

“CoachPod”: evaluation of an anatomy teaching podcast originally intended for learning anatomy on the move

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SUMMARY

Warwick Medical School (WMS) has no dissection facilities; students travelled by coach to the nearest medical school. The “CoachPod” is a series of podcasts designed to prepare students for dissection whilst travelling to dissection lab classes. Each podcast was filmed a week prior to each session and uploaded to the WMS website for students in the 2007 cohort (n=203). Evaluation was performed using a questionnaire with tickbox, Likert scale and free text questions. Overall response rate averaged 28%. Sixty-five percent watched the CoachPod on a computer, 34% watched it on an MP4 player, 55% viewed it at home, 31% viewed it on the coach, 26% watched each episode more than once, 83% perceived it as beneficial in aiding preparation, 51% felt the Coach was an appropriate learning environment, 90% felt they were of an appropriate length and that the anatomy was presented clearly, 89% believed the recordings were of adequate quality, 84% valued their tutors being in them, 92% enjoyed watching them, and 98% would value continued production. Suggestions for improvement were mostly on technical matters.

CoachPod is considered a valuable dissection preparation tool, although it is mainly used at home and not on the move. Just-in-time preparation allowed subsequent incorporation of feedback.

Key words: Human gross anatomy – E-learning – Undergraduate Medical Education – Computer-aided instruction – Teaching of anatomy

INTRODUCTION

Warwick Medical School (WMS) is one of the newest medical schools in the UK. It is also one of the only graduate-only medical schools in the UK, and as such offers a four-year accelerated course to students with a degree in biological sciences. WMS opened in 2000 as a partnership with Leicester Medical School (LMS), with an initial intake of 64 students which has steadily increased to between 180 and 200 students per year. The medical teaching centre at WMS does not have any facilities for cadaveric dissection, and therefore students were travelling for an hour by coach to LMS for dissection sessions. We felt that the hour spent travelling to LMS on the coach could potentially be utilised to prepare students for the dissection session. In order to do this, we

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planned to create a series of video podcasts that detailed the basic anatomy to be covered and various dissection techniques for each dissection session that could be downloaded from the University web-pages onto an MP4 player, and viewed on the coach whilst travelling to the dissection session, hence the name 'CoachPod'. Students could use their own MP4 players, or borrow one of a limited number from the Medical School.

It has long been recognised that more traditional methods of teaching in medical schools are becoming increasingly supported by adjuncts such as video (Heath et al., 2007) and 'computer-assisted learning' (Carmichael and Pawlina, 2000; Collins et al., 1994; Guttmann, 2000; Paalman, 2000; Van Sint Jan et al., 2003; Sugand et al., 2010), which are now incorporating technology such as the use of 'Smartphones' on which students can watch instructional video 'podcasts' (Trelease, 2008). The use of anatomy videos is a long-established method of teaching anatomy to medical students. Various studies have suggested that it may be used effectively as an aid to more traditional methods such as dissection (Bacro et al., 2000), or as an alternative method entirely, although it is suggested that this is not as effective as the use of anatomy videos as an adjunct to more traditional teaching (Granger and Calleson, 2007). Various studies have suggested that the use of anatomy videos in conjunction with traditional teaching methods may improve anatomy examination results (Casado et al., 2012; Pereira et al., 2007; Saxena et al., 2008). As technology has moved on, so has the manner in which anatomy videography is made available, from video cassette tapes (Birnbach et al., 2002) through CD-ROMs (Ernst et al., 2003), Videoconferencing (Methney and Gajewski, 1998; Moorman, 2006), DVDs (Van Sint Jan et al., 2003) and the internet. Choi et al. (2008) found that there are over 100 websites on the internet at present that are dedicated to teaching anatomy, with podcasting becoming a more widely used method of delivering educational material in recent years (Sandars, 2009). As well as being widely used in Undergraduate Education, videos

are increasingly being used in Postgraduate Education in order to aid teaching of anatomy and practical procedures (Birnbach et al., 2002; Hammond et al., 2004; Sugand et al., 2010; Warwick Medical School, 2011).

METHODS

A total of eleven podcasts (see Table 1) were filmed over a five-month period (January – May 2008) for the use of the 2007 intake at WMS (n=203). Each podcast was filmed in the LMS dissection room using a Sony Camcorder during the week prior to each session. None of the episodes were scripted; the learning objectives for each session were studied and from this a series of relevant 'bullet points' was drafted. Up to eight anatomy teachers were used per podcast, each of whom would have between one and three 'bullet points' to convey whilst using cadaveric dissections, cadaveric prosections, human skeletons or diagrams to illustrate points, with anonymity of each specimen being preserved at all times. Recorded footage was then edited into a podcast, which was uploaded onto the password-protected pages of the WMS website and made available for students to download in either iPod-compatible or WMV format the afternoon before each dissection session. Students were encouraged to watch the podcast during the coach journey from WMS to LMS. Prior to having access to the podcasts for the first time, students were given a lecture detailing the Human Tissue Act implications of having access to these podcasts, and were committed to signing disclaimers stating that they would adhere to the Human Tissue Act laws.

The project was evaluated using a questionnaire that we designed specifically for this purpose, incorporating simple tickbox questions, five-point Likert Scale questions (strongly agree (SA), agree (A), neither agree nor disagree (N), disagree (D) and strongly disagree(SD)) and free text response questions. The Likert scale questions were designed in such a way as to ensure that they could not all be answered satisfactorily by simply ticking the same box for each question by using a combination of positive and negative-type questions.

Table 1. List of CoachPod episodes

No.	Title	Length (min/sec)
1	An Introduction to the Dissection Room	13.21
2	Muscles of the shoulder and arm	12.41
3	Cardiovascular Anatomy	19.27
4	Vessels and nerves of the axilla and arm	12.49
5	Muscles of the forearm and hand	13.07
6	Vessels and nerves of the elbow, forearm and hand	11.18
7	The Abdomen and its contents	26.22
8	The gluteal region and posterior thigh	11.22
9	The anterior and medial thigh and hip joint	9.12
10	The knee joint and the muscles of the leg and foot	22.23
11	The nerves and vessels of the lower limb	9.27

Completion of the questionnaire was achieved either on paper or online, with completion being entirely optional and all responses being anonymous. Students were asked to fill in a questionnaire every week after each dissection session—during the first week students watched the first two podcasts—with one podcast for each subsequent week (see Table 2). Overall response rate throughout the project was 28% (n=573/2030).

RESULTS

Once the data were collected, the Likert Scale responses for all returned questionnaires were classified as follows for analysis purposes; each question was changed to a 'positive' question (e.g. the coach is not an appropriate learning environment became the coach is an appropriate learning environment) and the responses changed accord-

ingly (i.e. all 'SA' and 'A' responses respectively became 'SD' and 'D' responses respectively), with all 'SA' and 'A' responses being considered to be positive responses to a question, and all 'N', 'D' and 'SD' responses being considered to be a negative response to a question. Positive responses were then calculated as a percentage of the total responses for each question. The interpolated median (IM) for each question was calculated from the Likert Scale data on a scale of 1-5 (1=SD, 5=SA).

Thirty-four percent (n=192) of respondents viewed the podcasts on a mobile device such as an MP4 player, with 29% (n=166) reporting that they owned a portable video device. Sixty-four percent (n=366) viewed the podcasts on either a laptop or desktop computer. Thirty-one percent (n=176) viewed the podcasts on the coach, 54% (n=310) viewed the podcasts at home, and 13%

Table 2. CoachPod Questionnaire

Group	
Session	
Did you watch the CoachPod video this week?	Yes No
Do you own a portable video player?	Yes No
Which device did you use to watch this session? (tick all that apply)	iPod Nano iPod Video iPod Touch Archos Laptop Desktop Other
Please specify 'Other'	
Screen Size (ins)	
When did you watch the video? (tick all that apply)	Night before dissection session Morning of dissection session On Coach Not watched
Where did you watch the video? (tick all that apply)	On Coach Home University Other
Please specify 'Other'	
Which of the above best describes how you watched the video?	
Other Comments on how you used it	
Please rate the following statements	SD D N A SA
I enjoyed watching the videos	
The video did not help me prepare for this DR session	
The video presented the anatomy in a clear way	
I used the video in the DR	
I valued the fact that the video used my own teachers	
The coach is not an appropriate learning environment	
The video was of adequate quality	
I would value these videos throughout the module	
The length of the video was about right	
What did you like about this week's episode? Why?	
Is there any unnecessary material that could be removed from this episode? Why?	
What could we improve? Why?	
What was particularly useful? Why?	
How can we make it more useful?	
Other Comments	

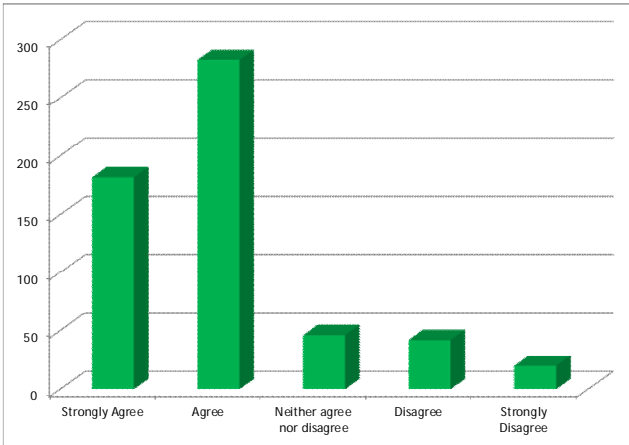


Fig. 1. The video helped me prepare for the Dissection Room Session.

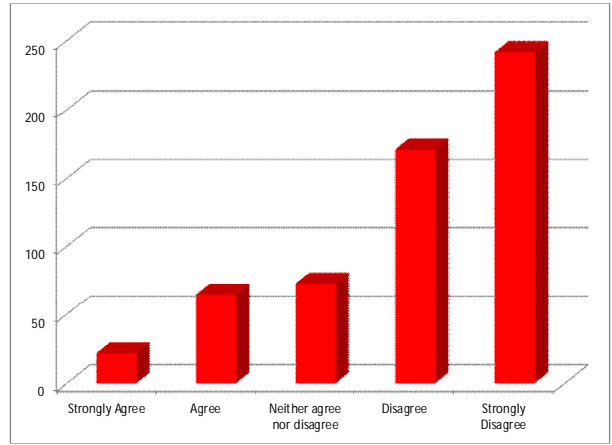


Fig. 2. I used the video in the Dissection Room.

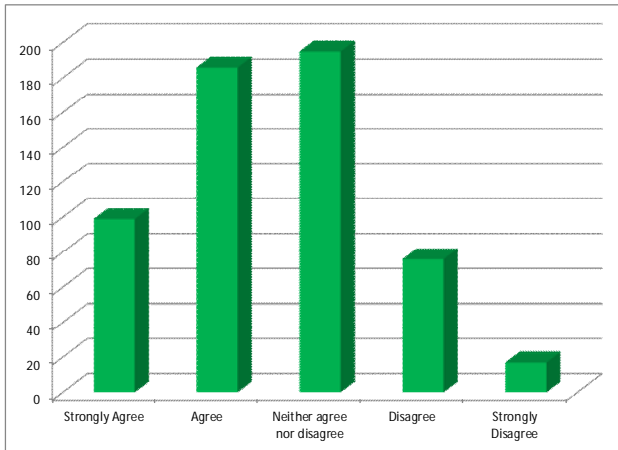


Fig. 3. The coach is an appropriate learning environment.

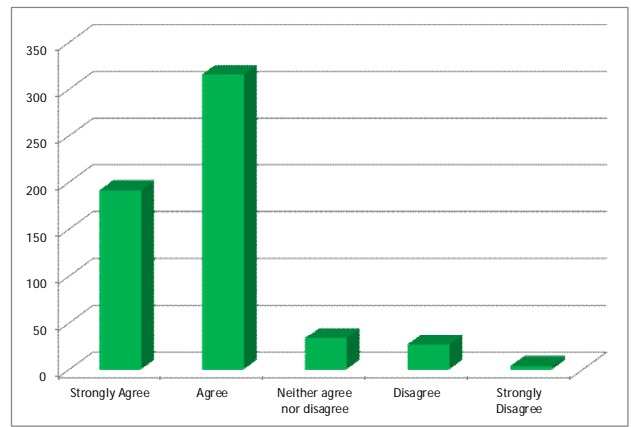


Fig. 4. The length of the video was about right.

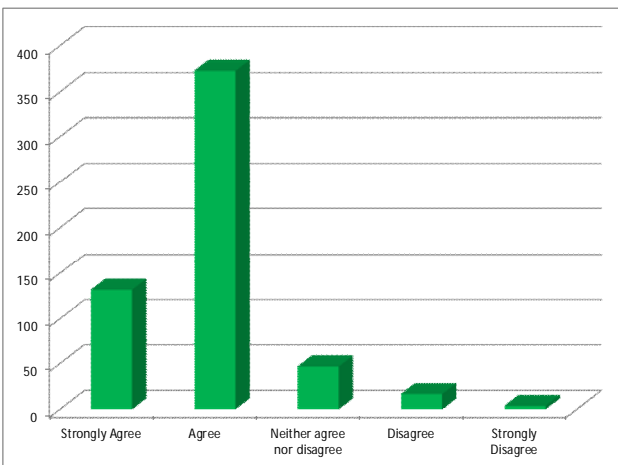


Fig. 5. The video presented the anatomy in a clear way.

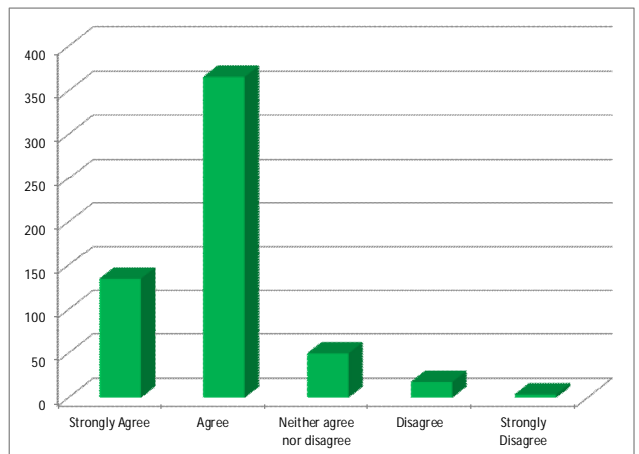


Fig. 6. The video was of adequate quality.

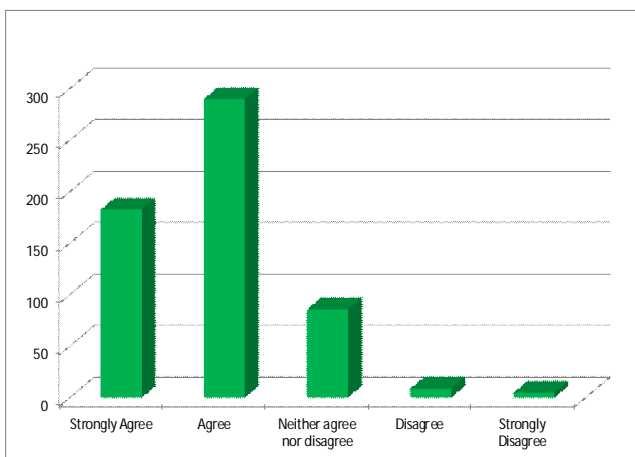


Fig. 7. I valued the fact that the video used my own teachers.

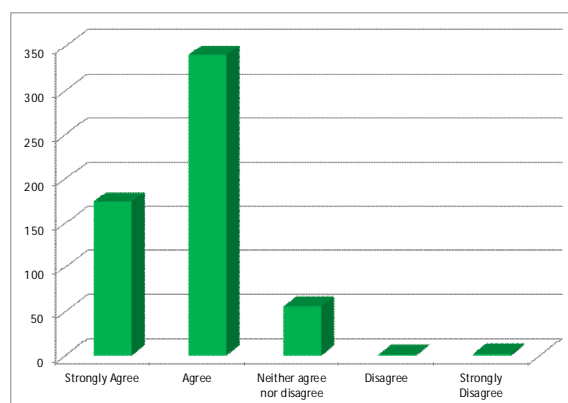


Fig. 8. I enjoyed watching the videos.

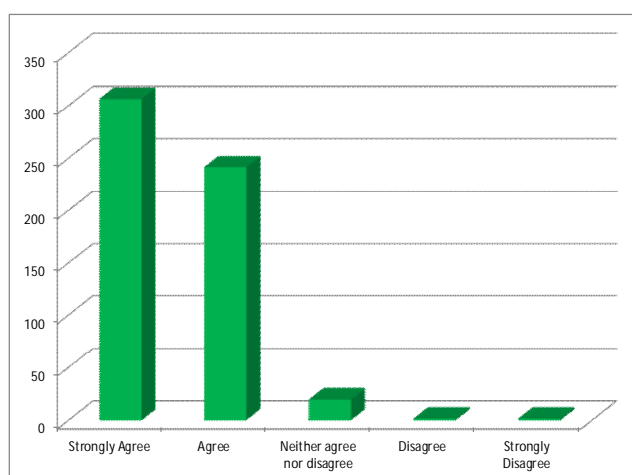


Fig. 9. I would value these videos throughout the module.

(n=74) viewed the podcasts at WMS. Twenty-six percent (n=149) viewed the podcasts on more than one occasion. Eighty-one percent (n=465, IM=4.14) perceived that the podcasts were beneficial in aiding their preparation for dissection sessions (see Fig. 1). Only 16% (n=89, IM=1.77) used the podcasts as a direct aid in the dissection room (see Fig. 2). Fifty percent (n=285, IM=3.50) felt that the coach was an appropriate learning environment (see Fig. 3). Eighty-nine percent (n=509, IM=4.21) felt that the podcasts were of an appropriate length (see Fig. 4), 88% (n=506, IM=4.09) believed that the anatomy was presented clearly (see Fig. 5), and 88% (n=502, IM=4.09) believed that the podcast recordings were of adequate quality (see Fig. 6). Eighty-three percent (n=473, IM=4.15) valued the fact that their own tutors were in the podcasts (see Fig. 7). Ninety percent (n=516, IM=4.18) enjoyed watching the podcasts (see Fig. 8), and 96% (n=550, IM=4.57) stated that they would value them being made throughout the module (see Fig. 9).

A total of 638 separate comments were made in

response to the 'free text' questions, which were broadly split into comments as to what each student enjoyed about each episode (n=219), comments as to how each episode could have been improved (n=281), and other comments (n=138). Of the 138 'other' comments, 49 were applicable to the other two categories and are included with them below.

The comments relating to what each student enjoyed about each episode were divisible into four broad categories:

1. The use of the podcasts as preparation tools for the dissection session (n=95):

"Seeing the nature of the dissection and seeing the body whole before coming into contact with a cadaver as I have never participated in human dissection before"

"Diagrams to illustrate areas of incision, generally explained all the basics so that I had a good idea of what I needed to look for before I went in"

2. The anatomy demonstrated in each podcast (n=71), with positive comments being made about the use of cadavers, prosections, and live models:

"Getting a 'feel' for the anatomy through seeing the dissections and demonstrations. I find I can learn a muscle's attachments and position etc. etc. but seeing it somehow puts it into context and makes it easier to remember"

"Seeing the anatomy 'in the flesh'"

3. General comments about the podcasts, mostly related to their quality (n=39):

"It was simple and clear"

"It was very thorough!"

4. The use of the podcasts as a revision tool (n=14, 8 + 6 from 'other'):

"(I liked)...the detailed dissection and good filming. It will also be a fantastic revision tool"

The comments about how to improve the pod-

Table 3. White Space Comments

Topic	Number of Comments
What was enjoyed by the students	219
Use of podcasts as a preparation tool	95
Anatomy demonstrated in each podcast	71
General comments relating to quality of podcasts	39
Use of podcasts as a revision tool	8 + 6 'other'
How subsequent episodes could be improved	281
Technical improvements (e.g. sound quality, detail, close-ups)	134 + 22 'other'
Changing the length of the podcasts	20 + 2 'other'
Problems downloading one episode	18 + 4 'other'
Available to download sooner	15 + 10 'other'
More dissection hints and tips	19 + 1 'other'
Improving the script	15
Changing the introduction sequence	7 + 4 'other'
General comments	15
No improvement necessary	31
Other comments	138 (also see above)
Positive general comments	89
Travel sickness whilst viewing podcasts on the coach	6
Not having an MP4 player	4
Other general comments	12

casts appeared to fall into nine different categories. The most commonly occurring theme appeared to be general technical improvements, such as close-ups, sound quality, and the amount of detail in each podcast (n=156, 134 + 22):

"More close ups and different camera angles during dissections & demonstrations on prosections (would be helpful)."

"The sound quality was fairly variable and a couple of times it was quite difficult to hear the presenter clearly"

"I personally would like more anatomy..."

Other categories included changes to the length of each podcast (n=22, 20 + 2), problems with downloading one episode (n=22, 18 + 4), suggestions that each podcast is available to download sooner (n=25, 15 + 10), more dissection hints and tips per episode (n=20, 19 + 1), improving the 'scripts' (n=15), changing the introduction sequence (n=11, 7 + 4), and various general comments (n=15). Of the 281 comments, 31 suggested that no improvements were necessary.

Of the remaining 89 'other' comments, the majority were positive comments related to the podcasts (n=67):

"This form of learning, and the enthusiasm and nurturing attitude of our teachers towards us is greatly appreciated. Thank you!"

"Great, keep them coming"

"Each week improves..."

Other comments included problems with travel-sickness when viewing podcasts on the coach (n=6), problems for those with no MP4 player (n=4), and other general comments (n=12, see Table 3).

DISCUSSION

This study only looks at student satisfaction with the podcasts, with the effect upon learning not being formally analysed by assessing outcomes such as subsequent dissection ability (Kinzie et al., 1993) and exam results (Schreiber et al., 2010), which is a potential avenue for research in the future. Our study's main limitation was the low overall response rate of 28%, but this figure is consistent with other studies using survey data (Kaplowitz et al., 2004; Sheehan, 2001). An additional factor that could have been explored is differences in perception based upon gender, as a recent study by Nieder and Borges (2012) concludes that male students use online resources more frequently.

Our data suggests that the 'CoachPod' project was well-received and appreciated by the students at WMS, and was perceived to be of benefit for in preparation for each session and for subsequent revision. A recent study by Casado et al. (2012) supports our findings, especially the fact that the 'CoachPod' was valued as a preparation tool. One of the main benefits of 'CoachPod' appears the bespoke nature of the podcasts; they were made with the express intention that they be used by the students at WMS as an aid to the more traditional methods of anatomy teaching, and were created specifically for that purpose, thus allowing full integration with the learning outcomes for each session. Our results support this as they show that the vast majority of students valued the fact that their own tutors were in the podcasts, and that they were specific to their own learning. Furthermore, the fact that they were made week-by-week allowed us to incorporate feedback from students

into each weekly podcast, such as reducing the length of the podcast (the podcasts that were over 20 minutes in length received a number of comments suggesting that they were too long) or altering the podcast content if necessary (e.g. adding in superimposed 'dissection lines' on cadavers). Also, they were not created as an alternative to other, well-established and much more comprehensive anatomy multimedia available, which are also widely used by our students (Acland, 2010; Primalpictures, 2007). However, it is apparent that students mainly used the podcasts as a preparation tool on a laptop or desktop computer whilst at home, as opposed to on the coach as was the original intention of this study, with less than a third of students viewing the podcasts on the coach; curiously, approximately half of students perceived the coach to be an appropriate learning environment, which is not consistent with viewing figures, and it is not entirely apparent from our results as to why there is a discrepancy between the answers to these two questions. It is perhaps because students will preferentially study in a time and place of their own choosing, and one of the most comfortable and familiar places for students to learn is in their own environment. Also, we received a number of comments suggesting that the podcasts were available to download earlier, which may support the lack of uptake on the coach and the preferred usage of the podcasts in the students' own homes. Our results showed that approximately a third of students owned or had access to a portable device suitable for viewing the podcasts, and it may be that this alone is enough to explain the limited uptake on the coach, with other factors such as travel-sickness playing a minor role; had this study been conducted in 2013, we may have seen a higher uptake of usage on the coach due to increased ownership of and access to portable devices such as MP4 players. Occasionally the coaches had televisions, and it may have been beneficial to have played the podcasts to the students in this way, as suggested in some of the white space comments. As well as using the podcasts for dissection preparation, students have also made it clear that they use them for learning anatomy, and intend to use them to revise in the future. Similar studies by DiLullo et al. (2006) and Shantikumar (2009) support these findings.

Trelease (2008) suggests that the use of technology such as podcasting is going to become more and more widespread and of great value to medical teaching in the future. Our study would appear to support this statement, and since Trelease's paper has been published a MedLine search reveals that 33 further studies have been published that relate to the use of podcasting in medical teaching and education. Samarakoon et al. (2013) state that 'teaching medicine is an ever-evolving

process', and it is apparent that the technology used to deliver information to students is ever-evolving. Since this project was undertaken, WMS has moved on to using plastinated specimens to teach anatomy and it is likely that all future podcasts using these plastinated specimens will be in an apps format on mobile devices such as smartphones and tablets (Abrahams, 2012).

Practice Points

- Anatomy podcasts were aligned with the learning objectives each week
- Just-in-time development allowed feedback to be incorporated into subsequent episodes
- Students appreciated their own tutors appearing in the podcasts
- Students used the podcasts primarily as a dissection preparation aid at home
- Students intended to use the podcasts for future revision

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