



# Advancing Anatomy Education Through Data-Driven Curriculum Development

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## OBJECTIVE

Our aim was to develop and integrate instructional modules featuring artistic, segmented, and dissected 3D models, followed by an assessment of student attitudes and academic performance.

## METHODS

Data-driven curriculum development entails gathering and evaluating both qualitative and quantitative data to recognize student requirements, capabilities, and deficiencies, thereby crafting instructional strategies tailored to address those needs (Figure 1).

### Curriculum Development

This study was conducted during the MD6 module that focused on head and neck anatomy. We have established weekly modules that encompass digital content aligned with the predefined learning objectives (Figure 2). The modules, which consist of a weekly overview, dissection guide, identification of structures on the donor, dissection checklist, clinical case, and quiz, are delivered one week prior to the scheduled lab activity (Figure 3). The weekly quizzes are closed prior to the lab session, requiring students to complete the module and the quiz before attending the lab.

## Participants

Second-year medical students from the JABSOM class of 2026 (n=77) taking the Head and Neck anatomy course were invited to participate.

### Educational Activities

An online live stream class focused on prosected materials and 3D digital content is provided just before in-person activity. Within the lab students read through the radiology reports and viewed the augmented reality (AR) visualizations of the MRI scans using z-space computers. This process included Sketchfab and other links to underscore anatomical correlations useful for the dissection (Figure 4).

### Analysis

Data were collected from course feedback surveys, LMS activity time, and exam results.

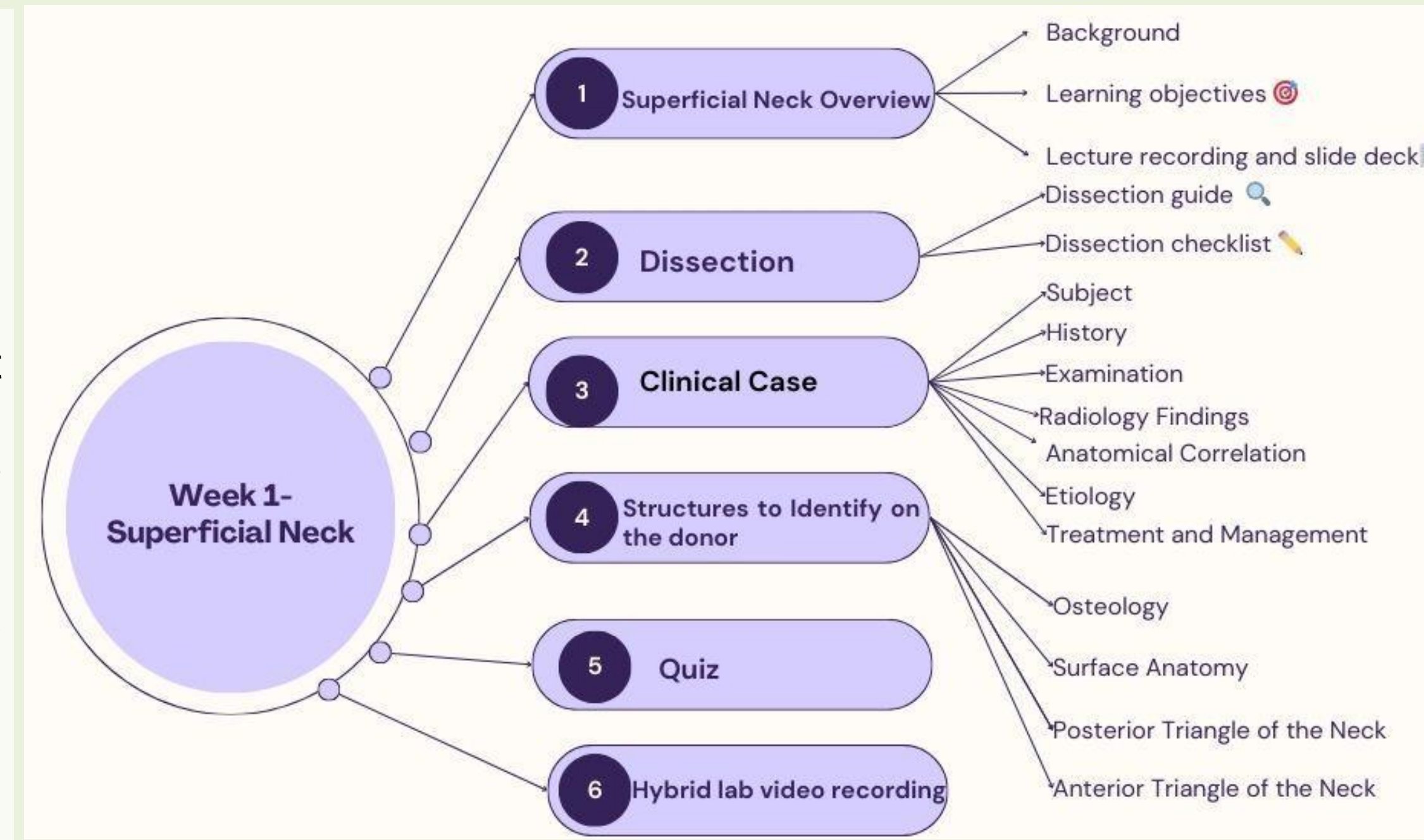


FIGURE 3 Flow chart showing an example for the weekly module contents.

Students responded favorably to the implementation of weekly quizzes in lieu of the traditional final exam (Figure 7). In their open-ended responses, students expressed that the weekly quizzes enhanced their weekly study routine, supported their engagement in laboratory exercises, and notably alleviated the stress associated with end-of-term exams.

Students provided positive feedback regarding the comprehensiveness and organization of the instructional materials, noting that they were easy to follow and contained relevant information for each dissection. They appreciated the structured format, with all necessary instructions conveniently located in one place. The inclusion of 3D models was particularly beneficial for visualizing anatomical structures, aiding in understanding and reinforcement of learned concepts

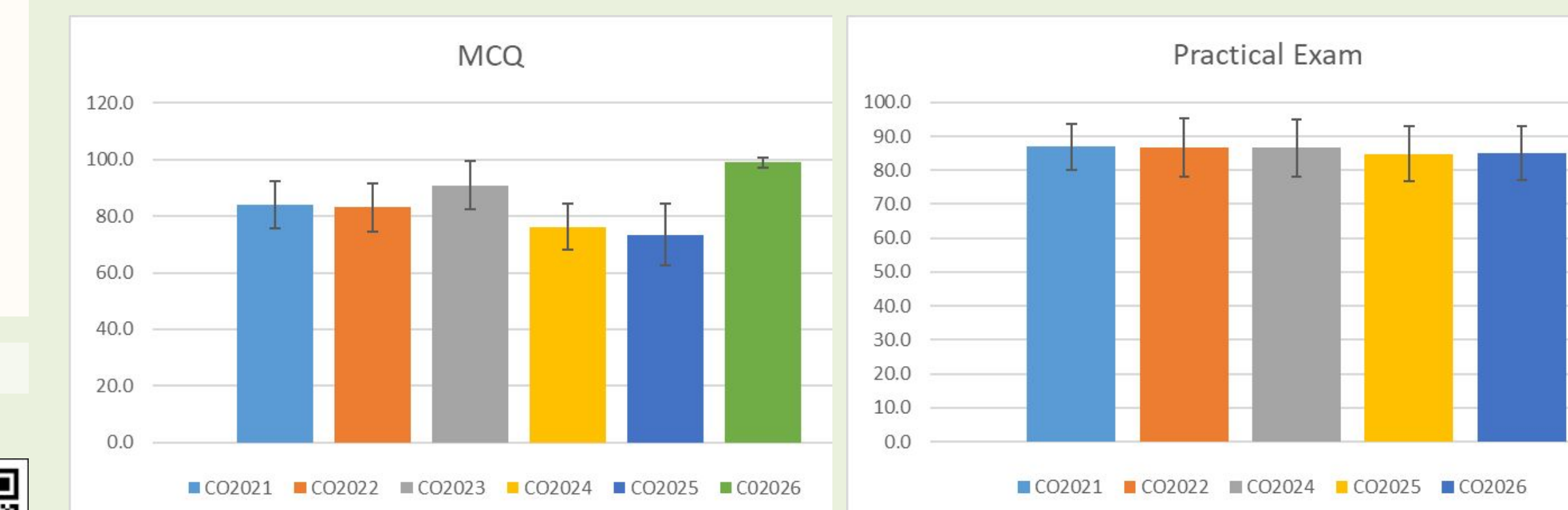


FIGURE 5. Average multiple choice and practical exam scores in MD6 (Head and Neck Anatomy) between 2018 and 2023

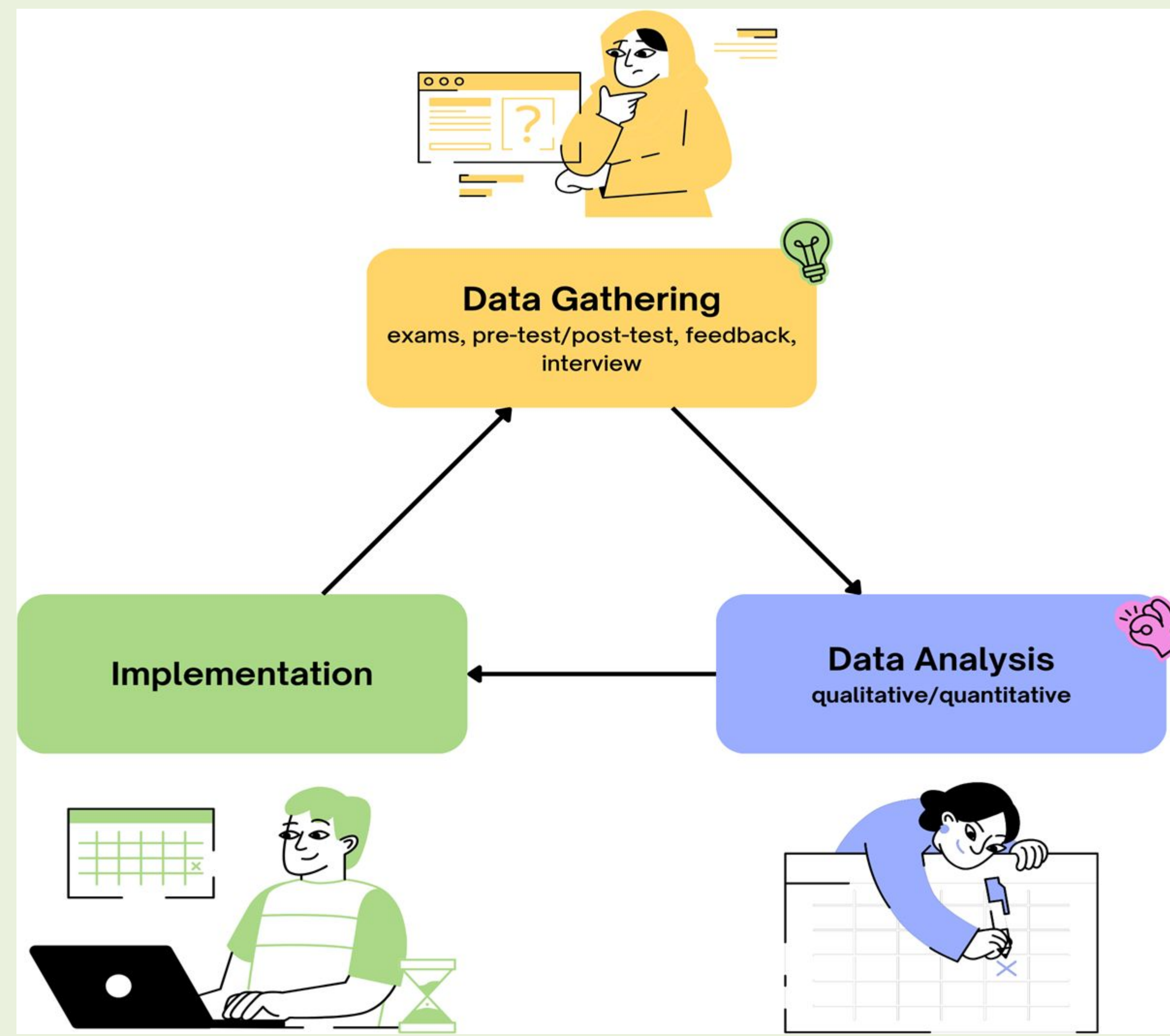


FIGURE 1. Flow chart showing curriculum design



FIGURE 4. Here are a few examples of the digital content utilized within the modules. A. A 3D artistic model illustrating skin incisions to aid in dissection guidance. B. A 3D photogrammetric model illustrating the superficial branches of the cervical plexus. C. The DICOM viewer showing a clinical case with facial cervical subcutaneous emphysema. D. Segmented 3D clinical case with facial cervical subcutaneous emphysema

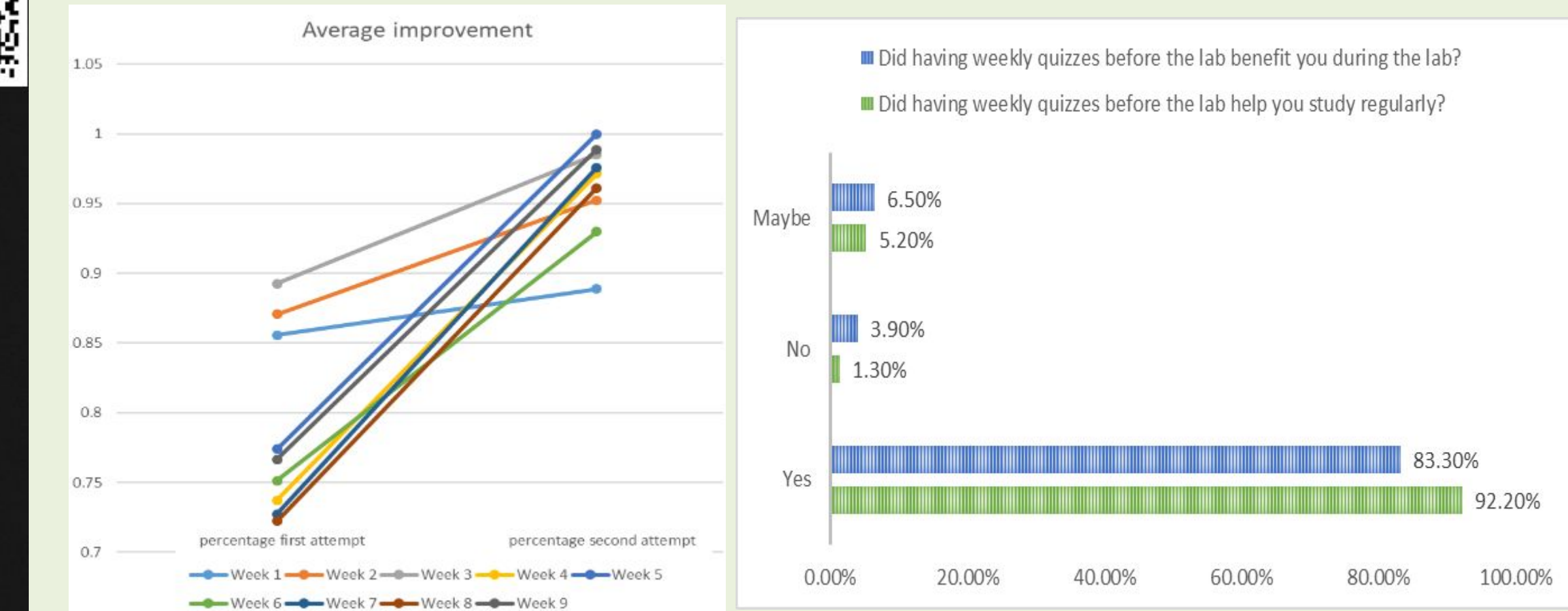


FIGURE 6. Average improvement for the second attempt. FIGURE 7. Student perceptions regarding weekly quizzes

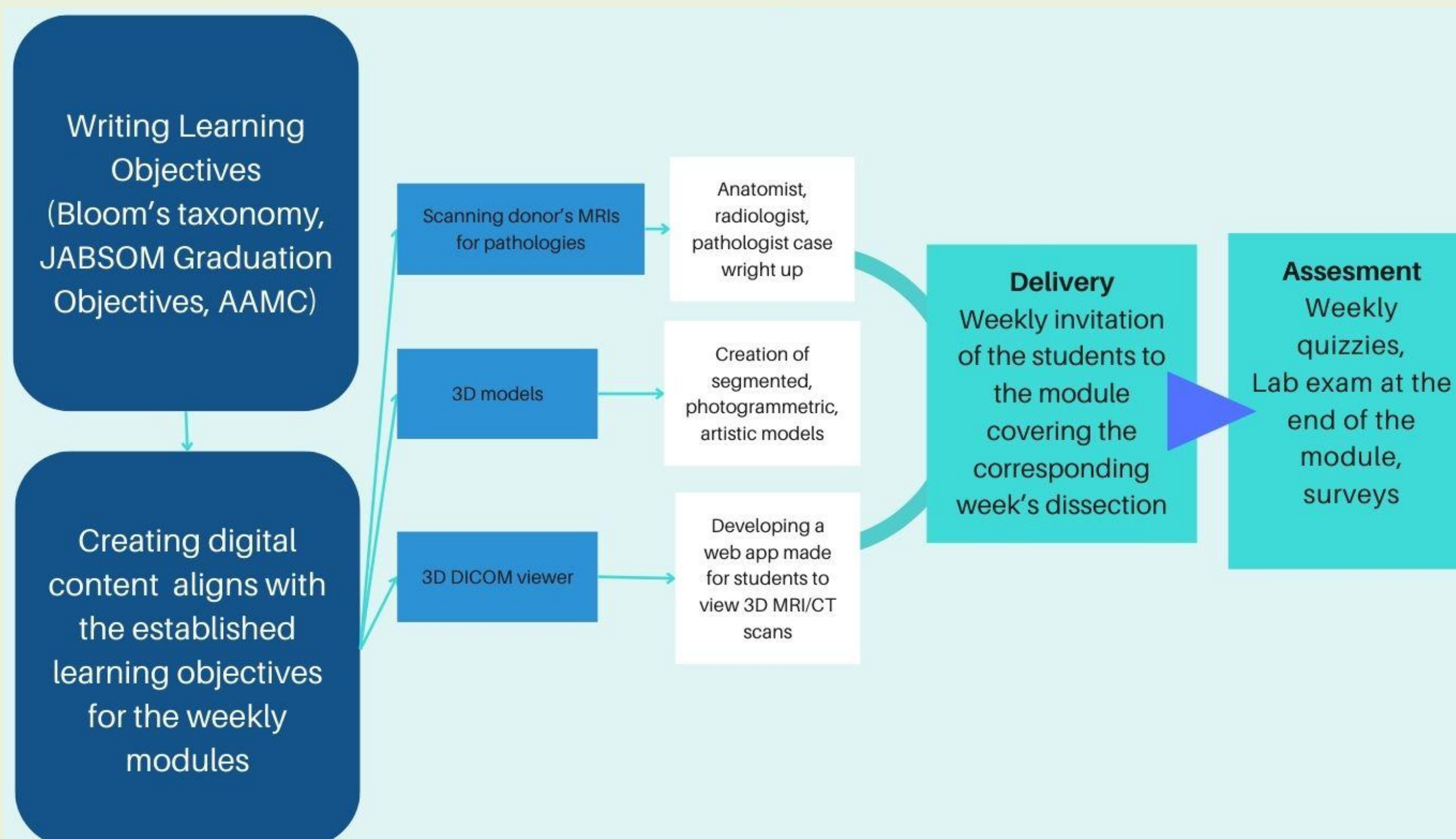


FIGURE 2. Flow chart showing curriculum design

## RESULTS

Before 2023, the final examination in anatomy was administered at the conclusion of each unit, comprising multiple-choice questions (MCQs) followed by a laboratory-based identification practicum, with weighting adjusted according to class contact time. In the current hybrid course format, the traditional final MCQ exam has been replaced by weekly online quizzes. Each quiz allows students two attempts, with the higher score being considered.

The multiple-choice test scores showed an increase compared to previous years, the practical exam scores were found to be consistent with those of previous years. (Figure 5). On average, students made 37.7 attempts (45.1%) for a second opportunity. Furthermore, the data indicates an improvement in average scores upon the second attempt (Figure 6).

## STUDENT COMMENTS



## CONCLUSION/NEXT STEPS

The implementation of learning modules incorporating MRI and XR technology, along with weekly quizzes, received positive feedback from students. Future endeavors should prioritize in-depth data analysis, enhancing student engagement, and reducing workload.

## ACKNOWLEDGEMENTS

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