

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

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In embryology, normal development of the body cavity is an intricate interplay of tissues folding into 3D structures. The embryo changes from a flat pancake shape around day 17 to a recognizable form at day 28. Understanding the body cavity formation is imperative to understanding multiple congenital variations. Current educational resources are sparse and do a poor job demonstrating the 3D and 4D intricacies of development. A series of models depicting embryo folding were created to demonstrate normal body cavity development called "The Virtual Folding Embryo" (VFE). The effectiveness of the VFE was tested on 155 first year medical students and 26 Modern Human Anatomy (MHA) graduate students. The students watched a pre-recorded lecture on embryology topics and then took a quiz to test their foundational knowledge. Students were then randomly divided into groups of 4-5 students. Half of the groups were given access to the VFE, while the other half were given access to a resource demonstrating a different embryonic process. After 15 minutes, all students completed a quiz and an optional short survey rating the perceived value of the resource. Scores between the pre- and post-quiz did not differ significantly. Student responses showed the perception of the VFE was very helpful for their learning. We also tested the VFE on the MHA students, following a similar testing regiment. This cohort showed a significant increase in performance between the pre and post quiz ( $n=26$ ) with an average increase of 1.4%  $p=0.0002$ . There is likely educational value to creating and incorporating the VFE and other 3D interactive resources into the medical curriculum. The large increase in post quiz score and positive feedback on the VFE indicate that it facilitated learning. These types of resources will enrich embryological education and provide a viable avenue for creating similar resources in the future.