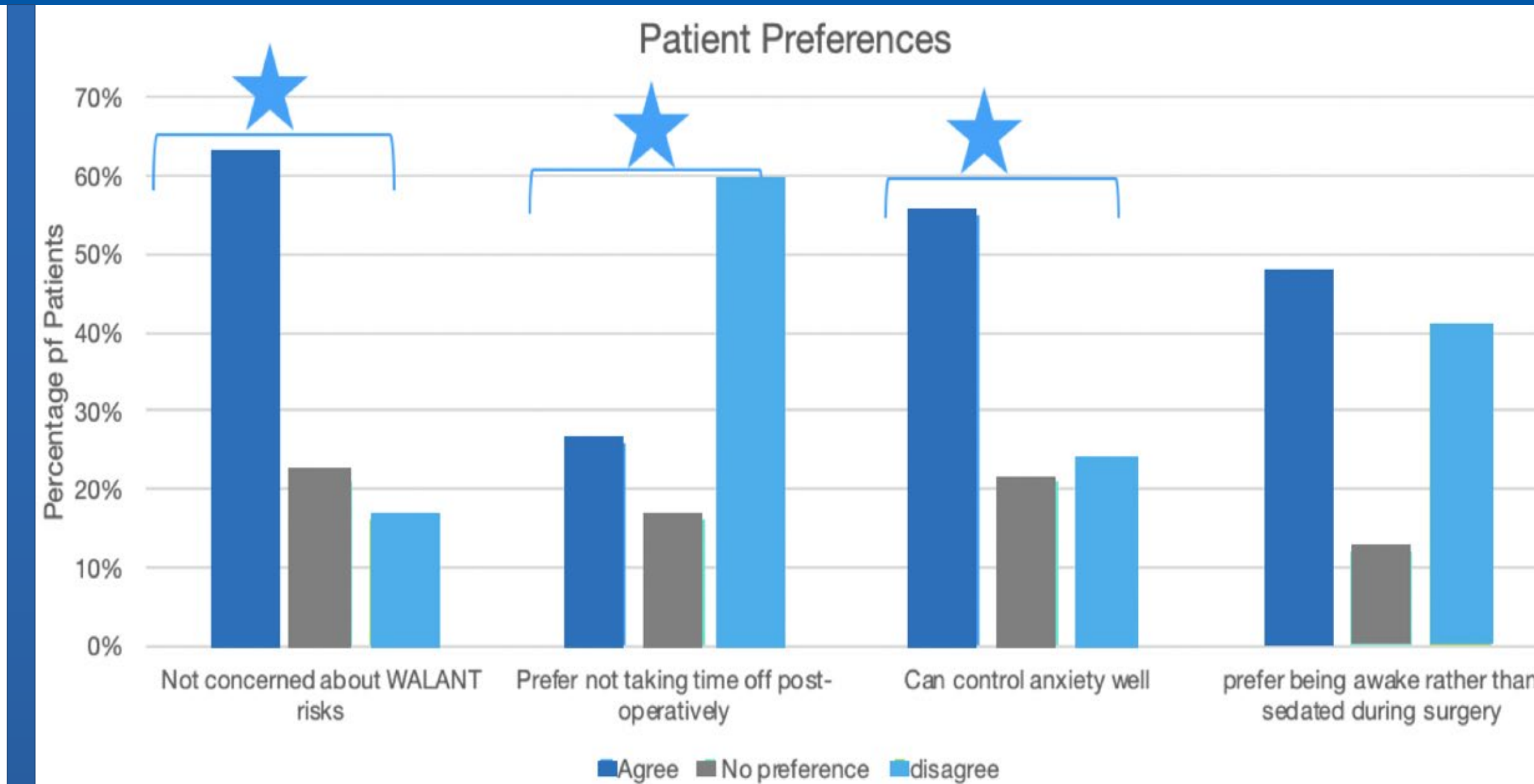


Figure 3: Graph Showcasing Patients' Readiness to Make a Decision

Discussion and Conclusion

- The decision aid helped educate patients about WALANT and traditional surgery and prepared them well for making a decision. Thus, this validates the decision aid.
- The patients' decisions were confident and aligned well with their values rendering the decision aid an effective tool.
- The majority of patients preferred WALANT surgery over traditional surgery which goes in-line with our initial hypothesis. However, a significant number still prefer traditional surgery rendering our decision aid even more useful.

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Effectiveness of Assessment of Self-Directed Learning in Health Professions Education: A Systematic Review

Sarah Lerchenfeldt, Misa Mi, Kyeorda Kemp and Tracey A.H. Taylor

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Introduction

- SDL is used in health professional education to promote the development of skills associated with life-long learning.
- SDL allows health professionals to continue to grow and refine their knowledge in order to improve patient care and well-being.¹
- SDL can be defined as a process in which individuals:²

- Take initiative, with or without the help of others
- Diagnose learning needs
- Formulate learning goals
- Identify resources for learning
- Choose and implement appropriate learning strategies
- Evaluate learning outcomes

- There is a need for research into SDL outcome measures and methodology in order to advance SDL in medical education.³

Objectives

- The goal of this systematic review is to explore how effective assessment methods are in evaluation of SDL learning outcomes for health professions students, including:
 - Learning activities used to promote/support SDL
 - How readiness for SDL is assessed
 - Assessment methods used to assess the effectiveness of SDL activities on student learning

Methods

- PRISMA standards used to guide this systematic review⁴
- Search strategies developed for 7 electronic databases: PubMed, Embase, PsycINFO, ERIC, CINAHL, Scopus, and Web of Science
- Inclusion criteria: English-language articles published since 2015, investigating assessment of SDL learning outcomes in health professions students.
- Two independent investigators screened titles and abstracts, full text articles
- Two independent reviews of the selected studies to extract data on settings, study design, participants, SDL assessment methods, and outcomes.

Results

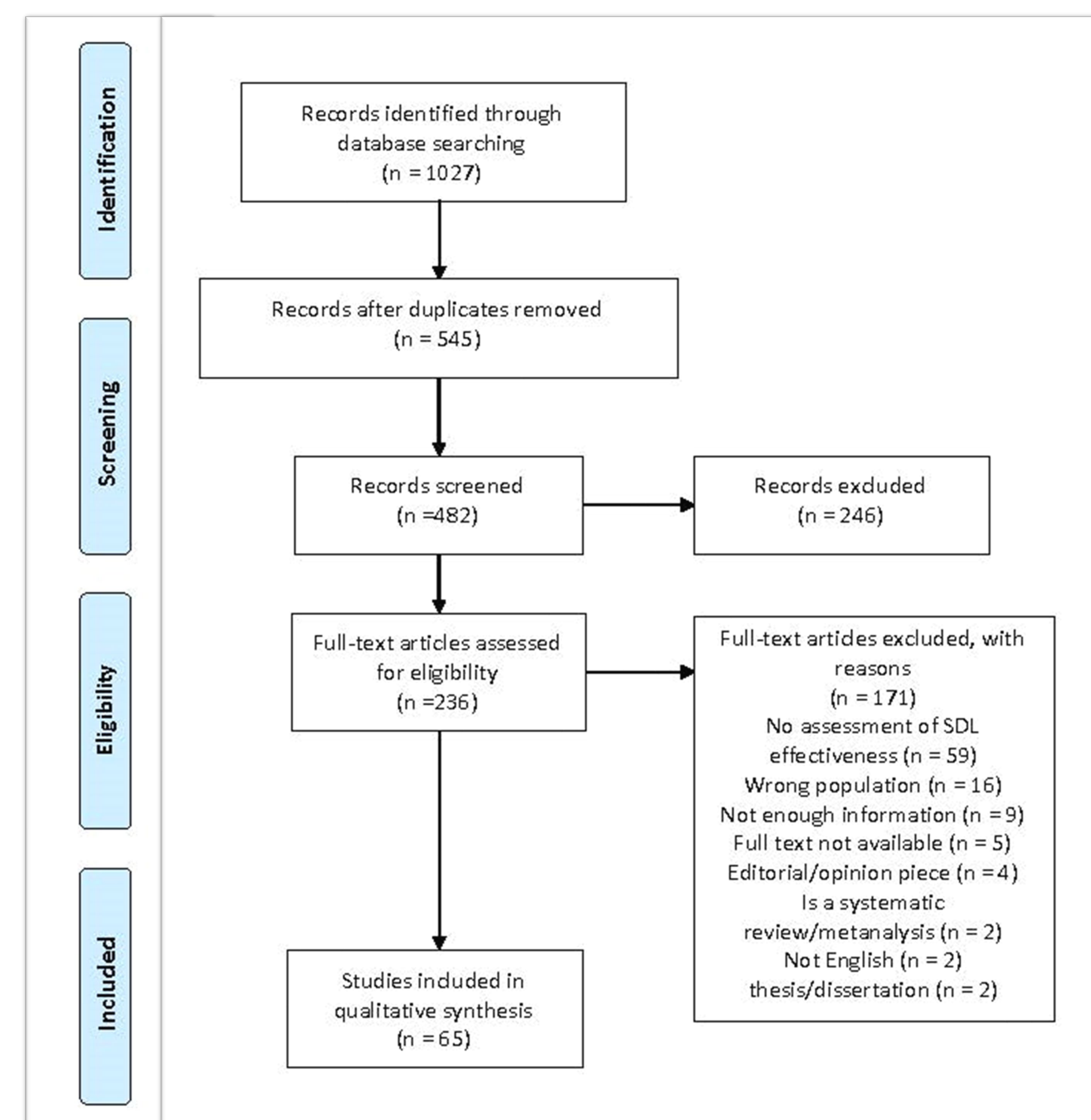


Figure 1: PRISMA flow diagram of SDL Systematic Review

- Our comprehensive searches yielded 1027 studies, 65 studies were selected for the review.
- Sample size of selected studies ranged from 14 to 872.
- 17 studies were conducted in the U.S., 12 studies were conducted in South Korea, and 36 studies were conducted in other countries.
- A total of 59% of studies had positive results, 9% had negative outcomes, and 32% had neutral or both positive and negative results.

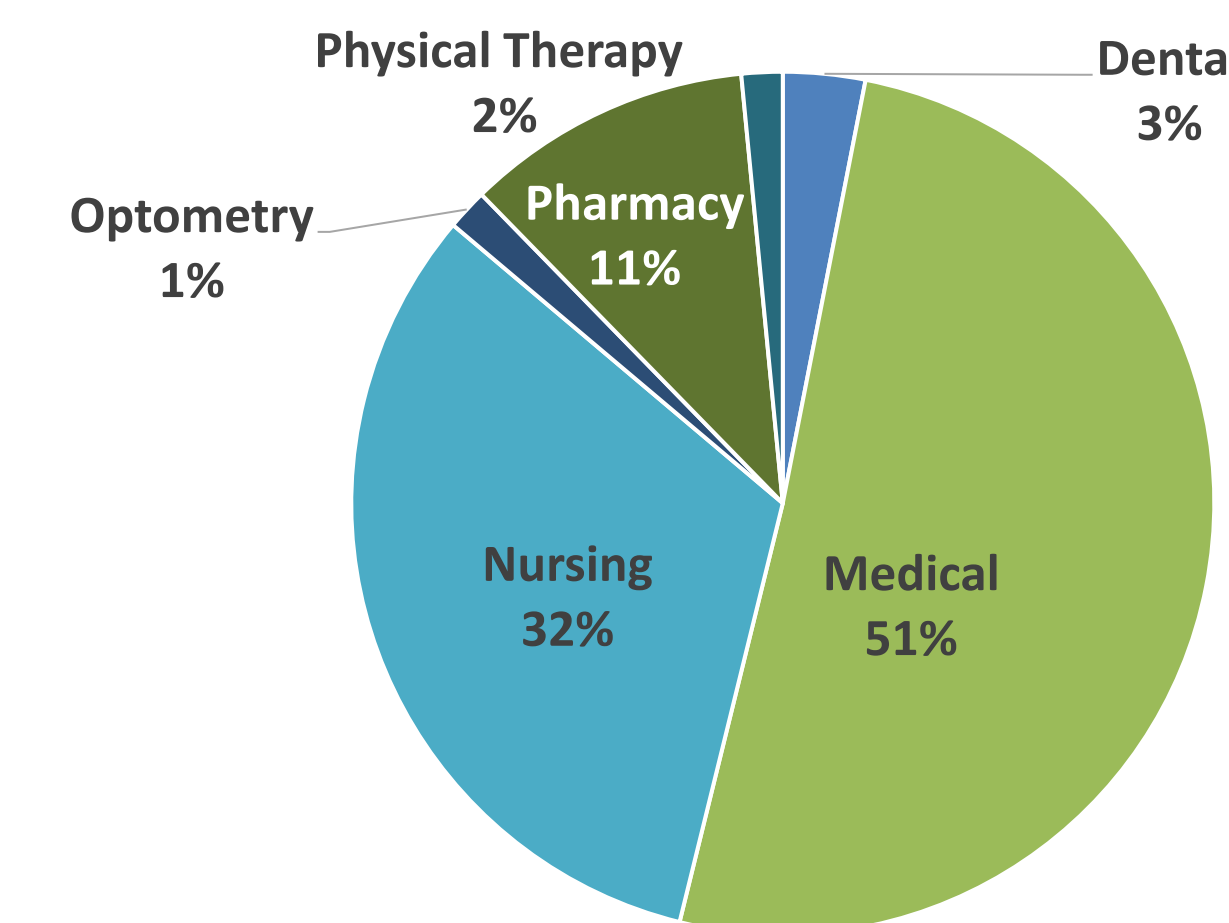


Figure 2: Types of Participants

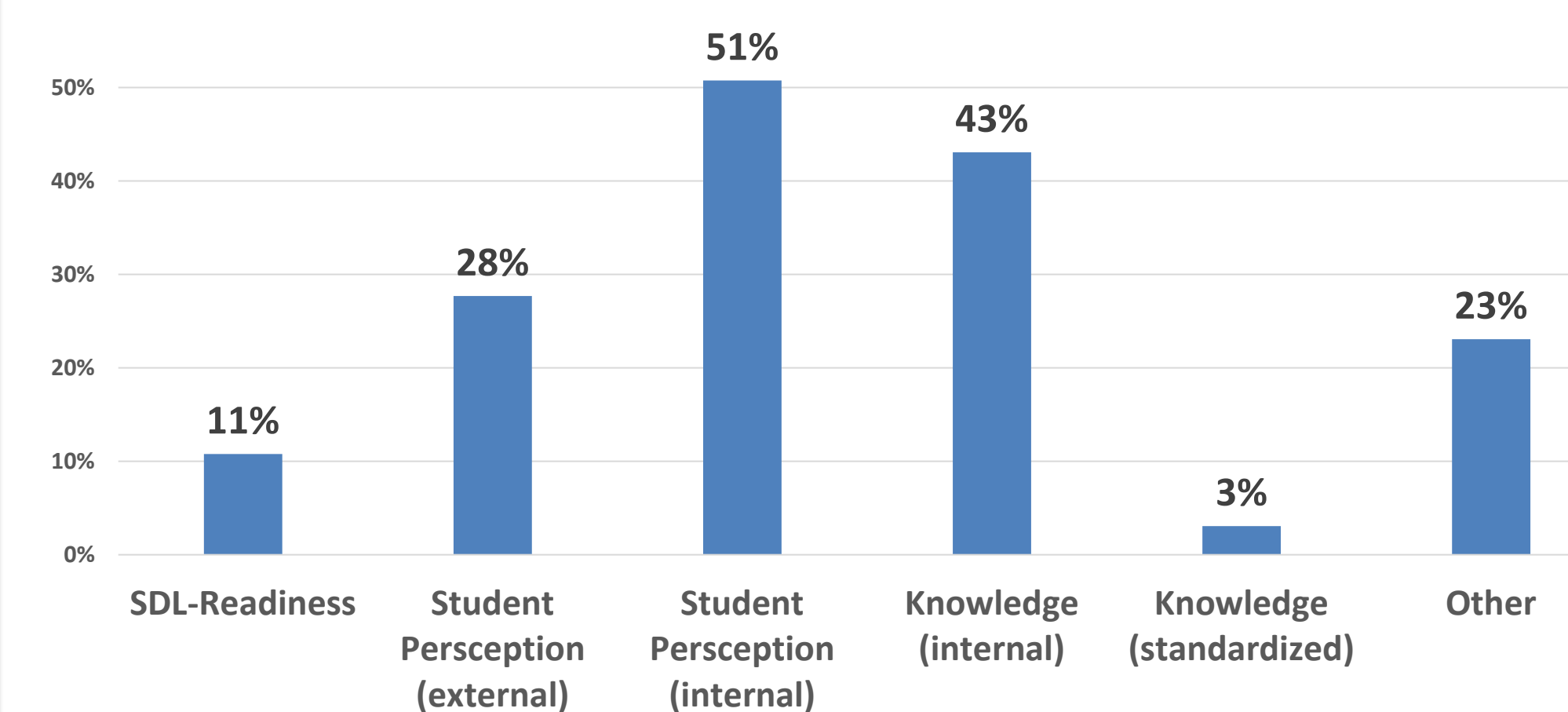


Figure 3: SDL Assessment Methods Used

Note: While there were 65 studies, many studies used more than one assessment method. Each was counted independently.

Conclusions

- There were wide variations in the SDL activities used as well as the assessments of these activities.
- The majority of studies evaluated SDL using assessments created internally (developed by the institution).
- Over half of the studies used more than one assessment method to evaluate the effectiveness of SDL.

Discussion

- Due to the wide variations in activities considered SDL and assessments used, it may be beneficial to standardize each component across healthcare professions.
- Future research should be conducted to determine the most accurate and effective method to assess SDL activities.
 - Student perceptions may not be an accurate evaluation of effectiveness.

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