

Teaching Development Grant sharing

Development of an interactive, immersive screen-based 360 virtual reality videos combined with facilitated structured 3D debriefing to the teaching of gastrointestinal endoscopy for medical students

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Co-investigators

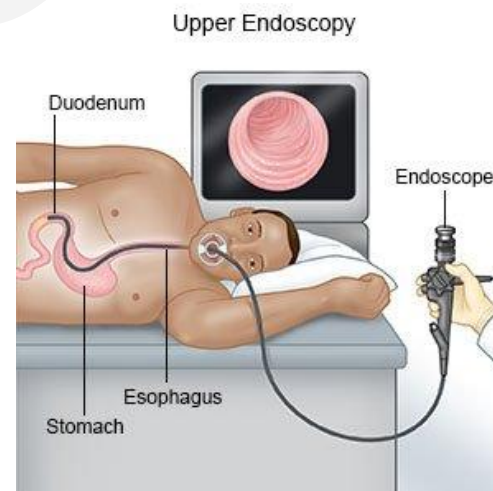
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- Dr. Polly Siu-Ling Chan²
- Prof. Man-Fung Yuen¹
- Dr. Thomas Ka-Luen Lui¹
- Dr. Michael Ka-Shing Cheung¹

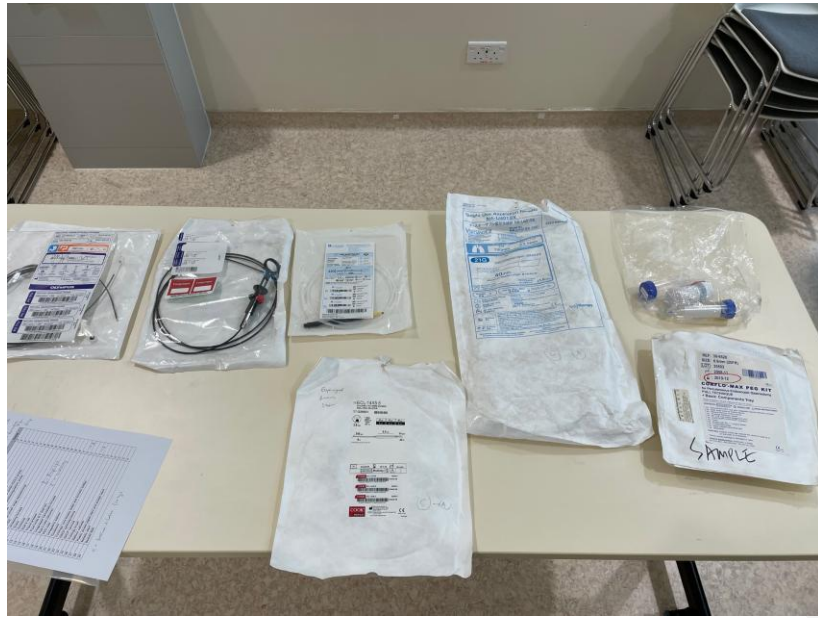
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Background

- Endoscopy teaching is an important form of clinical gastroenterology education as it gives students the opportunity to learn about the setting, diagnosis and treatment of gastrointestinal disorders.
- Endoscopy teaching was first implemented to MBBS year 2 curricula in the Gastrointestinal Block (~300 students) since year 2021.
- The mode of teaching includes a **whole class session** (lecture) and **on-site visit to endoscopy suite**.
 - Site visit: could not exert its full potential due to limitation in available time, space, and patient privacy issues. Students are only shown an **empty room**, without patients and any procedures on-going.





Background

- Endoscopy simulators have been shown to improve effectiveness of learning in undergraduates in other fields.
- Doctor's-eye view video in combination with endoscopic monitoring has been shown to [improve students' understanding, interest, and engagement in endoscopy learning](#) during COVID-19 pandemic.
- We would like to utilize [virtual simulation activities](#) and [structured debriefing](#) to develop a comprehensive platform to provide a media for students to learn about gastrointestinal endoscopy using interactive screen-based 360 videos, virtual reality (VR) technology, and inquiry-based debriefing.
- The 360 videos and VR technology provide a three-dimensional simulation environment for students to interact with vivid real-life situations to be encountered in endoscopy rooms.

Hypothesis:

The 360 videos combined with facilitated structured debriefing can improve the learning experience of medical students in learning GI endoscopy.

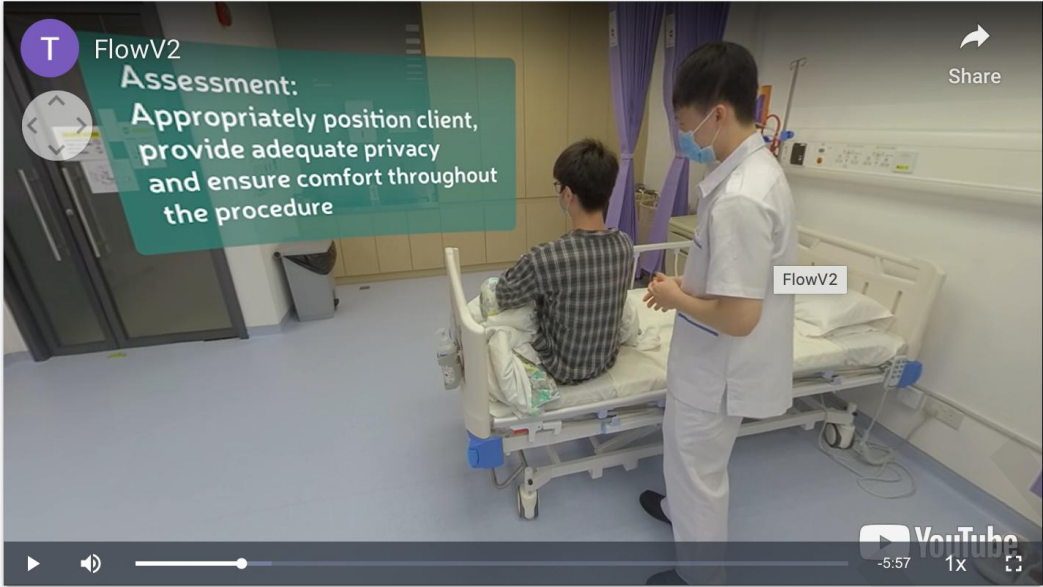
An example of the 360 VR-videos and structured debriefing

T

FlowV2

Assessment:
Appropriately position client,
provide adequate privacy
and ensure comfort throughout
the procedure

Share



FlowV2

YouTube

-5:57 1x

health

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Commer Type here ...

Anonymous

If you selected 'question', notification email can be sent to the course teacher and TAs. If you selected 'annotation', others can edit your annotation.

DISPLAY SETTINGS

Fung Tai Chun John

Jump to 01:52

bad

7 MONTHS AGO

0 0

Comment

ADD REPLY

☆

Sze Tsz Yan

Jump to 06:39

Total mark: 6/11

1 YEARS AGO

1 0

Comment

1 REPLY

☆

Fung Tai Chun John

yes 6/11

1 YEARS AGO

0 0

☆

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FlowV2

Share



Photo source
Janis physical examination and health assessment

YouTube

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health

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Commer Type here ...

Anonymous

If you selected 'question', notification email can be sent to the course teacher and TAs. If you selected 'annotation', others can edit your annotation.

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1 REPLY

☆

Fung Tai Chun John

yes 6/11

1 YEARS AGO

0 0

☆

Courtesy to Dr. John Fung's team for building and sharing of teaching platform

Study objectives

Primary:

- To test the impact of immersive 360 screen-based videos including the educational outcomes (perceived endoscopy-related competence, acceptability, simulation effectiveness)

Secondary:

- To consolidate knowledge in the practice of gastroenterology endoscopy through simulation-based training to achieve deep learning that aligns with the curriculum
- To enhance students' knowledge and decision making with guided practice to increase confidence
- To test the best sequence of teaching activities

Evaluation of project effectiveness: *(refer to appendix for the forms)*

- Clinical Competency Questionnaire (CCQ)
- Simulation Effectiveness Tool–Modified
- Student satisfaction

Inclusion criteria

- **Students:** Undergraduate MBBS II students who are about to start the GI system teaching including endoscopy.
- **Patients:** All mentally competent adult patients scheduled for GI endoscopy.

Exclusion criteria

- **Students:** Unwilling to join the study
- **Patients:** Unwilling to join the study

Sample size calculation

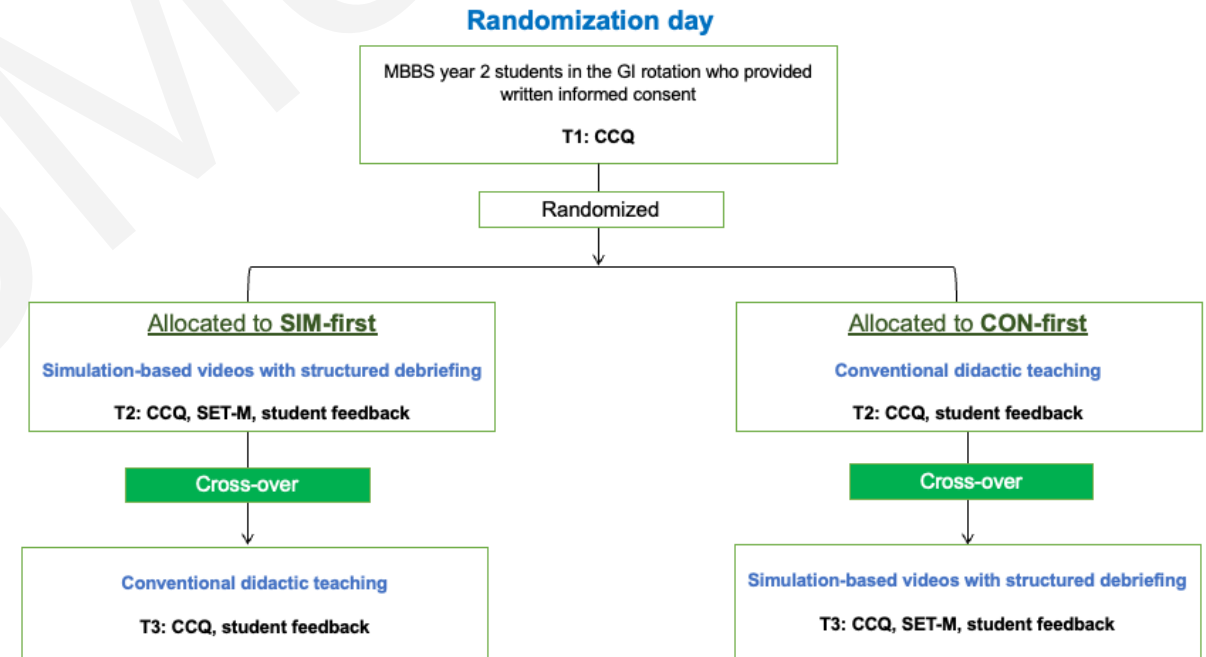
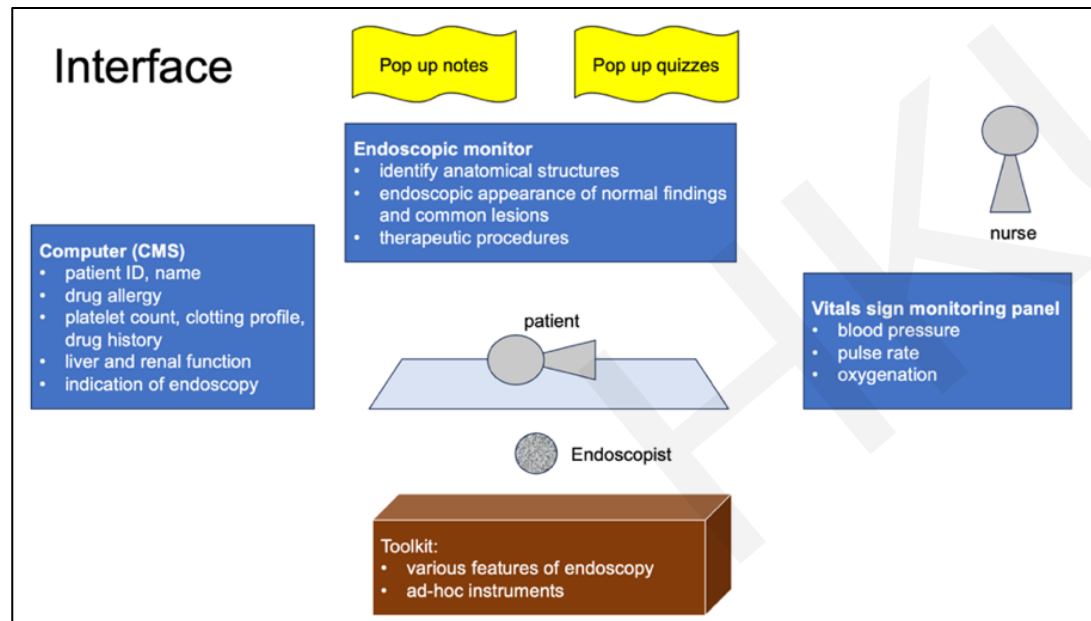
- No formal sample size calculation
- Convenience sampling

Method

- Participants: MBBS year 2 students enrolled in the Gastrointestinal System ($n \geq 300$),
- Design: A crossover randomized control trial (randomization ratio 1:1)
 - compares **conventional endoscopy teaching** (whole class session and endoscopy suite visit) against the proposed new mode of learning with **360-videos + structured debriefing**.

360-videos + structured debriefing

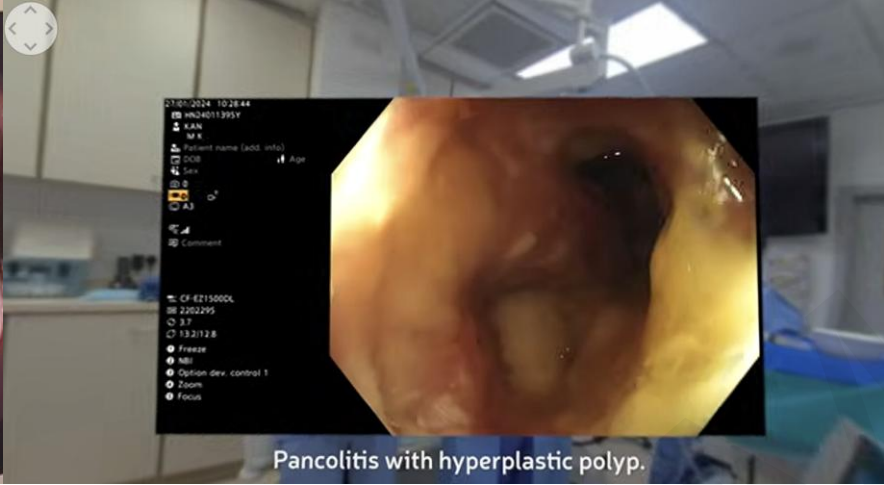
- The actual endoscopic suite in Queen Mary Hospital was filmed.
- The 360 videos consisted of the following framework:



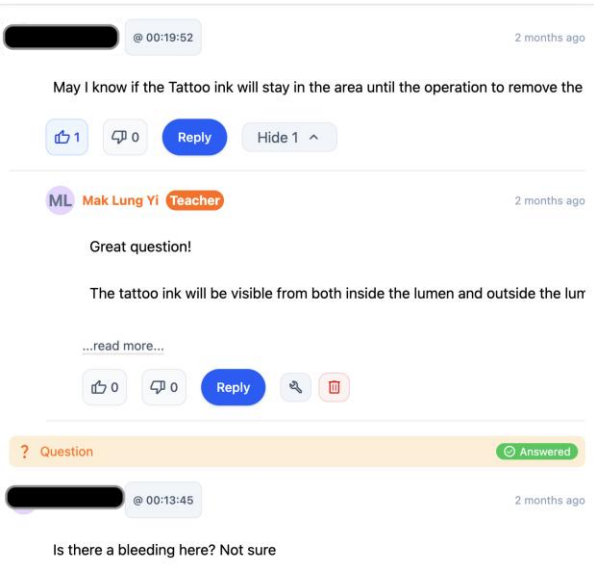
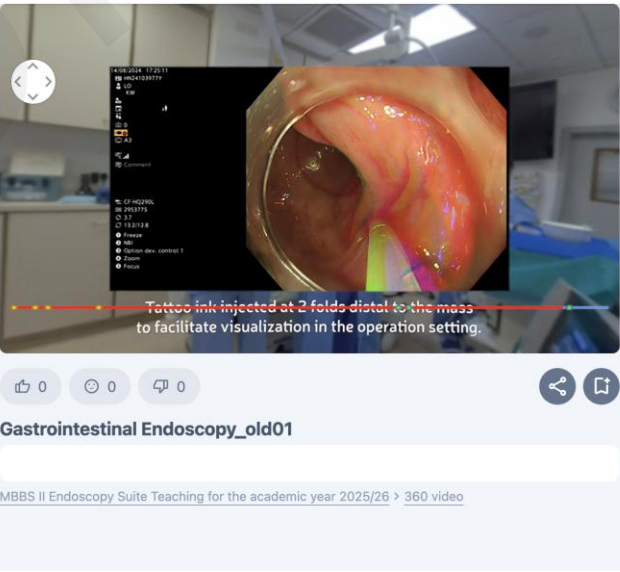
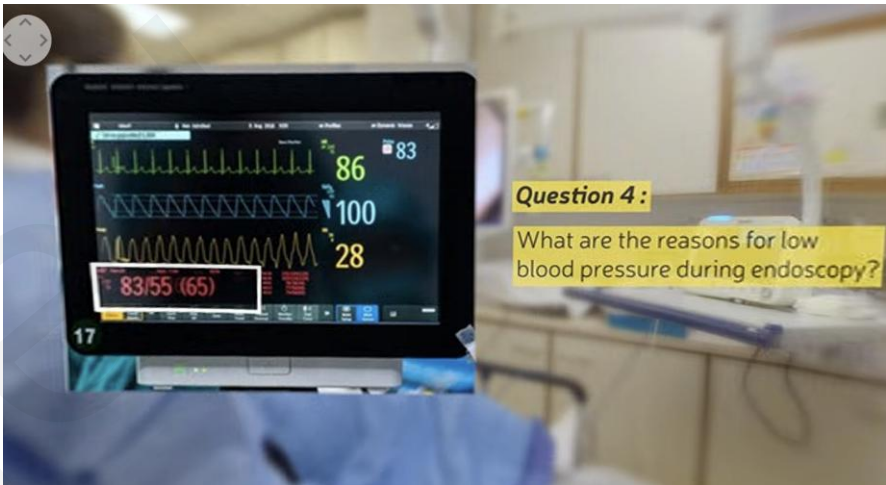
CCQ: Clinical Competency Questionnaire
SET-M: Simulation Effectiveness Tool- Modified
T1: time point 1; T2: time point 2; T3: time point 3

Workflow

	Randomization day 2/9/25	Day -1 3/9/25	Day 0 4/9/25	Day M 12/9 - 22/9	Day N 1 day after site visit
Intervention group	CCQ <i>QR code shown on slides</i>	LMS 1. SET-M 2. CCQ 3. student feedback <i>Google form sent to student's email with LMS access email</i>	WCS	Site visit 1. CCQ 2. student feedback <i>QR code printed and displayed in the student waiting room; email reminder by teaching team to students</i>	
Control group	CCQ	-	WCS	Site visit 1. CCQ 2. student feedback <i>QR code printed and displayed in the student waiting room; email reminder by teaching team to students</i>	LMS 1. SET-M 2. CCQ 3. student feedback <i>Google form sent to student's email with LMS access email</i>
Decline to join	-	-	WCS	Site visit	



Pancolitis with hyperplastic polyp.



Timeline (What I put in the grant application)

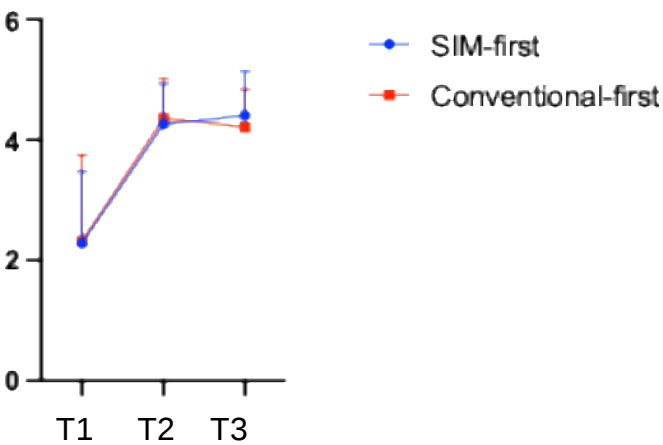
Milestone	Date	Complete
Phase I: Preparatory phase		
• Design the project	Dec 2024	Yes
• Simulation room, simulators preparation	Dec 2024	Yes
• Development of guideline	Dec 2024	Yes
• Development of scenarios and performance checklist	Jan – May 2025	Yes
• Input the scenario into the simulator and testing	May 2025	Yes
• IRB application	Jun 2025	Yes
• Prepare evaluation tools	Jul 2025	Yes
Phase II: Briefing to facilitators	Aug 2025	
Phase III: Recruiting students	Sept – Oct 2025	
Phase IV: Evaluation		
• Collect data on demographics, CCQ and student satisfaction	Nov 2025	
• Data analysis and result dissemination	Nov – Dec 2025	

Clinical Competency Questionnaire (CCQ)

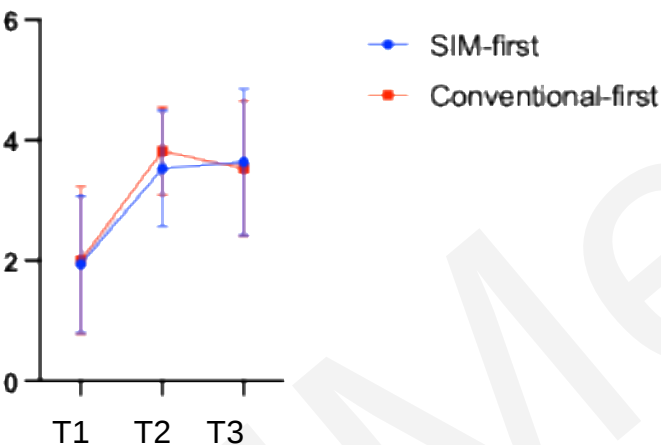
I am able to:

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
1. Understand the processes and procedures involved in GI endoscopy.					
2. Exercise clinical judgement to establish diagnosis upon endoscopic findings.					
3. Recognize serious or emergency GI conditions and appreciate the correct management plan.					
4. Understand the appropriate utilization of endoscopic procedures					
5. Appreciate the essence of teamwork and multi-source monitoring in the success of smooth endoscopic procedure.					

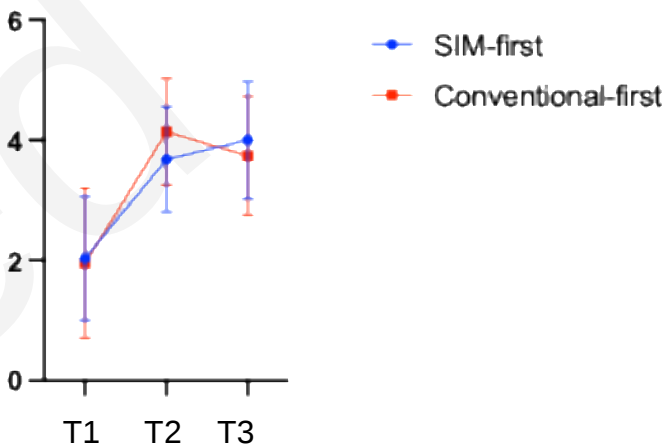
CCQ1: I am able to understand the processes and procedures involved in GI endoscopy.



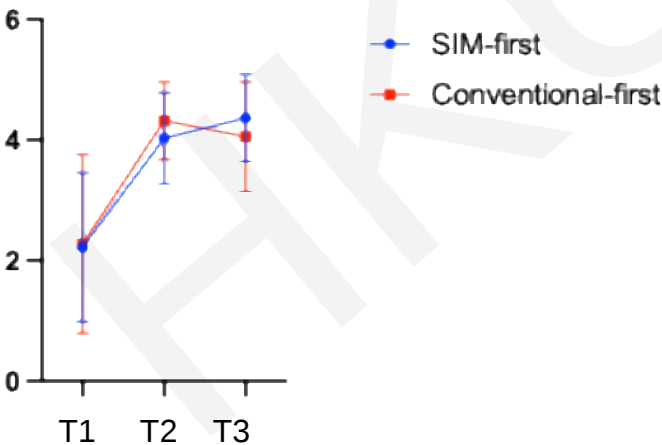
CCQ2: I am able to exercise clinical judgement to establish diagnosis upon endoscopic findings.



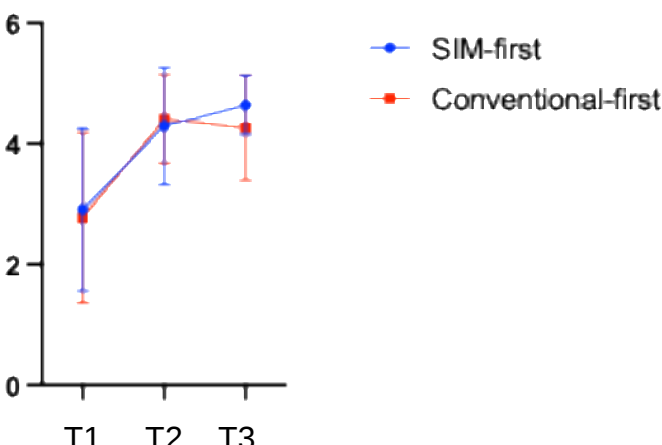
CCQ3: I am able to recognize serious or emergency GI conditions and appreciate the correct management plan.

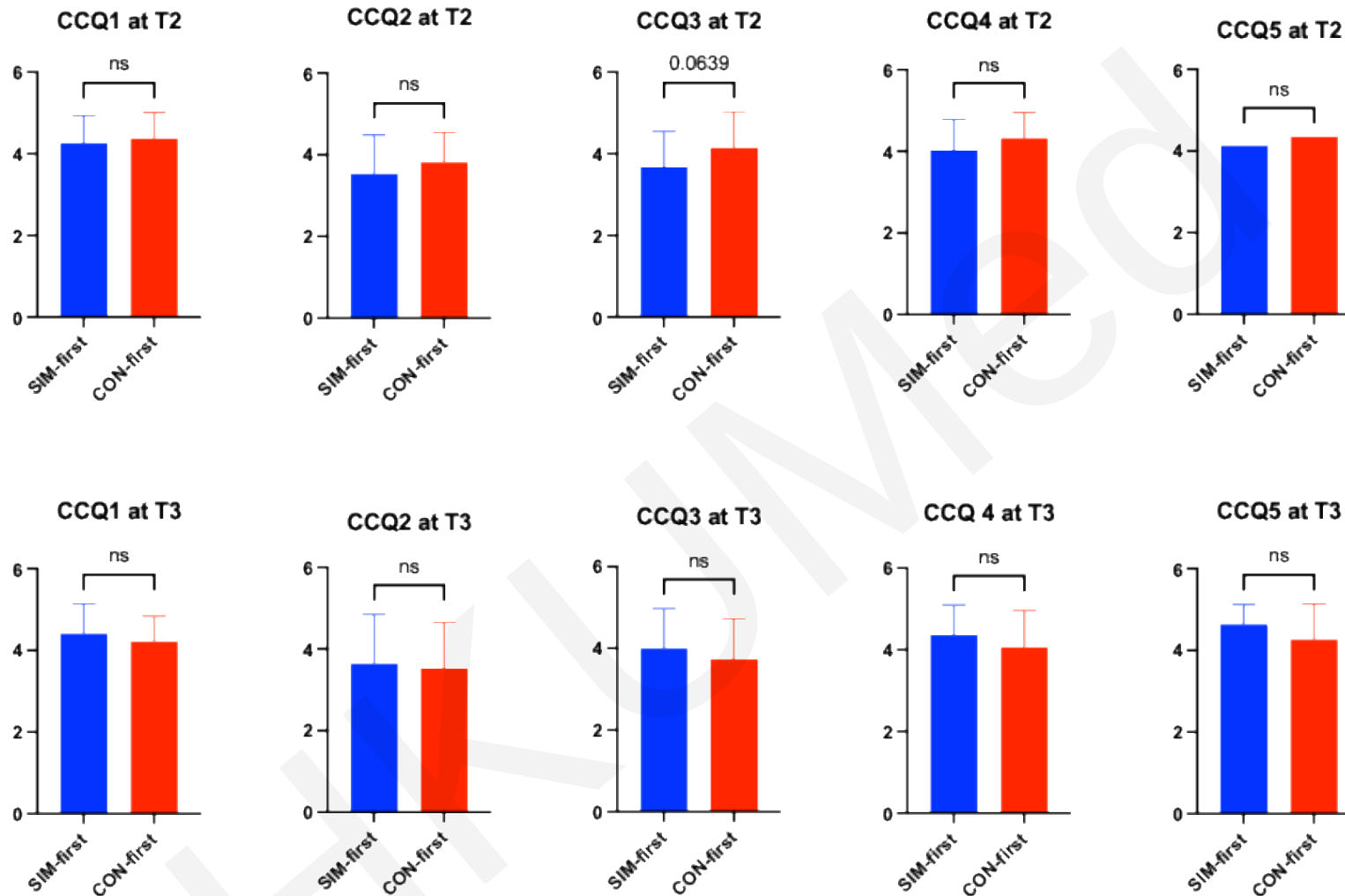


CCQ4: I am able to understand the appropriate utilization of endoscopic procedures.



CCQ5: I am able to appreciate the essence of teamwork and multi-source monitoring in the success of smooth endoscopic procedure.





Conclusion: Integration of simulation-based training with immersive 360-degree screen-based videos improved self-perceived endoscopy-related competence, which was not dependent on the instructional sequence.

Take home message

- Define the need and existing gap of students in your subject area
- Start by working with people who have experience and tools/ infrastructure
- Design: always consider equal opportunities for students who do not participate in the study but want the same exposure
- Always register a randomized trial (not limited to drug trials) before it starts (retrospective registration is very undesirable)