# Surgical Training in the Digital Age: New Approaches and Technologies

**Liam Nguyen***

*Department of Surgery, University of Greenville, 315 E College Ave, Greenville, IL 62246, USA*

## Introduction

The field of surgery is constantly evolving, and advancements in technology are changing the way surgical training is delivered. The use of virtual reality, simulation, and other digital technologies is transforming the traditional apprenticeship model of surgical training. In this article, we will discuss new approaches and technologies that are being used to train surgeons in the digital age [1].

Virtual reality and simulation technologies are increasingly being used in surgical training. These technologies allow trainees to practice surgical procedures in a safe and controlled environment, without putting patients at risk. VR and simulation can provide a highly realistic experience, allowing trainees to learn and develop skills in a way that is not possible with traditional training methods. One example of a VR surgical training system is the Surgical Science Virtual Reality Laparoscopic Simulator. This system allows trainees to practice laparoscopic procedures in a highly realistic virtual environment. The system includes haptic feedback technology, which provides a realistic sense of touch and resistance, allowing trainees to develop the muscle memory required for surgical procedures. Another example of simulation technology is the da Vinci surgical robot system. This system allows surgeons to perform minimally invasive procedures using robotic arms controlled by a surgeon. The system includes a highly realistic 3D view of the surgical site, allowing surgeons to perform procedures with a high degree of precision.

## Description

Digital learning platforms are becoming increasingly popular for surgical training. These platforms allow trainees to access learning materials and resources online, at any time and from any location. Digital learning platforms can include video lectures, interactive learning tools, and other resources that help trainees to develop their skills. One example of a digital learning platform is Touch Surgery. This platform provides access to a library of surgical procedures that trainees can practice and learn from. The platform includes a range of interactive tools, such as 3D models and simulations, which help trainees to understand the anatomy and physiology of the human body. Another example of a digital learning platform is the AO Surgery Reference. This platform provides access to a range of surgical procedures, along with detailed information on the anatomy and physiology of the human body. The platform includes interactive tools, such as animations and 3D models, which help trainees to understand the complexities of surgical procedures.

Artificial intelligence (AI) is also playing an increasingly important role in surgical training. AI can be used to analyze large amounts of data, providing

***Address for Correspondence:** Liam Nguyen, Department of Surgery, University of Greenville, 315 E College Ave, Greenville, IL 62246, USA; E-mail: liamnguyen@gmail.com*

insights that can help trainees to improve their skills and develop their understanding of surgical procedures. One example of AI being used in surgical training is the Surgical Metrics Project. This project uses machine learning algorithms to analyze data from surgical procedures, providing insights into the factors that contribute to surgical success. The insights provided by the project can help trainees to understand the key factors that contribute to successful surgical outcomes.

Another example of AI being used in surgical training is the Osso VR platform. This platform uses AI to analyze the movements of trainees during surgical procedures, providing feedback on areas where improvements can be made. The platform can help trainees to develop the muscle memory required for surgical procedures, improving their accuracy and precision. The field of surgical training is undergoing a significant transformation, driven by advancements in technology. VR and simulation technologies are allowing trainees to practice surgical procedures in a safe and controlled environment, while digital learning platforms are providing access to learning materials and resources online. AI is also playing an increasingly important role, providing insights into the factors that contribute to successful surgical outcomes. These new approaches and technologies are helping to train the next generation of surgeons, ensuring that they are equipped with the skills and knowledge needed to provide the best possible care to patients.

Despite the benefits of these new technologies, there are also challenges that need to be addressed. One of the challenges is the cost of implementing these technologies in surgical training. VR and simulation technologies can be expensive, and not all healthcare institutions may have the resources to invest in these technologies. Digital learning platforms and AI-based solutions may also require significant investment in terms of development and maintenance. Another challenge is the need to ensure that these technologies are effective in improving the skills and knowledge of trainees. While these technologies may provide a safe and controlled environment for trainees to practice, it is important to ensure that the skills and knowledge gained in these environments can be applied in real-world situations. This requires ongoing evaluation and assessment of these technologies, to ensure that they are meeting the needs of trainees and providing the desired outcomes. Furthermore, it is important to recognize that these technologies cannot replace the importance of traditional surgical training methods, such as apprenticeships and hands-on experience. These new technologies should be seen as complementary to these traditional methods, providing additional opportunities for trainees to develop their skills and knowledge [2-5].

## Conclusion

The field of surgical training is rapidly evolving, driven by the advancements in technology. VR and simulation technologies, digital learning platforms, and AI-based solutions are transforming the way surgical training is delivered, providing new opportunities for trainees to develop their skills and knowledge. While there are challenges that need to be addressed, these new approaches and technologies have the potential to improve the quality and safety of surgical procedures, ultimately benefiting patients and healthcare systems.

## Acknowledgement

## Conflict of Interest

None.

## References

1. Parker, Sharon K and Gudela Grote. "Automation, algorithms, and beyond: Why work design matters more than ever in a digital world." *Appl Psychol* 71 (2022): 1171-1204.

2. Satava, Richard M. "Emerging technologies for surgery in the 21st century." *Arch Surg* 134 (1999): 1197-1202.

3. Satava, Richard M and Shaun B. Jones. "Preparing surgeons for the 21st century: Implications of advanced technologies." *Surg Oncol Clin N* 80 (2000): 1353-1365.

4. Stacy, Elizabeth Moore and Jeff Cain. "Note-taking and handouts in the digital age." *Am J Pharm Educ* 79 (2015).

5. Larson, Lindsay and Leslie A. DeChurch. "Leading teams in the digital age: Four perspectives on technology and what they mean for leading teams." *Leadersh Q* 31 (2020): 101377.

**How to cite this article:** Nguyen, Liam. "Surgical Training in the Digital Age: New Approaches and Technologies." *J Surg* 19 (2023): 77.