

Capturing Archaeological Performance on Digital Video: Implications for Teaching and Learning Archaeology

Sarah Colley and Martin Gibbs

Department of Archaeology, School of Philosophical and Historical Inquiry, Faculty of Arts and Social Sciences, University of Sydney, Australia.

Note from the authors: This paper has been peer-reviewed and was provisionally accepted for publication in a proposed special issue of the journal *Research in Archaeological Education* in November 2011. The videos discussed here have since been accepted for publication by Alexander Street Press (Alexandria, VA) in their *Anthropology Online Collection*. As we currently still retain copyright in our work presented here we decided, given the delay in publication of our paper, to make it publicly accessible online pending further action from the journal to which it was originally submitted. We wish the content of our paper to be available to contextualise the videos which are available online. For further information please contact Sarah Colley at sarah.colley@sydney.edu.au. 20 September 2012.

Abstract

In 2009 we produced a series of edited video clips to demonstrate practical methods to archaeology students at the University of Sydney in Australia. The videos were made publicly accessible via YouTube and incorporated into teaching of an undergraduate archaeological field methods course in 2010 and 2011. Our paper outlines staff experiences of making and using the videos for teaching and discusses results of student questionnaire feedback about the videos and the course. The results provide insight into the effectiveness of different ways of teaching practical archaeology in a context of large class sizes and limited resources and the potential of using digital video technologies to communicate archaeology to students and other audiences.

Keywords

digital video technology, archaeological field methods, teaching, learning

Teaching 'ARCA2602 Field Methods' 2010-11

Archaeology at the University of Sydney is offered as a major within a general Arts or other undergraduate degree programme. A new introductory 'Laboratory Methods' unit of study was introduced to the curriculum in 2007, followed in 2008 by a new 'Field Methods' unit.

These courses are open to second or third year undergraduate students who have completed at least two units of first year introductory archaeology. Until 2011 they were offered in alternate years, typically attracted 70-75 students each and were co-delivered by two or three staff to manage student access to limited space and equipment. Following further organisational change and loss of some contract teaching staff positions, it was decided to review the curriculum and offer both units in 2011, with only one member of staff teaching each course. As expected, this resulted in slightly fewer students enrolled in 'Field Methods' in 2011.

Teaching hands-on practical archaeology to undergraduate students in Australian universities requires that staff and departments solve budgetary, organisational and other challenges (Colley 2011; Hall et al. 2005). Some universities are better placed than others to offer hands-on archaeology practical classes, field schools and practical work-experience training. In particular, Australian universities have a variable capacity and commitment to teaching field schools. In 2010-11, 11 Australian universities taught undergraduate degree programmes with an undergraduate major and fourth year Honours in archaeology. Four of these, including the University of Sydney, offered no assessed or formally taught field schools as part of their undergraduate teaching programme, although most offered some hands-on teaching of practical archaeology and students were encouraged to participate in external fieldwork projects and field schools in a private capacity

The University of Sydney's 'Field Methods' course (ARCA2602) was designed and coordinated by Gibbs. It counts for six credit points towards a 48 credit point undergraduate degree. Teaching hours, staff workloads, assessment word lengths and credit point values are regulated centrally by the university for reasons of financial management. Students are expected to attend formal classes for three hours each week over a 13 week semester, participate in a five hour field assessment exercise, submit a 3000 word notebook and complete a 1000 word test for assessment. In 2010 the 'Field Methods' unit was team taught by Gibbs and two other staff to 72 students. In 2011 there were 46 students and Gibbs taught the unit on his own.

The course takes place on the University of Sydney campus grounds. It aims to introduce students to basic archaeological fieldwork principles and skills listed by Gojak (2007) as the minimum needed for employment on a typical Australian field project, for example: site description; creating field maps and plans; tape and compass site recording; dumpy survey; research design, sampling and survey strategy; and knowledge of ethical and legal aspects of fieldwork. Teaching methods include lectures by staff in a lecture room, practical demonstrations by staff and students completing tasks themselves individually or in groups. Students are also expected to read detailed course notes and recommended text-books that explain and describe field methods. In 2009 Colley and Gibbs were awarded a university teaching grant to produce video of staff demonstrating field survey techniques. These can be viewed on YouTube (<http://www.youtube.com/user/ARCAUSYD>) and were used for 'Field Methods' teaching in 2010 and 2011.

Making the videos and 'broadcasting ourselves' online

Seven edited video clips, each between 3 to 4 minutes long, were produced by Colley.

These show Gibbs demonstrating how to:

- 1) Use a compass for archaeological survey;

- 2) Set up a 1 metre grid square using tapes;
- 3) Conduct a baseline offset survey;
- 4) Set up a dumpy instrument;
- 5) Level a dumpy instrument;
- 6) Focus a dumpy instrument; and,
- 7) Use a dumpy instrument to read a survey staff

These tasks were taught in lectures and demonstrations as part of the 'Field Methods' course. It was not possible to make videos about the entire content of the course due to our limited budget. We hired two archaeology research students as project assistants to help with video camera operation (Hugh Thomas), and post-production and editing (Annika Korsgaard). None of the team were video production professionals although some of us had made other videos and undertaken basic training. Gibbs, Colley and Thomas had significant experience of teaching and explaining archaeology to audiences. Skills gained in this context were immediately and obviously transferrable to the digital video format, especially the currently common method of delivering archaeology lectures by talking to rapidly changing digital slideshows of multiple images and text.

Gibbs presented his archaeology practical methods demonstrations to camera rather than to a group of students and his performance was captured by Colley and Thomas using two video cameras mounted on tripods. Hand held shots were used to follow some actions. We did not use a storyboard or script as Gibbs was already very familiar with the material and had rehearsed many times in front of classes. Some actions were repeated several times to allow key details to be videoed from different angles or in close-up, and to deal with interruptions and mistakes. While we discussed and planned how to line up some shots, our general approach was not significantly different to how we already use photography and video in the field to record archaeological site information. As the location was outside on a sunny day artificial lighting was unnecessary. Poor quality microphones, and our relative

inexperience of audio recording, resulted in poorer sound quality than desired. We have since acquired better and more appropriate microphones for future productions.

The raw video was edited by Colley using Final Cut Pro (FCP) to remove superfluous content, change the order of some shots, and add cutaways to close-ups and stills created by freeze framing the video. FCP motion effects, filters and other utilities were used to pan, zoom, change opacity, correct colour, add transitions and shorten the length of some sequences by speeding up the action. Explanatory graphics and text labels were created to clarify key points and reinforce Gibbs' verbal presentation. The text partly compensated for the variable quality of the audio and produced the unintended benefit of making the videos easier to understand for viewers with impaired hearing (Alice Storey, pers. comm.) or who have a non-English speaking background. For some clips it was possible to add short sequences of additional video previously captured on-site by excavation director Denis Gojak and edited by Colley, that showed professional archaeologists using similar equipment to perform similar tasks on a 'real' excavation at the 19th century colonial settlement of Old Marulan in New South Wales. Original music composed and produced to a high standard in AIFF format by Rob Colley was added to some sequences for interest and to improve audio quality. Title and credit sequences were created so that essential metadata about content and intellectual property were embedded in the video file, which is also important for digital archiving (see below). The video sequences were exported from FCP in standard QuickTime and MP4 formats that can be played on different software and equipment or uploaded to the internet.

The final product is less technically polished than might be expected if we had hired experienced professionals with better equipment to make the videos for us. Our limited video making experience shows, for example, in the poor framing of some shots, occasional problems with lighting and exposure, clunky editing, inconsistent graphic design elements and variable audio quality. Variations in image resolution and colour reproduction of the

video from different cameras are also apparent. The videos were shot in standard definition PAL DVD format (aspect ratio 4:3) and already look dated given the rapid transformation of even low cost digital video cameras and equipment to widescreen and high definition formats. Compression for upload to YouTube has produced further distortion of image quality and pixilation.

However, the videos were produced on a tiny budget and they are more than fit for purpose. The production values are comparable with PowerPoint presentations and other 'in-house' digital materials we regularly create and use for teaching archaeology. Within the limits of our technical and video production abilities, making the videos ourselves rather than hiring professionals gave us close control of content and the visual, textual and audio messages we wanted to convey to students. We also learned a lot more about producing and editing digital videos for archaeological research and communicating with audiences.

Student evaluation of the videos as part of the learning experience

Gibbs informed students enrolled in 'Field Methods' in 2010 and 2011 that the videos were available on YouTube and provided them with the URL. The videos were offered as an extra resource for self-directed study to supplement text-books and course notes. They were not shown in class or linked to assessment, and watching them was entirely voluntary.

Students present at one of the 'Field Methods' lectures late in semester were invited to complete a questionnaire survey in class to help evaluate the videos. Survey participation was anonymous and voluntary. 64% of students (46 of 72 enrolments) completed the survey in 2010 and 56% in 2011 (26 of 46 enrolments). These figures reflect the now common circumstance (Fredericksen 2005; Gibbs et al. 2005) where many university students do not attend classes unless they are compulsory and count towards assessment. It is reasonable to assume that students who attended the lecture and completed the questionnaire survey were more likely to be interested in learning field methods and motivated to undertake optional learning tasks including watching the videos.

The questionnaire survey asked 12 questions that required respondents to rank answers on a scale, tick boxes or write short open-ended replies. Minor flaws in some of the survey methodology became apparent during analysis and no claim is made for the statistical reliability of results from such a small study. Despite these limitations, some strong patterns emerged from the quantitative data and information derived from the free-format responses provides interesting and useful insights.

How many videos did you watch? If you did not watch some of the videos, why not? In 2010, 22 of the 46 respondents (48%) watched more than one video. In 2011 all 26 respondents watched at least one video and 9 (35%) watched them all. Students were given different information in 2010 and 2011 about how to access the videos. In 2010 some students watched selected videos only, rather than all of them, because they misunderstood the instructions. A few said they had not watched the videos because they “forgot”, “were too lazy”, “had computer problems” or through “lack of time”. One person said “even though I didn’t watch them, I think it was a great idea”. In 2011 the instructions were made clearer. This confusion reduced the size of the sample available to investigate some questions and makes quantitative comparison of results for different videos unreliable; however, it did not impact on the results for most other questions.

How generally useful did you find the videos for learning field methods? For 2011, 58% (n=15) of respondents thought that overall the videos were *Quite Useful* and 42% (n=11) considered them *Very Useful*. 2010 responses were generally similar (Figure 1) although many people did not answer the question, maybe because they did not watch many videos. The overall impression is that most people who *did* watch the videos, and were present in class to participate in the survey and also answered the question found the videos to be at least *Quite Useful* for learning and a smaller but significant number found them *Very Useful*.

In both years, no students said that videos they watched were *Not Useful*. This indicates that students generally thought the videos were valuable for learning.

How useful for learning [each different task] was each video? Students were asked to rank their opinion of each video along the scale of *Very Useful*, *Some Use* or *Not Useful*.

Comparing 2010 and 2011 responses is difficult because a significant number of 2010 respondents watched only a few videos. In general terms the video found most useful by 2010 students was 'How to set up a 1 m grid square'. This result contrasts to 2011 when more students nominated as useful the four videos explaining the use of dumpy surveying equipment, while the video about setting up the grid square ranked as least useful and was least watched overall. There was a marked contrast of opinion about the value of the video explaining how to use a compass. In 2010 only 6.5% of respondents found this *Very Useful* compared to nearly 31% in 2011. Which video topics and videos students did or did not find useful in a particular course each year is presumably influenced by their prior experience, by how well they were able to learn the topic by other means (e.g. lectures, practical demonstrations, self-directed study), what they thought was important to know, and their individual reactions to the style and content of each video.

Were the videos too long, too short or about the right length? 70% (n=32) of 2010 respondents and 92% (n=24) from 2011 felt the videos were about the right length. "Concise, helpful and time saving". "Didn't drone on". Several people wanted longer videos that incorporated additional and more sophisticated content (see below) and only two respondents thought the videos should be shorter.

What was good about the videos? Can you see any benefits in having access to well-made and useful videos for learning archaeology practical methods in future? These questions were asked separately but the results are combined as student responses to both were similar. Video technology provides unique functionality that is helpful for learning. Students

liked being able to pause, rewind and watch the videos multiple times at their own pace before or after classes for self-directed learning and revision. “You can watch whatever you want, as many times as you want”. “You can go back and re-watch them if you didn’t understand the first time”. “It made me more confident starting the exercises in class having a visual explanation of what is in the text book”.

Watching the videos also compensated, at least in part, for problems experienced by some students trying to learn practical methods in large classes with few staff, limited access to equipment and not enough time. One person said they preferred using videos to “asking many questions in class” which they thought was “too time consuming”. Others commented: “the [videos] were easy to hear and see what is happening, compared to class [sic]”, “a vital visual resource as the explanations before the exercises were a bit overwhelming”, “saves time, allows you to revisit and clarify, is clearer than a rushed, interrupted class presentation”, and “yes [the videos were useful] as some days it was rainy/bad weather so time was limited to actually use the equipment”.

Several students commented on the visualisation of practical tasks made possible through video. “[The videos] showed rather than explained how to perform the exercises”. “Being able to see the exercises ... provided a better level of comprehension...”. “Better understanding – visual understanding; allows for people who learn better with visual prompts to understand”. “They could explain things which could not be explained by words alone.” “Because archaeology is a hands-on discipline, seeing things in real time makes them simpler and more relevant to seeing them written down”. “As a dyspraxic student who struggles with visualisation and spatial reasoning it is vital to see activities physically acted out rather than drawn or described. [The videos] were the only effective teaching method in the course.”

Students offered many more positive than negative comments (see below) about the content of these particular videos for learning as part of the 'Field Methods' course. Most students thought the presentation was clear, well-structured and easy to follow and understand. "Well explained. Not just talking – showed the practical side". Many liked the step by step instructions and the use of text to reinforce key points and at least one person "liked the 80s soundtrack".

How could these videos be improved? What could be better?

In terms of how the videos could be improved, only one respondent commented on technical production values and thought that the sound and picture quality (through use of a tripod) could be better. Their reply to another question (see below) also showed they had experience of video production, which almost no other students did. There were very few comments on the style of the videos beyond: "could be more lively", "looked a little 70s home made", "need some cool music – got a bit bored", "you should add a soundtrack I found parts boring". Another respondent requested sub-titles, without explaining why. The very few other comments about specific things that could be improved related to presentation of content for learning: "perhaps more detail, or a little longer", "too much time on the simple tasks, maybe?", "more concise", "include examples of calculations and final product (like the baseline offset)". Most respondents volunteered no suggestions for improvement and seemed to like the videos.

Generally, how useful for helping you learn was each teaching method used in the 'Field Methods' course? This question was followed by a list of teaching methods (see above) which respondents were asked to rank on a scale of *Very Useful*, *Some Use* or *Not Useful*. Overall, the 2010 and 2011 'Field Method' students agreed on the broad relative usefulness of different teaching methods (Figure 2) although differences were apparent in the relative popularity of text-books, course notes and videos between 2010 and 2011. In both years staff lectures and staff demonstrations were thought to be the most useful teaching methods,

with students completing tasks themselves coming a close third. In 2010 the videos produced by Colley and Gibbs were considered less useful than text books, course notes and studying for exams (Figure 2). However, in 2011 this pattern was reversed with videos voted more useful overall than these other methods. Patterns in these quantitative data are hard to interpret further for reasons discussed above.

In what ways are face to face classes and hands on practical work sessions better (or worse) for learning than videos and online resources? The 2011 data was more useful for answering this question than replies from 2010 when fewer students watched the videos. In summary, the 2011 students found their learning was enhanced by the videos. They watched them before the relevant class and found that this made the practical work more efficient (less time by the demonstrator explaining basics). If they had questions they could prepare them in advance and ask them early. Nonetheless, the students strongly felt that the videos were no substitute for face-to-face learning in lectures or practical work sessions. “You have to *do* things to really learn them”. Face-to-face classes and group practical work sessions offered “engagement, discussion and hands on learning that allow you to ask questions and make mistakes ... much better than online”. “Practical work has been proven to be more effective than theoretical, i.e. you learn better when you do it rather than thinking about doing it”. “Definitely need hands on practice to reinforce what is learnt through video”. “Computers don’t answer questions”.

Some respondents commented that the videos and other teaching methods “work well together” and “you need both”. “Experiencing something for yourself is the best way to learn, but online resources and videos help clarify a week or month later for revision”. “Hard copy is helpful for understanding tables (e.g. reduced levels for dumpy) as well as seeing how drawings work, videos are more helpful for instruments”. One student liked the structure imposed by attending face-to-face classes. “Classes and pracs force me to do the work”.

If you could download videos about field methods to your mobile phone, iPod etc. to take into the field, would you find this useful? Answers from both years were broadly similar. In 2011 just under half the students said they would be interested in having iPod or mobile phone versions of the videos. “Yes, because if you are completing a task and get stuck, you can just watch the video again”. “Very! You could stop and figure it out instead of messing around with the equipment until you get it right”.. “Could be extremely useful when outside of the lecture theatre”. “I could download them and watch them on buses or the train or during breaks”. A few students asked for the videos to be made accessible via the University’s standard eLearning platforms WebCT or Blackboard rather than YouTube.

Around 15% were not interested. “Prefer to personally know the basics rather than ‘relearn’ in the field”. “No. Don’t do this”. “No. I am a technofobe [sic] and don’t like that type of thing and I can’t use them”. Around 19% were equivocal, mainly due to not owning the relevant technology. “My phone is too old, maybe if I had an iPhone”, “No – cause my phone does not allow. Yes – it would be useful.”

Do you make or edit your own videos? Have you ever submitted videos for university or similar assessment? This question produced the clearest result of the whole survey. Only three people (4%) from a total of 72 (2010 and 2011 combined) said they had any previous experience of making videos. Most people said “no” or did not answer the question. A few respondents offered explanations that indicated a range of reactions and interest. “Went to, but it was too hard to get the equipment”. “Unsure how to”. “No – not that good at computers”. “No – I’m not tech savy”. And the very definitive “No. Hate.” This result is interesting given popular assumptions that younger people are highly competent with digital technologies.

If more videos were produced to help students learn archaeology, what topics or content would be most valuable? Some students wanted videos about all practical methods covered

by the 'Field Methods' course in 2010 and 2011, not just some of them. Our small video production budget meant we had to be selective. Others wanted videos that explain particular methods further and in more detail e.g. "videos were too basic", "how to correct a slope with the dumpy – didn't understand in class", "finding a location from four compass points", "theoretical background to archaeology methods", "explain some issues and common errors made".

Some students wanted more content from actual excavations and field surveys showing how to apply techniques in real situations and how they relate to each other as part of a field project: "Make a couple more in-field examples". "Proper site examples, not pointless gardens". "Show more examples used with the method". "Overall processes of field work".

Students also suggested videos on topics not covered in the current 'Field Methods' course, especially archaeological excavation, rather than just field survey and recording methods. "Five minute video blogs about present excavations the lecturers are involved in, explaining archaeology online". "Any practical components, maybe videos on excavation techniques (physically) seeing as we don't do excavation", "The physical digging. We can't dig here so it would help". Other suggestions included photography, drawing, artefacts analysis, archaeological theory, funding and academic publishing.

Discussion

This project illustrates some challenges and also the great potential of making and using digital videos to help teach field archaeology. Our experience as archaeologists and teachers, and responses to the student questionnaire survey, provide insight into why video cannot replace other teaching methods, especially hands on practice and real-life field experience, while at the same time it is a very useful medium for teaching practical archaeology. The videos we made for the 'Field Methods' course helped students learn a set of atomised practical tasks (e.g. setting up survey gear, measuring and setting out a grid

square, drawing a simple scaled map) that are essential and useful. However, doing archaeological fieldwork involves applying such techniques in an appropriate way in an 'authentic' context (Perry 2004) to address research and other questions. Extending the video project to include further content that demonstrates and explains how and why these techniques are applied in different real field situations in an obvious next step. The digital video format is highly suited to such an exercise, and video is a good medium for providing students with a deeper understanding of practical and professional archaeology. However intellectual understanding alone does not qualify anyone to practice field archaeology. Doing fieldwork requires professional judgement, an understanding of relationships between practice and theory, and direct practical experience in applying a potentially wide range of techniques that can only be learned off campus in a field context (Colley 2003, 2007; Fredericksen 2005).

High production costs are another challenge to making video for teaching. For our project, each three minutes of video involved us in approximately three days of work. Obviously costs can be reduced by applying professional level expertise and having access to better equipment, especially faster and more powerful computers that can render video and copy large files more quickly. Professional standard equipment and software is still expensive, although rapidly coming down in price. Making and editing video is a professional skill in itself and involves a steep learning curve for beginners, especially use of higher-end commonly available editing software such as Final Cut Pro. However, as professional archaeologists we already have many transferrable skills that are directly applicable or can be quickly adapted to making these kinds of video products.

The benefits of digital video for showing practical archaeology to audiences, and as a tool useful for student learning, are well-expressed in the questionnaire survey comments. Video can show movement, sound, processes and timing that are much harder to explain in other

ways. Digital technologies allow students to focus on content they find useful, to re-wind and review what they want to learn outside class.

Video is useful for explaining small details, movements and actions that need to be seen in close-up. These can be very hard to demonstrate properly when few staff are now expected to teach excessively large class sizes with limited access to equipment and time pressures due to funding and other issues (Colley 2011). Several students commented on these aspects of the videos and the teaching and learning experience. Video can incorporate subtitles and text which makes learning easier for some students. This also has potential for presenting the same vision to audiences who speak different languages (e.g. overseas students or for international cooperation). Well made videos can also capture the 'feel' of a location and sense of physical context of places that are often important to field practice. Archaeologists already use video and other kinds of digital visualisation technologies in this way (e.g. Earl 2006; Witmore 2005) for research and public outreach.

Digital video can be incorporated into other online learning tools and technologies. For this project we made an entirely pragmatic decision to use YouTube as a platform for making video content publicly accessible. We did not incorporate the videos into interactive learning modules on the standard university platforms (e.g. WebCT or Blackboard) because the 'Field Methods' course is mainly taught in face-to-face mode, with internet technology used primarily to distribute course information and assist administration. Owing to limited computer infrastructure and expert technological support available to us through the university at the time, it was much quicker and easier to load the videos to YouTube than to have them put on WebCT through normal university processes. YouTube is specifically designed for quick and easy upload and 'broadcast' of videos of all standards of production and students can easily find and view them. Currently our videos can be viewed by anyone, not just our students. This has made it much easier to publicise and demonstrate our project to others beyond the University of Sydney. For example, teaching staff at two other

Australian universities have since advised Colley that they are using some of the videos in their own teaching.

However, we are deliberately not using our YouTube channel as an interactive social media technology that allows students or other viewers to add comments or upload their own content. When Colley first set up the YouTube channel, some visitors left inappropriate comments on clips made by Colley with other archaeologists for another project. As this project was primarily about making videos for teaching and for communicating archaeology to audiences, and we did not want to commit to the extra work required to moderate the channel on a regular basis, commenting was turned off. Embedding fieldwork videos into Web 2.0 technologies in future is certainly an interesting option for distance learning. For example, students could upload their own videos of themselves performing field tasks as part of the assessment process and there is clear and obvious potential for university staff and other professionals to upload video taken in the field to demonstrate examples and ways of applying basic techniques in a range of 'real-life' situations. Other social media and content sharing platforms may be more appropriate than YouTube for such a project. Such systems (using Facebook and other blogging and wiki technologies) have been developed by archaeologists, heritage and museum professionals elsewhere (e.g. Flinders University 2011, Webmoor 2008 and see Richards 2006). Such projects raise additional practical, intellectual property and other dimensions. One concern is digital literacy skills (cf. Russo and Watkins 2007) and the varying attitudes of students, university teachers and professional archaeologists towards digital technologies and social media (Colley 2012). Results of our 'Field Methods' questionnaire survey demonstrated very variable attitudes towards digital technologies among our students and lack of access to basic equipment. Another issue is the extent to which archaeologists employed by universities can or should make their internal teaching content publicly accessible online free of charge when universities are essentially now run as commercialised organisations who must compete with each other for income based on student enrolments. WebCT and Blackboard only allow

enrolled students to access content online. If we were to make more videos for teaching using university funding we would have to restrict access to enrolled students and be obliged to comply with recently introduced branding policies and guidelines for university website design. A final issue is sustainable digital archiving. If we just leave the videos on YouTube we have no control of what happens to them in future. We currently store copies of the videos on securely backed-up server space maintained by the University of Sydney, but if we want the videos to remain accessible into the future we need to move them to a sustainable digital archive (Carroll 2008) and are in the process of uploading them to the University of Sydney eScholarship Repository and investigating ways of making these and other digital video content available through our NSW Archaeology Online sustainable digital archive project (<http://nswaol.library.usyd.edu.au>; Gibbs and Colley, in press).

In conclusion, our project to make our own digital videos available to students for the 2010 and 2011 'Field Methods' course, and analysis of the student questionnaire survey data, raises a range of wider issues about teaching and learning, practical methods and the role of rapidly changing digital technologies in archaeological practice more generally.

Acknowledgements

Denis Gojak allowed us to use parts of his Old Marulan digital video in some of the clips. Hugh Thomas, Annika Korsgaard and Kate da Costa provided research assistance. Sarah Colley would also like to thank Russell Emmerson, Jane Simpson, Anne de Broglio and Bec Plumbe. We are grateful to ARCA2601 students who participated in the questionnaire survey. The project was part-funded by a 2009 University of Sydney, Faculty of Arts, Small Teaching Infrastructure and Equipment Scheme grant.

References

Carroll, M.S. 2008. From data to knowledge: Creating and managing archaeological data for the future. In, F. P. McManamon, A. Stout and J.A. Barnes (eds), *Managing Archaeological Resources: Global Context, National Programs, Local Actions*, p. 241-256. Walnut Creek, CA: Left Coast Press, One World Archaeology Series.

Colley, S. 2012. Digital technologies & archaeological ethics. Presentation at the *Digital Humanities Australasia 2012: Building, Mapping, Connecting [Conference]- aaDH12*. Canberra, Australia: ANU. <https://digitalcollections.anu.edu.au/handle/1885/8995>. Accessed 20th September 2012.

Colley, S. 2007. Assessment of archaeological skills: implications for theory and practice. In, P. Ucko, Q. Ling and J. Hubert (eds), *From Concepts of the Past to Practical Strategies: The Teaching of Archaeological Field Methods*, p. 183-192. London: Saffron.

Colley, S. 2011. Archaeological Field Schools and Fieldwork Practice in an Australian Context. In, H. Mytum (ed), *Global Perspectives on Archaeological Field Schools*, p. 61-81. New York, Springer.

Colley, S. 2003. Lessons for the profession: Teaching archaeological practical work skills to university students. *Australian Archaeology* 57:90-97.

Earl, G. P. 2006. At the edges of the lens: photography, graphical constructions and cinematography. In, T. L. Evans and P. Daly (eds), *Digital Archaeology: Bridging method and theory*, p. 191-210. London & New York: Routledge.

Flinders University Archaeology Blog 2011 <http://flindersarchaeology.blogspot.com>. Accessed 30th May 2011.

- Fredericksen, C. 2005. Archaeology out of the classroom: some observations from the Fannie Bay Gaol field school, Darwin. *Australian Archaeology* 61:41-47.
- Gibbs, M & S. Colley S. (in press). Digital preservation, online access and historical archaeology 'grey literature' from New South Wales, Australia. *Australian Archaeology* 75.
- Gibbs, M., D. Roe & D. Gojak 2005. Useless graduates?: Why do we all think that something has gone wrong with Australian archaeological training? *Australian Archaeology* 61:24-31.
- Hall, J., S. O'Connor, J. Prangell & T. Smith 2005. Teaching archaeological excavation at the University of Queensland: Eight years inside TARDIS, *Australian Archaeology* 61:48-55.
- Gojak, D. 2007. The 'Gojak List'; or Denis Gojak's Tips for Evaluating Your Performance as a Cultural Heritage Practitioner'. In, C. Smith & H. Burke (eds) *Digging It Up Down Under: A Practical Guide to Doing Archaeology in Australia*, p.15-17. New York: Springer.
- Perry, J. E. 2004. Authentic learning in field schools: preparing future members of the archaeological community. *World Archaeology* 36(2):236-260.
- Richards, J.D. 2006. Archaeology, e-publication and the Semantic Web. *Antiquity* 80:970-979.
- Russo, A. & J. Watkins. 2007. Digital Cultural Communication: Audience and Remediation. In, F. Cameron and S. Kenderdine (eds), *Theorizing Digital Cultural Heritage: A Critical Discourse*, p.149-164. Cambridge, Massachusetts and London: The MIT Press.
- Webmoor, T. 2008. From Silicon Valley to the Valley of Teotihuacan: The "Yahoo!s" of New Media and Digital Heritage. *Visual Anthropology Review* 24(2):183-200.

Witmore, C. L. 2005. Four archaeological engagements with place mediating bodily experience through peripatetic video. *Visual Anthropology Review* 20(2):57-71.

Figures and Figure Captions

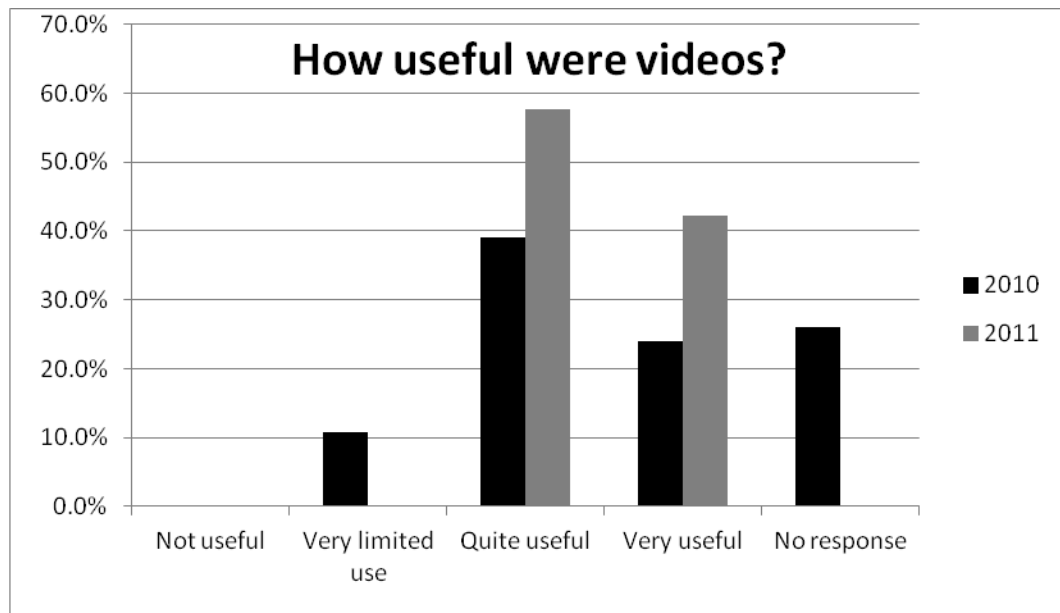


Figure 1. Comparison of 2010 (n=46) and 2011 (n=26) responses.

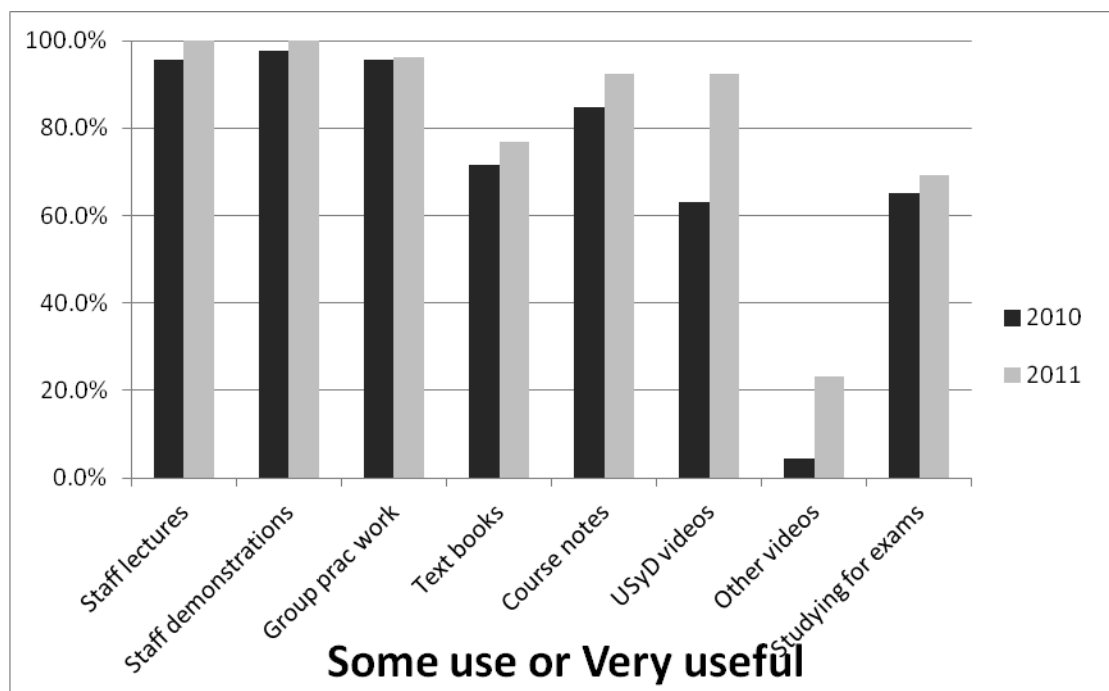


Figure 2. Teaching methods classified by 2010 and 2011 respondents as being 'Some use' and 'Very Useful'.

Author biography

Dr Sarah Colley was Senior Lecturer in the Department of Archaeology at the University of Sydney when she produced this paper. Her research and teaching interests include Australian public archaeology, archaeology and heritage of the Sydney region, and uses and impacts of digital technologies and sustainable digital archiving on the way people communicate and share archaeological information. She also conducts and publishes research that relates archaeology teaching and learning to wider issues of professional archaeological practice and public perceptions of archaeology.

Dr Martin Gibbs is a Senior Lecturer in the Department of Archaeology at the University of Sydney. His research interests include archaeology of the convict systems of New South Wales, Tasmania and Western Australia, cultural processes in wreck site formation, shipwreck survivor camps, frontier maritime industries (especially whaling and sealing) and maritime cultural landscapes. He is currently investigating the archaeology of 16th century failed Spanish colonisations of the Solomon Islands with Dr David Roe. He also has expertise in applying remote sensing techniques (ground penetrating radar, magnetometer, resistivity meter) on Australian and Pacific archaeological sites.