

## APPLICATIONS OF MOBILE DEVICES IN ANATOMY STUDIES

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### **Abstract**

*Anatomy is one of the heaviest topics addressed in the faculties of medicine because of the amount of information and their complexity. The new acquisitions allow for a different way of learning the notion of anatomy. Fixing knowledge in long-term memory requires systematic learning and repetition over a relatively long period of time. Anatomy in its classical form is based on the detailed description of the constituent anatomy elements of the human body. The modern means of learning focus on drawing pictures with reconstruction in an abstract form of organs. Nowadays, there are intelligent applications that, in addition to clear images of anatomical structures, present quiz modes of learning and repetition at intervals that lead to long term memory fixations. Dissection is one of the oldest methods of teaching anatomy, which today, for ethical, moral, legal and financial reasons, has a downward trend. Mobile devices allow access to information at any time and in any location.*

**Key words:** anatomy, devices, knowledge, development

### **INTRODUCTION**

For a long time, dissection was considered a cornerstone of medical education. In ancient Egypt, dissection was part of a religious ritual for the death of the dead, the procedure being much more brutal than today's anatomical dissection (H. V. Staden, 2004,). After the establishment of the first medical school in Salerno, Italy 1235, anatomy gained an important position in the medical curriculum, and human dissection was considered sacred. During the rebirth, after the opening of the anatomical theater in Padua-1490, and Bologna-1635, anatomy was considered a spiritual art and exploration of life, suffering and death. Anatomists began dissection to investigate the structure of the human body (R. Richardson, 2000,), (M. Hunter, 2001,), (R. Porter, 2002, ). Removing anatomical demonstrations deprived surgical preparation of a valuable exposure to clinical anatomy, the new generation of surgeons must assume responsibility for operator maneuvers despite the poor knowledge of

anatomy (J. Older, 2004). Most UK surgical program managers noted that the anatomical knowledge of new residents was very poor (24% of cases), or in 67% of cases refresher courses were needed, 52% of them considered that current training programs have less anatomical knowledge than 10 years ago (W. W. Cottam, 1999,). Between 1995 and 2000, there has been a 7 times increase in mistakes associated with anatomical errors sent to the Medical Defense Union (H. Ellis, 2002 ). In a study of 174 London 2nd year student, it was noted that 99% of the students agreed that they needed more time to learn the anatomy curriculum and disagreed with the closure of the dissection rooms of the university and removing dissection from the curriculum (P. Gogalniceanu, et al. ,2010). Considering that the use of human tissue for research has become controversial for ethical and practical reasons, the use of human bodies for learning is surrounded by emotional and ethical concerns (P. Furness, 2003), (K. Shaffer, 2004 )( J. C. McLachlan, et al ,2004, ).

#### **MATERIAL AND METHOD**

Anatomy is an abstract form of the human body because the organs are normally modified by degenerative processes, malformations or individual variations, varying with the age and gender of the individual. There is no consensus on the ideal age at which anatomy can be considered normal, much less in medical practice, where patients are of different ages, depending on the specificity they are addressing. The teaching of anatomy in the classical vision is done on the text that describes in detail the anatomy of each organ. The drawings are rather few and charged because of the difficulty of making them. Internet development now offers almost instant access to specific and detailed images of each organ. Mobile devices allow access to information at any time and in any location.

#### **RESULTS AND DISCUSSION**

Modern methods of teaching anatomy allow focusing on anatomical details as self-contained notions of images and drawings easily accessible on the internet. In the classic system, the drawings required long study with the emphasis of every detail in order to be understood. Also, nowadays, there are intelligent applications that, in addition to clear images of anatomical structures, present quiz modes of learning and repetition at intervals that lead to long term memory fixations. Dissection is one of the oldest methods of teaching anatomy, which today, for ethical, moral, legal and financial reasons, has a downward trend ( Garrison, F.H., 1921 ). Some studies find that students who did not

participate in the dissections have less knowledge than those from previous generations who had this privilege. This is questionable because we can not compare the knowledge of the two groups because of the accumulation of the anatomical knowledge of the old generations acquired through practical experience (Kogut, B., 2000). Modern learning methods take account of discoveries in the fields of pedagogy and psychology of education, trying to communicate information in a more efficient and clear way (Parsons, J. and Taylor, L., 2011 ), (Cohen, L.,et al , 2002). Taking into account the magnitude of the development of the information age, we consider that the anatomical information is more accessible and can be accessed at any time compared to the conditions of previous generations, where the information resources were personal books or libraries as well as posters, casts and information from other colleagues.

## **CONCLUSIONS**

1. Recent technological developments offer an improvement in teaching and learning anatomy by clarifying and simplifying notions.
2. Mobile devices allow repeating anatomical notions so as to ease their fixation in the basic medical language.
3. The main advantage of today in terms of learning anatomy is the speed of access to information and its almost universal accessibility.
4. Anatomy learned during dissection is an altered form of ideal anatomy due to pathological processes, individual variations or malformations.
5. Anatomical knowledge is one of the fundamentals of any medical education, but it is an abstract topic, being the result of numerous studies conducted in the past, summed up to an aspect considered normal by most researchers.
6. The use of human bodies in learning anatomy raises ethical, moral, emotional, legal and financial issues, the tendency to renounce them and their replacement with artificial replicas or information on a digital support.

## REFERENCES

1. Cohen, L., Manion, L. and Morrison, K., 2002. *Research methods in education*. Routledge.
2. Garrison, F.H., 1921. *An Introduction to the history of medicine c. 2*. WB Saunders Company.
3. H. Ellis, 2002, "Medico-legal litigation and its links with surgical anatomy," *Surgery*, vol. 20, no. 8, pp. 1–2.
4. H. V. Staden, 2004, *Herophilus—The Art of Medicine in Early Alexandria*, Cambridge University Press, Cambridge, Mass, USA,.
5. J. C. McLachlan, J. Bligh, P. Bradley, and J. Searle, 2004 "Teaching anatomy without cadavers," *Medical Education*, vol. 38, no. 4, pp. 418–424.
6. J. Older, 2004, "Anatomy: a must for teaching the next generation," *Surgeon*, vol. 2, no. 2, pp. 79–90.
7. K. Shaffer, 2004 "Teaching anatomy in the digital world," *The New England Journal of Medicine*, vol. 351, no. 13, pp. 1279–1281.
8. Kogut, B., 2000. The network as knowledge: Generative rules and the emergence of structure. *Strategic management journal*, 21(3), pp.405-425.
9. M. Hunter, 2001, "Alder Hey report condemns doctors, management, and coroner," *British Medical Journal*, vol. 322, no. 7281, p. 255.
10. P. Furness, 2003 "Consent to using human tissue," *British Medical Journal*, vol. 327, no. 7418, pp. 759–760.
11. P. Gogalniceanu, J. Palman, H. Madani et al. 2010, "Traditional undergraduate anatomy education—a contemporary taboo?" *ANZ Journal of Surgery*, vol. 80, no. 1-2, pp. 6–7.
12. Parsons, J. and Taylor, L., 2011. Improving student engagement. *Current issues in education*, 14(1).
13. R. Porter, 2002, *Blood and Guts. A Short History of Medicine*, Penguin Press,.
14. R. Richardson, 2000, *Death, Dissection and the Destitute*, University of Chicago Press, Chicago, Ill, USA, 2nd edition,.
15. W. W. Cottam, 1999, "Adequacy of medical school gross anatomy education as perceived by certain postgraduate residency programs and anatomy course directors," *Clinical Anatomy*, vol. 12, pp. 55–65,.