

## Perceived value of student-led near-peer teaching in anatomy education within a problem-based learning medical curriculum

Valeur perçue de l'enseignement par les pairs dans l'enseignement de l'anatomie dans le cadre d'un programme d'études médicales basé sur l'apprentissage par problèmes

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### Implication Statement

Problem-based learning (PBL) has become widely adopted in medical education, but its implementation presents challenges, particularly regarding decreased anatomy hours and knowledge acquisition compared to traditional methods. The Faculty of Medicine and Health Sciences Anatomy Club's near-peer teaching model demonstrates an effective, scalable solution to bridging anatomical knowledge gaps inherent in PBL curricula. By pairing virtual workshops with clinical cases and interactive quizzes, the club enhances medical students' understanding and retention of anatomy while reducing stress. Survey results suggest significant gains in knowledge and engagement, making this approach beneficial for self-directed, PBL-based settings. Institutions aiming to supplement anatomy education in PBL environments may find this model both feasible and valuable.

### Énoncé des implications de la recherche

L'apprentissage par problèmes (APP) est devenu largement adopté dans l'éducation médicale, mais sa mise en œuvre pose des défis, notamment en raison de la réduction des heures d'anatomie et de l'acquisition des connaissances par rapport aux méthodes traditionnelles. Le modèle d'enseignement entre pairs du Club d'Anatomie de la FMSS propose une solution efficace et évolutive pour combler les lacunes en anatomie inhérentes aux programmes basés sur l'APP. En associant des ateliers virtuels à des cas cliniques et des quiz interactifs, le club améliore la compréhension et la rétention de l'anatomie chez les étudiants en médecine, tout en réduisant le stress. Les résultats des sondages suggèrent des gains significatifs en connaissances et en engagement, rendant cette approche bénéfique pour les environnements d'apprentissage autonome basés sur l'APP. Les institutions cherchant à compléter l'enseignement de l'anatomie dans les contextes APP pourraient trouver ce modèle à la fois réalisable et utile.

### Introduction

Increasingly, medical faculties, including the Faculty of Medicine and Health Sciences (FMSS) at the University of Sherbrooke, have adopted problem-based learning (PBL) over traditional teaching methods.

PBL enhances education by connecting knowledge to real clinical cases, emphasizing key medical practice skills, and fostering leadership, communication, and teamwork, aligning with CanMEDS competencies. PBL also encourages

self-directed learning essential for medical careers, with studies showing improved academic results and fewer assessment failures than traditional methods.<sup>1</sup>

However, PBL has challenges, including increased demands on students' time and risks of underrepresenting certain subjects like anatomy. Many PBL-based curricula offer less anatomy learning than previously,<sup>2</sup> and research shows that students in PBL-only programs often have weaker anatomical knowledge than those in traditional models.<sup>3</sup>

In response to this, medical students at the University of Sherbrooke founded the FMSS Anatomy Club to bridge gaps in anatomy training.

## Description of the innovation

This club stands out by using the near-peer teaching model, where tutors just a few academic years ahead of students create a comfortable learning environment, effectively reducing stress.<sup>4</sup> Research even suggests that near-peer teaching sometimes matches the efficacy of faculty instruction.<sup>5</sup>

Prospective tutors must show a strong anatomy foundation, favoring those with previous studies in the subject. Medical are selected over residents to enhance the learning experience. No formal training is provided for the tutors. The club supplements preclinical education independently from the faculty, which offers limited anatomy lab hours, by offering real-time virtual workshops. Each workshop is collaboratively designed by three to four tutors, requiring on average 6-10 hours to develop, and typically last one hour. Review sessions start with simplified explanations of neuro-musculoskeletal or visceral concepts, followed by explanations of cadaveric prosection images. Medical clinical cases and interactive quizzes, such as identifying possible nerve injuries caused by traumatic fractures, help consolidate the material and bridge anatomical concepts.

During the 2023-2024 academic year, the Anatomy Club conducted 11 workshops, with attendance varying between 40 and 160 participants. Topics covered included gastroenterology, upper and lower limbs, cardiovascular and respiratory systems, neurology, genitourinary and vascular systems.

## Outcomes

We distributed a survey to 160 active members who attended at least one Anatomy Club workshop in 2023-2024, with 92 participants (57.5% of attendees) responding. Participation was voluntary and responses were anonymous. We used a 5-point Likert Scale, where 1 represented “Strongly Disagree” and 5 “Strongly Agree”, to gather data, then analyzing it to determine mean, standard deviation, and 95% confidence interval for each question (Table 1).

Most participants felt the sessions substantially improved their understanding of anatomy concepts (77.2% strongly agreeing, mean 4.75/5.00) and medical pathologies (64.1% strongly agreeing, mean 4.64/5.00). Additionally, 85.9% strongly agreed that these sessions positively impacted their learning in a self-directed PBL medical program (mean 4.86/5.00). Quizzes reinforced anatomy understanding, with 97.8% of students agreeing or strongly agreeing, and 69.6% strongly agreed attending workshops increased their anatomical knowledge in comparison to before (mean 4.67/5.00). Lastly, 52.2%, 51.1%, and 77.2% strongly agreed that the workshops reduced their stress, increased their motivation to study, and met their expectations for presentation quality, respectively.

Table 1. 5-point Linkert Scale Survey Results on the Impact of FMSS Anatomy Club Workshops (n = 92)

	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Mean	Standard Deviation	Confidence Interval (95%)
1. The anatomy club sessions improved my understanding of anatomy.	71 (77.2%)	19 (20.7%)	2 (2.2%)	0 (0%)	0 (0%)	4.75	0.48	[4.65, 4.85]
2. The anatomy club sessions contributed to my understanding of medical pathologies.	59 (64.1%)	33 (35.9%)	0 (0%)	0 (0%)	0 (0%)	4.64	0.48	[4.54, 4.74]
3. Participating in the anatomy club sessions had a positive impact on my learning within a self-directed PBL medical education program.	79 (85.9%)	13 (14.1%)	0 (0%)	0 (0%)	0 (0%)	4.86	0.35	[4.79, 4.93]
4. The quizzes during the anatomy club sessions reinforced my understanding of anatomy concepts.	62 (67.4%)	28 (30.4%)	2 (2.2%)	0 (0%)	0 (0%)	4.65	0.52	[4.54, 4.76]
5. My anatomical knowledge has increased after attending an anatomy club session compared to before.	64 (69.6%)	26 (28.3%)	2 (2.2%)	0 (0%)	0 (0%)	4.67	0.51	[4.57, 4.78]
6. The anatomy club sessions played a role in reducing my stress from studying anatomy.	48 (52.2%)	30 (32.6%)	14 (15.2%)	0 (0%)	0 (0%)	4.37	0.73	[4.22, 4.52]
7. Participating in the anatomy club sessions increased my motivation to study anatomy	47 (51.1%)	24 (26.1%)	20 (21.7%)	1 (1.1%)	0 (0%)	4.27	0.84	[4.10, 4.44]
8. The quality of the presentations during the anatomy club sessions is satisfactory.	71 (77.2%)	19 (20.7%)	1 (1.1%)	1 (1.1%)	0 (0%)	4.74	0.53	[4.63, 4.85]

## Suggestion for next steps

These findings support that the FMSS Anatomy Club's near-peer teaching model effectively enhances anatomical understanding, confidence, and engagement among medical students by addressing the gaps of anatomical concepts in PBL. It can be easily replicated without any specific preconditions or financial resources, utilizing free cadaveric images and making implementation accessible. The small sample size is a limitation of this study, and we acknowledge some responses may reflect positive bias to show support for this student-led initiative. Future work could compare objective anatomy question grades in faculty medical exams between attendees and non-attendees. Moving forward, developing extracurricular dissection workshops may further enrich students' learning, allowing them to revisit concepts through hands-on experiences.

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