



Evaluation of free i-applications for tertiary level gross anatomy education

Jon Cornwall, Matthew F. Pollard

Department of Anatomy, University of Otago, Dunedin, New Zealand

BRIEF REPORT

Please cite this paper as: Cornwall J, Pollard MF. Evaluation of free i-applications for tertiary level gross anatomy education. AMJ 2012,5,4,239-242.
<http://doi.org/10.21767/AMJ.2012.1249>

Corresponding Author:

Dr Jon Cornwall, Department of Anatomy,
University of Otago, PO Box 56, Dunedin,
New Zealand
Email: jon.cornwall@anatomy.otago.ac.nz

Abstract

Background

The use of electronic resources in education, including i-applications used on portable handheld devices, is increasing. Apple® handheld devices are popular, with free applications the most prevalent download form. Many gross anatomy i-applications are available, however no information on the quality of free anatomy products is available. Rating such products could therefore guide product recommendations.

Aim

To evaluate the quality and range of free iPod® applications that are applicable for tertiary level gross anatomy education.

Methods

A search of the iTunes® Application Store with keywords anatomy, free, medical, functional, clinical, gross, and human was performed, with inclusion based on free applications containing human gross anatomy usable for tertiary education purposes. Application specification was noted; each was trialled independently and rated for usability, specification, academic level, and quality (image and programme).

Results

Sixty-three applications were identified and eleven met inclusion criteria. Two provided gross anatomy of the entire body, nine examined specific regions or systems. Five were judged introductory in academic level, five intermediate, and one advanced. One application was rated low quality, and four excellent. None were considered difficult to use (six easy, five medium). Application size ranged between 1.2MB and 229MB (mean 27MB).

Conclusions

There are few free i-applications for learning gross anatomy and most concentrate on individual body systems, with the academic level and usability of all products well rated. Results suggest some free i-applications could be suitable adjuncts for gross anatomy education at both an undergraduate and graduate level.

Key Words

Gross anatomy, i-applications, education

Background

The use of electronic resources in education is increasing, including the use of i-applications on portable pocket-sized and handheld devices.^{1,2} The trend towards having a handheld device with greater capabilities and electronic storage has allowed a massive i-application market to develop, thereby creating a new electronic-based medium for teaching and learning. Apple® (Apple Company, Cupertino, CA) handheld devices are currently one of the most popular platforms,⁴ with free applications being the most popular download form and the iTunes® application store (www.apple.com/itunes/) the most popular site for application download.^{3,4} Many gross anatomy applications are available through the iTunes® site, including free applications. These no-cost applications are an attractive resource option for students, staff and departments of tertiary institutes because no financial outlay is necessary for their acquisition. They also represent a novel way of introducing anatomy to students, and are therefore attractive options for conveying content to students.⁵

A search of electronic databases including Google Scholar, MEDLINE, Cinahl and PubMed indicated that at present there is no data available on the quality of free gross anatomy i-applications for the iPhone® and iPod Touch®. Rating such items would provide information and guidance in relation to product recommendations. Therefore, our aim was to evaluate the quality and range of free iPhone® and iPod Touch® applications from the iTunes store to assess their potential for use in tertiary-level gross anatomy education.



Methods

A search of the online iTunes® Application Store was performed with keywords anatomy, free, medical, functional, clinical, gross, and human, with inclusion based on free applications containing human gross anatomy suitable for tertiary education purposes. Application specification was noted, then each trialled independently by three anatomists (average eight years' experience) who had previously used or owned an iPod® and were familiar with current electronic resources and education curricula in the field of gross anatomy. Programmes were subjectively rated for usability (ease of use), academic level of the anatomy material, and quality (image and programme).

Usability was rated as easy, medium or hard and was judged by how difficult a programme was to use. Those that were judged to be intuitive and straightforward to follow were to be rated 'easy', those that were difficult to interact with or navigate through were to be rated as 'difficult'. The academic level was rated as introductory, intermediate or advanced. This was based on introductory material being assessed as appropriate for first-year tertiary students, intermediate level for those with previous exposure to gross anatomy, and advanced being appropriate for post-graduate level gross anatomy education. Product quality rated the quality of the images and the overall 'package' that the programme presented. This was to be judged as low, good or excellent.

Post-test all programmes and category results were discussed between the testers when tester ratings were not unanimous. In these instances a majority decision dictated rank or category placing; where three different ratings (or highly diverse ratings) were made the three testers discussed the merits of their score or ranking until a majority decision was reached.

Results

A total of 63 applications were identified and 11 met the inclusion criteria (Table 1). Two applications provided gross anatomy on the whole body with the remainder examining specific regions or organ systems. Five were rated introductory in academic level, five intermediate and one advanced. One application was rated low quality, five were of medium quality, and four of excellent quality. None were considered difficult to use, with six rated easy and five medium for usability. Application size ranged between 1.2MB and 229MB (mean 27MB) with all applications functional on a second generation iPod®.

Discussion

Many anatomy teachers, like those in various educational fields, are continually exploring novel and unique ways of

transferring knowledge.^{5,6} These methods not only embrace traditional resources such as textbooks and dissection, but also low-cost approaches such as body painting, drawing, or even ideas like the use of a newspaper model to describe the development of the adult gut configuration.^{5,6,7} Novel methods of engaging students are useful because of the possible educational benefits associated with 'new' ideas.⁵ Furthermore, low-cost teaching aids are an attractive option for departments or tertiary institutes who may be fiscally responsible for providing resources within budget or have few financial resources. With the use of handheld devices continuing to increase in popularity, free i-applications that contain material able to be used for the purposes of teaching gross anatomy are therefore useful because of both their novelty and 'no-cost' nature.

The good quality and relative 'ease of use' of the majority of applications suggest many of these applications may be useful as teaching adjuncts. Although most of the applications examined in this project concentrated on individual body systems, only a few products covered gross anatomy material for the entire body. Individuals or departments wanting to integrate these resources into their courses should therefore be familiar with the programmes before recommending them to students because of the restriction in the material covered in some instances.

There are some limitations to this study. The ranking categories and criteria used for usability, level and quality were subjective, however each tester was experienced with using the technology and familiar with the levels of educational curricula in gross anatomy. This therefore provides some level of validity to the testing as testers were familiar with the boundaries of expected knowledge in this subject. In addition, each independent rating for every product was discussed and agreement decided upon if initial rankings were not unanimous, thereby removing any bias that may have occurred with the use of a 'median score' ranking system. This discussion process decreased possible errors where a tester may have ranked products erroneously after overlooking the scope or functions of a programme because of unfamiliarity.

This is the first examination of free gross anatomy i-applications, with results suggesting that some contain material that may be useful for human gross anatomy education at both graduate and undergraduate level. Such applications could be integrated into teaching curricula at no cost to students or tertiary institutes and may therefore provide a useful, stimulating and free adjunct to current anatomy syllabuses.



Addendum

This project was presented as a poster at the 2011 Australian and New Zealand Clinical Anatomists conference where it won the prize for best educational poster.

References

1. Trelease RB. 2008. Diffusion of innovations: smartphones and wireless anatomy learning resources. *Anat Sci Educ* 1:233-9
2. Franko OI, Trillel TF. 2011. Smartphone app use among medical providers in ACGME training programs. *J Med Syst Epub ahead of print* DOI 10.1007/s10916-011-9798-7
3. Differentdistrict.com. http://www.differentdistrict.com/more.php?id=3815_0_25_0_C%29. [Internet]. Retrieved 15 November 2011.
4. Techcrunch.com 'Google Android has double the number of free apps than Apple's App Store'. [Internet]. Distimo. 15 July 2009. <http://techcrunch.com/2010/07/05/distimo-june-2010/> Retrieved 15 November 2011.
5. Sugand K, Abrahams P, Khurana A. 2010. The Anatomy of Anatomy: A Review for Its Modernization. *Anat Sci Educ* 3:83-93
6. Nayak SB, Kodimajalu S. 2010. Progressive Drawing: A Novel "Lid-Opener" and "Monotony-Breaker". *Anat Sci Educ* 3:326-329
7. Nayak SB. 2010. A response to "Pulling My Gut Out – Simple Tools for Engaging Students in Gross Anatomy Lectures". *Anat Sci Educ* 3:277

ACKNOWLEDGEMENTS

The authors would like to acknowledge the efforts of Richard Storey and A.Prof Phil Sheard who gave their time to various aspects of this project.

PEER REVIEW

Not commissioned. Externally peer reviewed.

CONFLICTS OF INTEREST

The principle author is a senior editor of the AMJ.

FUNDING

Nil.

ETHICS COMMITTEE APPROVAL

N/A

Table 1: Ratings for free i-Application gross anatomy products available from the iTunes® store.

All applications are identifiable on iTunes® by the product names and icons as listed. Abbreviations: Med - medium; Intro - introductory; Inter - intermediate; Adv - advanced; Sk - skeletal; H / N - head and neck; M - muscles; MB - megabytes

	Product name	Usability	Level	Quality	Body region	File size
	Human Anatomy!	Easy	Intro	Low	All	7.5MB
	Speed Bones Lite	Easy	Intro	Good	Sk	12MB
	Bones, Joints and Muscles	Easy	Inter	Low	All	1.2MB
	IMAIOS e-Anatomy	Med	Adv	Ex	Neuro	268MB
	Heart Illustrated	Easy	Intro	Good	Cardiac	2MB
	Human Anatomy - Free	Easy	Intro	Low	All	2.8MB
	Monster Anatomy Lite - Knee	Med	Inter	Good	Knee	11.3MB
	Muscle System (Head and Neck)	Med	Inter	Good	H / N	12.5MB
	Musculoskeletal System - Quiz	Easy	Intro	Good	M, Sk	5MB
	Skeletal System (Head and Neck)	Med	Inter	Good	H / N	10.2MB
	Free Primal Anatomy Quiz	Med	Inter	Low	Organs	8.8MB