

3D Anatomy Software Technology :Boon Or Curse ?

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Abstract-

It's no secret that 3D technology is becoming increasingly popular throughout a number of industries. Whether it's a teenager using an AR/VR headset on their gaming console, or a surgeon utilizing 3D visualizations for preoperative planning, 3D technology has become an advanced part of industries, far quicker than predicted. **3D anatomy software** provides a number of options to deliver on an institutions vision for innovative learning.

Today's generation of students are continuously exposed to innovative technology, hence why they are frequently referred to as "Digital Natives." These are children and young adults that haven't experienced a world without technology, as it has always been provided for them. Digital natives show great aptitude for modern technology and prefer using technology compared to the "old school" methods. Human Anatomy Atlas and other 3D visual anatomy apps like it are the future of learning anatomy.

Additionally, many anatomy structures have a **function**, or relate to other structures. Muscles have one or more **origin and insertion points** and each of those has a standard term. When this information is presented, whether in 3D or 2D form, it is usually accompanied by other information that is essential for the learning purpose. Typical anatomy atlases and many computer-based 3D atlases will present a lot of information at once. It's not uncommon to see visualizations with two or three dozens of anatomy terms. This is what we consider "**information overload**" and we try to avoid it at all costs.

3D technology is becoming increasingly popular throughout a number of industries. We have lot of advantages through this technology but every technology having two phase one is good and other one is bad for over society the article discuss about advantages or disadvantages of these type of technology.

KEYWORDS- 3D anatomy software, cadaver, anatomists, scholars, visualization

Introduction-

Mastery of anatomy and pathology is achieved through repeated exploration, dissection, and inquiry into the body's interconnected systems. Two-dimensional textbook images do not adequately show the critical and complex 3D spatial relationships that students, surgeons, and clinicians need in order to master anatomy, plan procedures, and counsel patients. Medical illustrations and gray-scale MRI and CT imaging data require significant mental agility to convert 2D representations into 3D mental images. By translating MRI and CT scans directly into 3D visualizations. It's true that being able to visualize a complex or unfamiliar anatomy structure is very important. After all, we live in a 3-dimensional world and our bodies are not flat. Being able to simulate visually the real human body can have its benefits. However, visualization is not the only challenge in learning a subject. In fact, from our own experience and feedback from our users, **visualization alone can be overwhelming**. The amount of information a typical student needs to digest is huge.¹

Benefits Of 3d Anatomy Software-

- The Enterprise edition of 3D Organon software has already reached numerous institutions providing them multiple benefits:
- Cost effective self-directed learning
- Utilization of new technologies in education
- Suitable for distant learning-based curricula
- Exceptional for universities utilizing a blended learning approach
- Knowledge delivered in a digital form that today's students prefer
- Acceleration of learning
- The ability to navigate efficiently through different bodily layers and structures in 3D space
- Providing more opportunities to explore anatomical structures on their own
- Allowing students more autonomy in choosing different views, angles, and combinations of anatomical images that is not possible in traditional cadaver-based instruction.³

Need Of 3D Software:

The main disadvantage for an academic institution using human cadavers is the cost, which can be more than \$1,000 for each. In addition, the institution must have facility to properly maintain and store the cadaver, which can be an additional expense. This can be covered with student fees, but that places the burden on the students. Health problems are also cited as a disadvantage to cadaver use, as exposure to embalming chemicals have been shown to affect human health.

Another disadvantage to using cadavers is the perspective of the students. Many students adhere to religions that do not permit viewing a dead body without a religious ceremony, and even students whose religion does permit it do not want the exposure. The sight or smell of a deceased person may make any student queasy. Computers and textbooks may provide easier access to deeper levels of muscle or organs than a cadaver, and finding a human with all "normal" organs, bones and muscle may be difficult. Thus, each cadaver may have its own limitations.

The new generation is more adapted to the technology & has a capacity to use this technology better to learn new things. So this interest of the new generation can be enhanced by adopting 3D software in anatomy teaching so that it is easily grasped by the students. By sidetracking the traditional method & adapting the contemporary method, anatomy education will be more effective.⁵

High Standard Of Medical And Scientific Information

The 3D Organon apps deliver accurate visual and contextual information, agile response time, and intuitive navigation. The apps satisfy the highest criteria of medical and scientific standards in design and knowledge base. All anatomical definitions and clinical correlations are written by professors of anatomy and medical professionals. 3D Organon is a feature-rich software with multiple levels of detail and an advanced toolset that could complement any anatomy curriculum. The 3D models can add important cognitive input for understanding key anatomical concepts essential for learning clinical, topographic and systems-based anatomy. The inclusion of 3D visuals in pedagogy leads to an increased retention of knowledge

Freedom and the **ability to control** your pace, orientation and subject assimilation may intuitively seem like a positive thing to enhance the learning experience. Having the ability to rotate, zoom and focus on different anatomy structures from different angles could be considered an advantage.

Memorization - A core aspect of learning anatomy is being able to recall the term for each given structure. Those learning goals are best achieved when distraction is minimized and the elements avoid creating overload. Each of our exercises is focused on one or two structures and not more. Combination of different cognitive elements (voice, visual and textual) can help improve memorization. Repetition and restructuring of exercises help create a focused, but interesting experience.

Didactic concepts - Presenting the information is not enough. The core benefit of our platform is to use didactic elements during the learning process. We reduce "freedom" in order to achieve high level of information retention and reduce cognitive load.

Personalization - Each student is different and their levels and needs might be different. Therefore, the learning experience should target each student individually.

Fun - we try to incorporate game elements into the platform, to make the learning experience more engaging. Again, it's not all about the information. Motivation plays an important role in successful learning.²

Disadvantages Of 3d Anatomy Software

- Lack of haptic (sense of touch) understanding of anatomical structures
- The ability to give students too many views of anatomical structures and, so doing, distracting them from focusing on key information
- The software's navigation and abundant options overwhelm students' cognitive processing capabilities and, as a result, impair learning.³

Conclusion-

The best "model" for investigating human anatomy has always been the human cadaver itself, because, in most cases, all the parts are there in the correct arrangement, the fine membranous and facial elements are intact, and the presentation of structures (soft, hard, smooth, rough, dry, moist) is accurate. It is safe to say that, from the beginning of curiosity, early man investigated wounds and organs of their dead brethren. However, in today's regulated and socially conscious institutions, access to a cadaver may be limited through budgetary or social issues, or, even if a cadaver is available, presentation of the desired cadaveric anatomy may be confusing, such as that of the pelvic spaces and fascia.

Finally, body donation programs, storage, chemical and biological hazard compliance, and proper disposition of the cadaveric specimens may be daunting financial and logistical burdens for some institutions. These issues can be addressed through the use of fabricated anatomical models. Ancient and contemporary anatomical models range greatly in the detail and material

A clear advantage of digital 3D anatomical models is that any educator or institution can create them in a relatively short period of time, with the proper expertise (experienced biomedical illustrator). The costs can be relatively low, a workstation with free and open-source software. However, more effective software can be expensive (\$1000–\$5000/year), even at academic pricing. Software purchasing or license fees depend on personal or institutional use, successful negotiation, and type of use (clinically approved or academic/educational). The creation and proliferation of model libraries or repositories may reduce the need for original models and drive the costs lower.⁴

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