

3d Print Models in Medical Education

Lusiella Fazzino, Assistant Professor, eScholarship Repository Librarian

Introduction

Using 3D print models for study increases the level of student engagement, not only improving the rate of recall but minimizes the amount of time needed for recall. Being able to physically handle the models further enhances a student's level of understanding and comfort with human anatomy. One possible barrier in faculty and students not producing and utilizing 3D models may be a perceived difficulty of finding and printing adequate medical models.

How to print a 3D model from a CT Scan, MRI or Ultrasound

DICOM format



Use SLICER converter (free)



NRRD format



Use embodi3d.com (free)



STL format



Ready to 3d print

...we believe medical students are most likely to benefit from basic 3DP models such as graphically designed models from imaging studies simplified to target the material medical students are expected to learn.

Table 1. Medical student systematic review, individual study characteristics summaries

Study	Country	Study Design	Participants	Assessment	Intervention Group			Control Group			P Value
					Intervention (Lecture + ____)	n	Final Score, Mean (SD), %	Intervention n	Final Score, Mean (SD), %		
Cai et al 2019 [36]	Singapore	RCT	Medical students	MC	3DP knee	17	85.0 (10.1)	Lecture	18	70.7 (15.1)	<.05
Chen et al 2017 [19]	China	RCT	Medical students	MC	3DP skull	26	65.6 (10.8)	Lecture	26	57.8 (12.1)	<.05
Hojo et al (1) 2019 [20]	Japan	RCT	Medical students	Unsure	3DP pelvis	17	64.8 (15.7)	Textbook	17	48.0 (27.0)	<.05
Li et al 2015 [24]	China	RCT	Medical students	MC	3DP spine	40	71.8 (12.0)	Lecture	40	41.0 (11.4)	<.05
Smith et al 2018 [26]	UK	RCT	Medical students	SA	3DP lungs and bones	66	74.6 (16.3)	Lecture	61	62.5 (13.1)	<.05
Su et al 2018 [37]	China	RCT	Medical students	MC	3DP heart	32	62.5 (19.0)	Lecture	31	51.3 (17.6)	<.05
Wu et al 2018 [27]	China	RCT	Medical students	MC	3DP bones	45	71.7 (7.2)	Lecture	45	60.3 (8.2)	<.05
Yi et al 2019 [28]	China	RCT	Medical students	SA	3DP brain ventricles	20	74.2 (6.7)	Lecture	20	65.6 (8.2)	<.05

Fleming, C., Sadaghiani, M. S., Stellan, M., & Javan, R. (2020). Effectiveness of three-dimensionally printed models in anatomy education for medical students and resident physicians: systematic review and meta-analysis. *Journal of the American College of Radiology*.

WORKFLOW

Slicing a 3D drawing effectively translates that 3D drawing into something that a 3D printer can understand and print.

REFERENCES

VIDEO

