

# The Virtual Folding Embryo: The Efficacy of Virtual Resources in Anatomy Education

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## Background and Rationale

Embryology education provides a foundation to build knowledge in anatomy and congenital conditions.

Few resources exist that accurately depict complex changes to an embryo in 3D (space) and 4D (time).

The purpose of this project was to create a series of 3D models that demonstrate embryo folding titled "The Virtual Folding Embryo (VFE)"

After interacting with the VFE, medical students will demonstrate better special understanding of normal body cavity development.

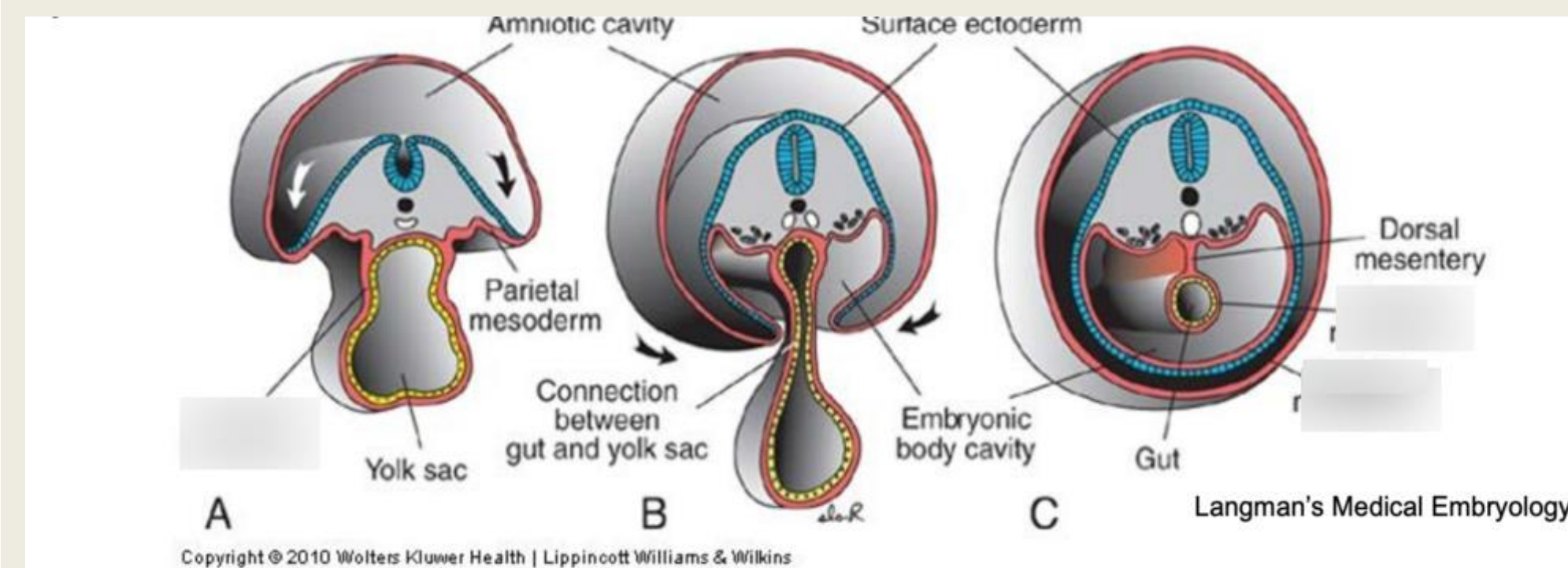


Image above shows current standard resource for teaching embryo body cavity development in anatomy education (Langman's embryology 13<sup>th</sup>)

## Methods

Histological sections from the Carnegie Collection of embryos were used to create models



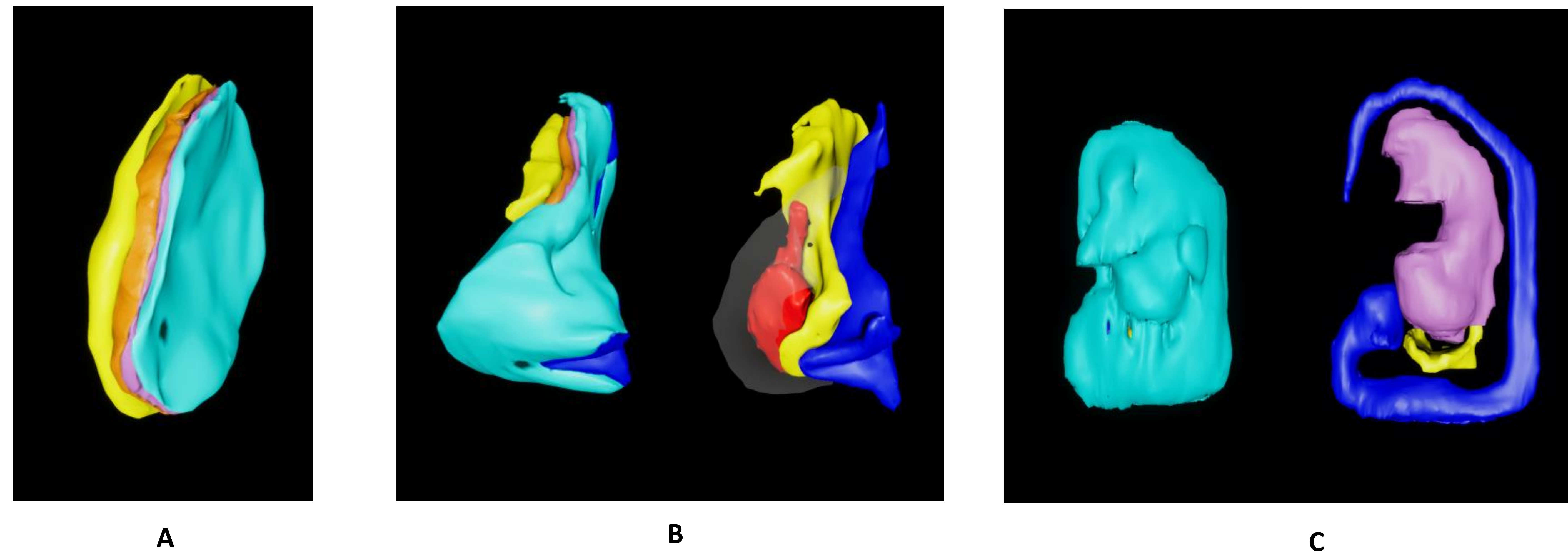
The models were presented to the students on a webpage: <http://3.23.64.227/>

## Methods

Medical students and MHA students were given content to complete before class and complete a quiz.

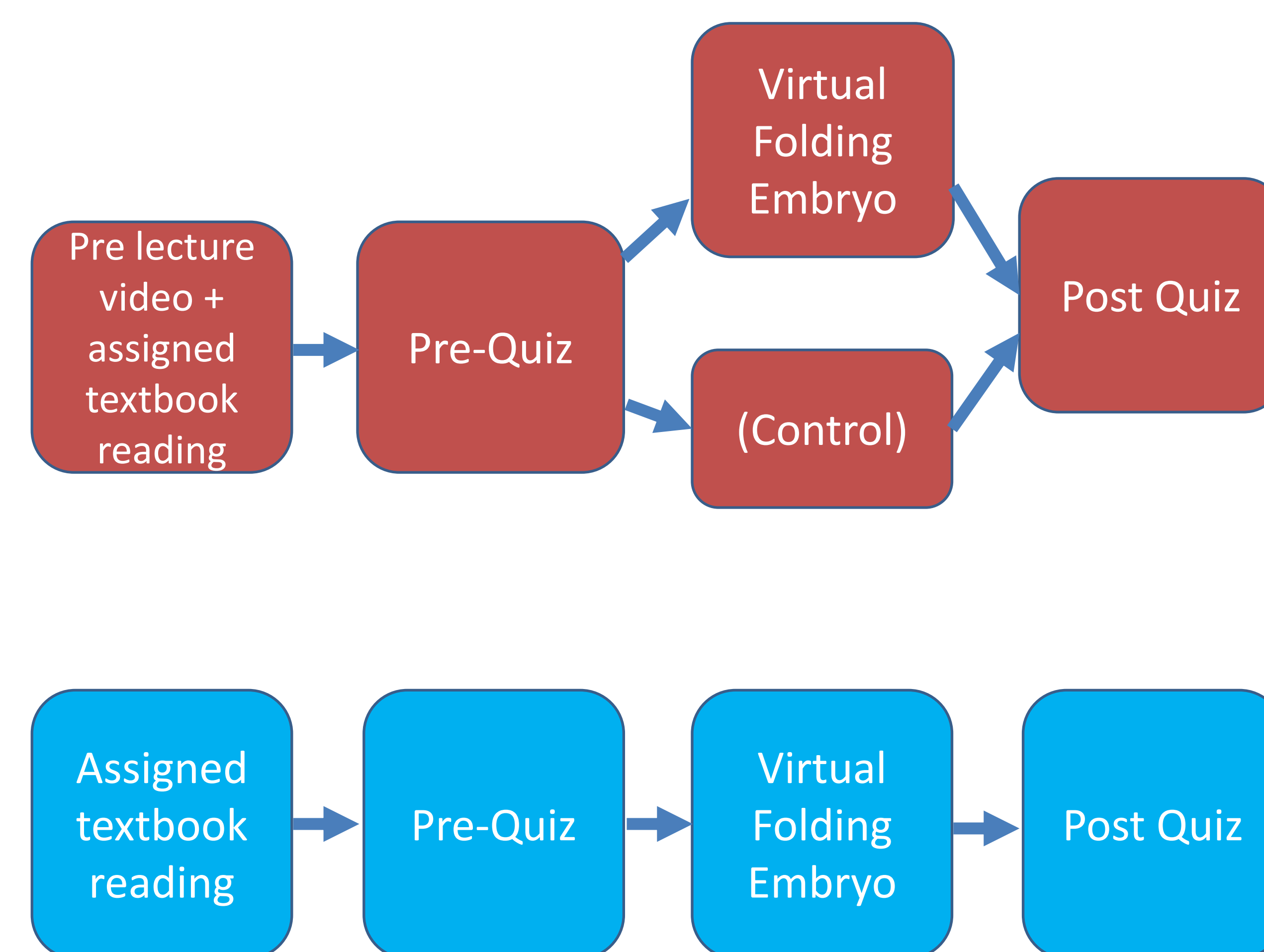
Medical students were broken to two groups, one interacted with VFE, the other worked with other embryology content. After 15 minutes, another quiz was administered.

## Three Stage Embryonic Models



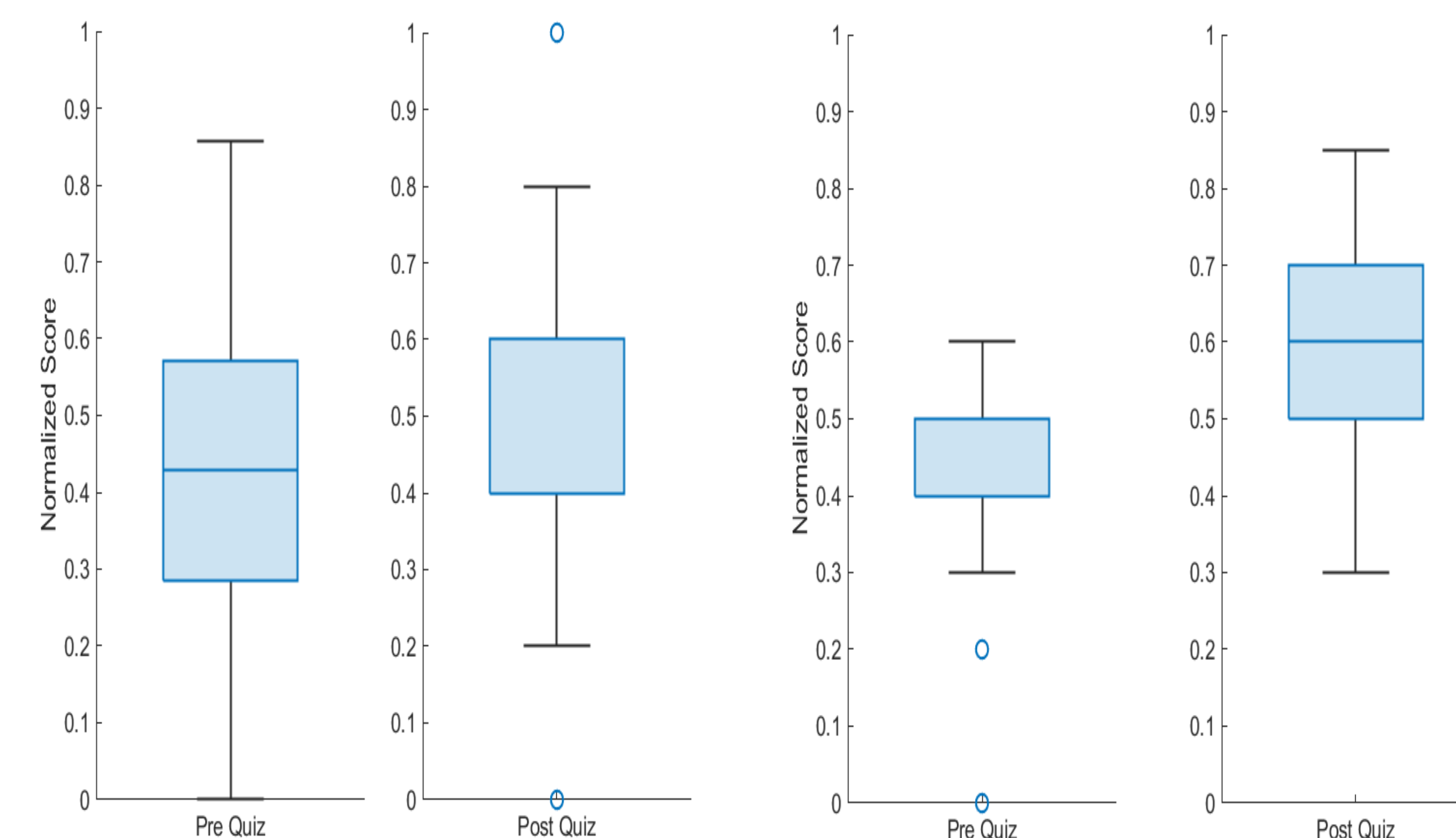
**Figure 1:** VFE models depicting embryo folding process at days 17 (A) , 19 (B), and 28 (C) post fertilization. Models B and C with removed exterior to see internal organ systems

## Study Design



**Figure 2:** Study design showing time of taking quiz before and after interacting with VFE for 1<sup>st</sup> year medical students (red) and 1<sup>st</sup> year Modern Human Anatomy Students (blue).

## Increased Quiz Performance



**Figure 3:** Pre and post quiz results for 1<sup>st</sup> year medical student cohort (left) and Modern Human Anatomy students (right). Pre and post scores increased after interacting with resource

## Discussion

Medical student cohort showed no significant improvements.

T- test on Modern Human Anatomy cohort improved an average of 15% (1.5 points)  $p=0.0002$ .

Medical student Likert scale responses indicate the resource was helpful (4 out of 5).

Students indicated the resource was helpful for understanding this material (3.83 out of 5).

These resources are relatively easy to make, anatomically accurate, and effective at depicting these complex processes.

Other organ systems can be displayed in this way would be effective.

More testing with the VFE in a more controlled environment may show more conclusive results.

## References and Acknowledgements

### References

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