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3D PDF: A Promising Learning Tool for Anatomy Education

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Background: Anatomy has always been challenging for medical students. Although conventional 2D atlases can provide broad knowledge, they fail to give a 3D perspective. As technology evolves, many steps are taken to solve this problem but most of them are impractical. Besides, their effectiveness is unclear. Therefore, we utilized a free 3D source to investigate its effect on learning compared to a 2D atlas, on the different structures with different complexities.

Summary of Work: This was a randomized-controlled study involving 87 first and second-year medical students. We randomly assigned the students into two groups: 3D PDF, and 2D atlas. In a classroom setting, both groups watched two lecture videos explaining two structures: Liver (non-complex) and male genitalia (complex). The only difference between the videos was the type of visual material, either 3D PDF or 2D atlas. Following each video, the participants took a test. To evaluate follow-up outcomes, we administered the same test ten days later.

Summary of Results: The initial liver test scores of the 3D PDF group (median=15.00) were not significantly different from the atlas group [(median=17.99), p=0.695]. In contrast, the initial male genitalia test scores of the 3D PDF group (median=24.50), were significantly higher than the atlas group's [(median=21.00), p=0.017, Cohen's d=0.57]. The liver follow-up test results of the 3D PDF group (median=12.00) were not significantly different from the atlas group [(median=9.50), p=0.519]. Similarly, the male genitalia follow-up test results of the 3D PDF group (median=21.00) did not differ significantly from the atlas group's [(median=18.50), p=0.118, Cohen's d=0.40].

Discussion and Conclusion: Considering the initial test on genitalia, 3D PDF had a positive effect on learning complex anatomical structures. Although there was no difference between the two groups in the genitalia follow-up test, it can be concluded that there would be significance if the number of participants in the second test was higher. In conclusion, 3D PDFs are easily accessible and applicable with no need for additional equipment and online access. 3D PDF is a promising tool to learn especially complex anatomical structures.

Take-home Message: 3D PDFs can be used as a feasible tool to learn complex anatomical structures instead of 2D atlases.

