

Dynamic Identification Checklists In The Anatomy Dissection Lab – Approach to Enhance Formative Feedback Through Multi-Faceted Communication and Self-Monitoring

Giuliano Romano ¹, Stefanie M Attardi Ph.D. ², Jickssa Gemechu Ph.D. ²

1 Oakland University William Beaumont School of Medicine

2 Department of Foundational Medical Studies, Oakland University William Beaumont School of Medicine

Introduction

- Large-group anatomy instruction presents challenges in monitoring student progress and understanding.¹
- Summative assessment predominates, limiting formative feedback during learning.²
- Checklists improve learning, but dynamic checklist communication tools remain understudied.³

Aims and Objectives

Using gross anatomy as a model for basic science medical education, this study aims to:

1. Develop a novel efficient, timely, and convenient mechanism for communication of students’ dissection progress to peers and faculty via Google workspaces.
2. Evaluate effectiveness of using Google Workspaces as a communication tool for use in dissection, exam preparation and instruction.

Methods

- **Prior to Fall 2023 (Traditional):** Team resources for each lab included Lab Identification Checklist (LIC) spreadsheets with check boxes for tracking dissection of >1000 total structures, which were tagged on identification-based practical examinations.

- **Fall 2023 (Novel):** LICs were offered in shared Google Sheets (Google LLC, Mountainview, CA), with a tab for each team’s lists (Fig 3). For each structure, formulas and App Script code generated the number of teams who found the structure with a list of their specific donors (Fig 4). The data were dynamic and openly accessible to students and faculty.

Methods (continued)

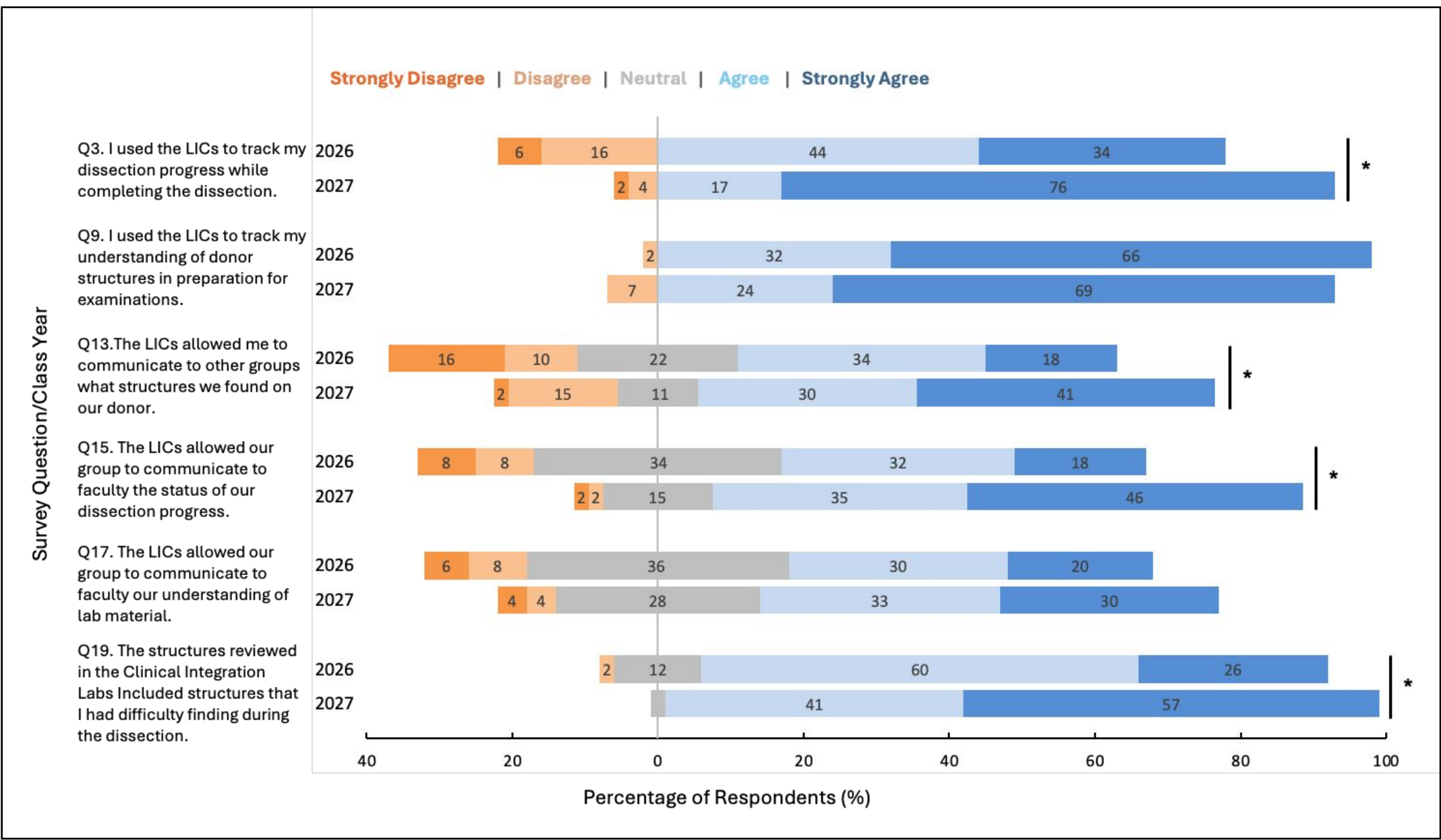
Q1 Back Lab Identification Checklist (LICs)						Dissection findings	
Structures on the practical examination will be tagged from this list.						Briefly note anatomical variations, pathology, and/or evidence of procedures.	
*Anatomical spaces will have an object placed in them (e.g. cloth, probe, pipelcleaner) and the object will be tagged. *Imaging column will be updated before the Clinical Integration Lab						Complete notes only where applicable) before the start of the next dissection lab.	
Complete the yes/no column before the start of the next dissection lab							
Identified on your sheet?	YES	NO	Structure	Donor	Imaging*	Surface Anatomy	
Superficial Back Muscles							
2	☐	☐	trapezius m.	☒	☒	☒	
3	☐	☐	latissimus dorsi m.	☒	☒	☒	
4	☐	☐	rhomboid major m.	☒	☒	☒	
5	☐	☐	rhomboid minor m.	☒	☒	☒	
6	☐	☐	levator scapulae m.	☒	☒	☒	
Thoracolumbar fascia							
Intermediate Back Muscles							
10	☐	☐	serratus posterior superior m.	☒	☒	☒	
11	☐	☐	serratus posterior inferior m.	☒	☒	☒	
Erector Spinae							
14	☐	☐	iliocostalis m.	☒	☒	☒	
15	☐	☐	longissimus m.	☒	☒	☒	
16	☐	☐	spinalis m.	☒	☒	☒	
Splenius Group							
17	☐	☐	splenius capitis m.	☒	☒	☒	
18	☐	☐	splenius cervicis m.	☒	☒	☒	
19	☐	☐	semispinalis capitis m.	☒	☒	☒	
20	☐	☐	semispinalis cervicis m.	☒	☒	☒	
Spinal Cord							
21	☐	☐	posterior/dorsal roots	☒	☒	☒	
22	☐	☐	anterior/ventral roots	☒	☒	☒	
23	☐	☐	spinal nerve	☒	☒	☒	
24	☐	☐	spinal ganglion	☒	☒	☒	
25	☐	☐	conus medullaris	☒	☒	☒	
26	☐	☐	cauda equina	☒	☒	☒	
Meninges							
27	☐	☐	dura mater	☒	☒	☒	
28	☐	☐	arachnoid mater	☒	☒	☒	
29	☐	☐	denticulate ligament	☒	☒	☒	
30	☐	☐	filum terminale	☒	☒	☒	
Neurovasculature							
31	☐	☐	Greater occipital n.	☒	☒	☒	
32	☐	☐	Accessory n.	☒	☒	☒	
33	☐	☐	dorsal scapular n.	☒	☒	☒	
34	☐	☐	dorsal scapular a. and v.	☒	☒	☒	

Figure 1. Sample Individual Team Lists.

Each list includes columns for students to check yes/no for finding a structure, the list of required structures, and notes of dissection findings.

- Quasi-experimental cross-sectional comparison of first-year medical students using static checklists (Class of 2026, n=125) versus dynamic Google Sheets–based checklists (Class of 2027, n=125) during gross anatomy dissection.
- A 19-item Likert survey evaluated self-monitoring, peer communication, and student–faculty communication; responses were collected anonymously after course completion.
- Descriptive statistics and Mann–Whitney U tests compared cohorts ($p < 0.05$); study approved by the OU IRB.

Results



Class Totals									
YES	NO	Structure Name	Number of groups found	Number of groups not found	Teams Found				
Superficial Back Muscles									
		trapezius m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		latissimus dorsi m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		rhomboid major m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		rhomboid minor m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		levator scapulae m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
Thoracolumbar fascia									
		Thoracolumbar fascia	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
Intermediate Back Muscles									
		serratus posterior superior m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		serratus posterior inferior m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
Erector Spinae									
		iliocostalis m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		longissimus m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		spinalis m.	21	0	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
Splenius Group									
		splenius capitis m.	20	1	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		splenius cervicis m.	20	1	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		semispinalis capitis m.	19	2	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		semispinalis cervicis m.	16	5	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
Spinal Cord									
		posterior/dorsal roots	4	16	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		anterior/ventral roots	3	16	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		spinal nerve	3	18	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		spinal ganglion	4	17	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		conus medullaris	4	17	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		cauda equina	4	17	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
Meninges									
		dura mater	6	15	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		arachnoid mater	4	17	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		denticulate Ligament	4	17	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		Filum terminale	4	17	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
Neurovasculature									
		Greater occipital n.	7	18	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		Accessory n.	19	2	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		dorsal scapular n.	7	18	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
		dorsal scapular a. and v.	7	18	Team1, Team2, Team3, Team4, Team5, Team6, Team7, Team8, Team9, Team10, Team11, Team12, Team13, Team14, Team15, Team16, Team17, Team18, Team19, Team20, Team21				
Totals									

Figure 2. Sample Aggregate Data from 21 Teams.

The totals tab includes information about the number of teams that did/did not find a structure and a list of teams that did find a structure

Results (continued)

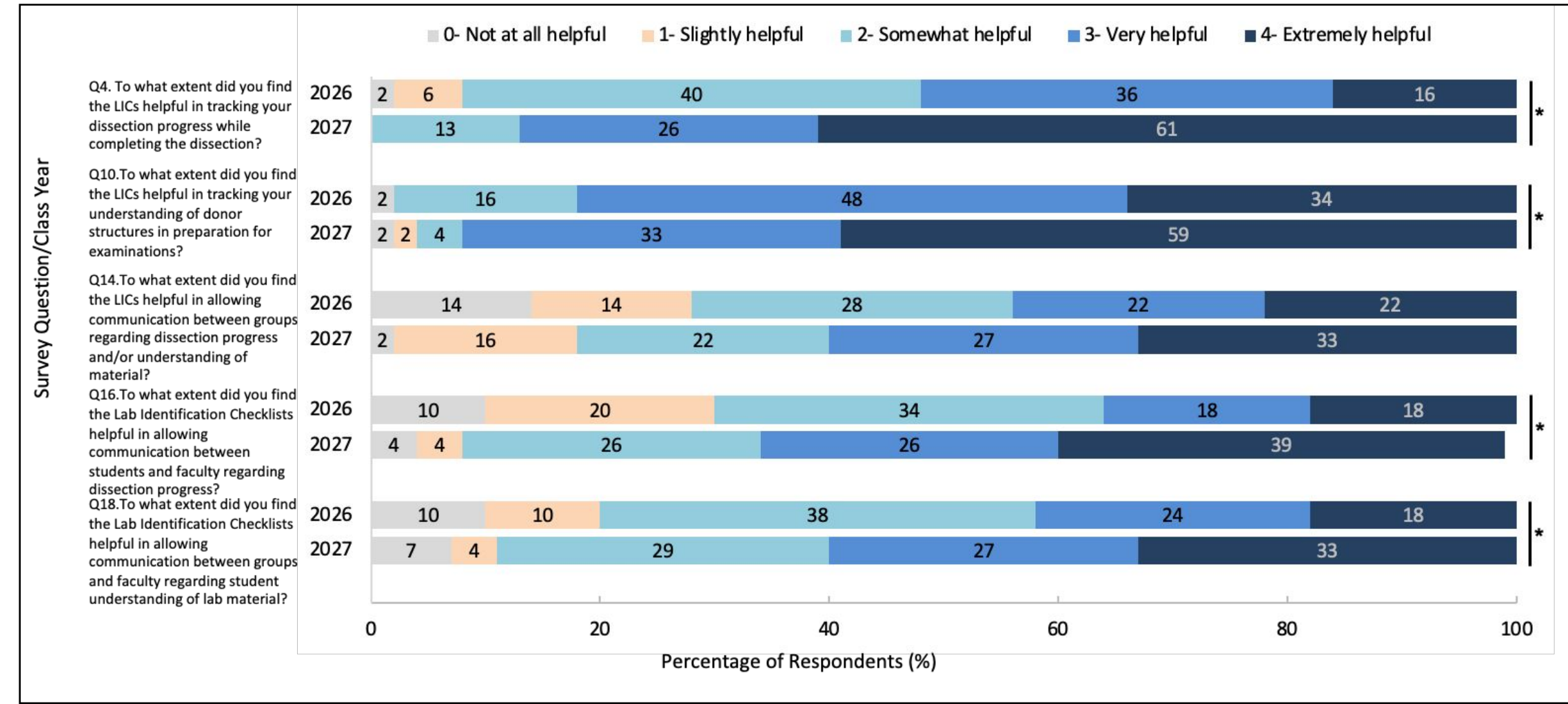


Figure 4. Student responses from Class Years 2026 and 2027 regarding the perceived helpfulness of Lab Identification Checklists (LICs) for communication. Responses were rated on a 5-point Likert scale: 0 = Not at all helpful (light gray), 1 = Slightly helpful (light orange), 2 = Somewhat helpful (light blue), 3 = Very helpful (medium blue), and 4 = Extremely helpful (dark blue). Asterisks (*) denote statistically significant differences between class years ($p < 0.05$) determined with Mann Whitney U Test.

Conclusions

- Students using dynamic checklists reported improved self-monitoring and dissection progress tracking, with significantly higher agreement and helpfulness ratings.
- Real-time shared data enhanced inter-group collaboration and improved communication of dissection findings, while reducing reports of the tool being "not helpful."
- Student-faculty communication improved, with increased perceived usefulness for conveying progress and learning needs and supporting targeted review of difficult structures.
- Dynamic checklists strengthened multidirectional communication and formative feedback in the anatomy lab, supporting a learner-centered approach to large-group medical education.