



Special Report

Dynamic Approaches to Teaching Lithic Technology

Using YouTube in the Classroom

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Abstract Anthropology departments in universities and museums do not always have a staff member trained in flintknapping. This can be problematic because aspects of flaked stone technology can be difficult to illustrate to students and the public without replicative demonstrations. Fortunately, there has been a recent florescence of flintknapping videos on the website www.YouTube.com. This phenomenon allows educators to expand, cost-free, their pedagogical arsenal by bringing flintknappers of all skill-levels “into the classroom.” Here we describe the advantages and disadvantages of using YouTube flintknapping videos in an educational setting. While there are ethical issues to consider, YouTube ultimately offers unique possibilities to enrich and enliven the teaching of prehistoric lithic technologies.

Despite providing a junction for science, prehistory, art, and social heritage, flintknapping remains an obscure craft (Whittaker 2004:4). While this may have to do with the expense and difficulty of acquiring the necessary materials or the time and skill involved in mastering the craft, the fact remains that most university and museum anthropology departments do not have a flintknapper on staff.

A small number of flintknapping anthropologists translates into few anthropology students holistically educated in lithic technology. This is unfortunate: knapped stone tools provide the bulk of evidence regarding human cultural and behavioral information for most of the last 2.6 million years. Given the global and temporal ubiquity of flaked stone, the correct analysis of these artifacts is vital for developing hypotheses about cultural evolution, technological change, human cognition, and social identity. Traditional approaches to teaching flaked stone tools, such as typology (Debenath and Dibble 1994), are certainly valuable for issues of identification and chronology. However, by learning how stone tools are made via flintknapping, students can formulate different anthropological questions such as those having to do with craftsmanship (Stout 2002), efficiency (Eren et al. 2008), and even prehistoric individuality (Machin 2009).

Promisingly, the use of the Internet is increasingly pervasive in anthropological interpretation and education (Clarke 2004:275). As discussed below, the ease of viewing and posting videos on the cost-free website www.YouTube.com can increase lithic literacy among students assigned to watch them. From a professional anthropological standpoint, www.YouTube.com also has tremendous potential. From documentation of archaeological experiments or discoveries, to sharing and promoting stone flaking as well as other prehistoric crafts (e.g., ceramics), a valuable “cyberinfrastructure” (Snow et al. 2006) can be built that benefits all people with interests in archaeology. Luckily, archaeologists do not have to start from scratch by building a “monolithic cyber-entity”; instead, as Snow et al. (2006:15–16) suggest, it is better to allow owners to manage and maintain their own information, exemplified by the www.YouTube.com format.

Teaching Lithic Technologies and Flintknapping

While illustrations, books, and artifact examination may provide some idea of the reductive procedures required for stone tool production, these “static” media are unrepresentative of the dynamic nature of lithic technology. VHS/DVDs are

better, but can be rare or absent in library collections or difficult and expensive to obtain. Since YouTube® videos can be emailed or spread through social networks, they can be easily accessed by students or sent as part of an assignment by an educator directly to students' email inboxes. While flintknapping and lithic analysis can be done by oneself, our own personal experience, as well as others', suggests to us that after time, a student's learning can "plateau." The remedy for this is to apprentice oneself to a Master knapper. Yet, it can be hard to find such a doyen to show subtle techniques and hand motions or to pass on tips and anecdotes. Dynamic media, like YouTube videos, can begin to fill this gap.

University educators can take advantage of the numerous prehistoric flintknapping sequences demonstrated on YouTube to highlight aspects of archaeological research (Eren 2009). For example, students viewing and reporting on a YouTube video that shows prismatic blade reduction can act as the customary "pre-lab," to which the educator can then follow up with actual artifact examination in the classroom. Further, activities that use stone tools (like butchery or hafting) can be captured on video, posted, and then compared to laboratory specimens. Finally, another interesting classroom project involves YouTube videos that illustrate flintknapping mistakes and errors. Since lithic reduction involves many steps, YouTube videos may allow students to debate at which point during the reduction sequence was the "make or break" point — an avenue of lithic inquiry not yet explored in any arena, but vital to questions of cognition, skill, and learning.

Since university educators seek not only to inculcate their students with a knowledge of flintknapping techniques or improve their abilities as knappers, but also to develop desirable learning and evaluation skills, it is worth also considering the range of learning outcomes likely to arise from using web-based replicative experiments and demonstrations in classroom settings. YouTube knapping videos present replicative knapping experiments, often as a middle range tool for understanding past behavior, and at their best, these can be informative about not only knapping techniques but also assemblage formation and discard conditions. Commentaries on ethics, identification of key artifact characteristics, illustration of mistakes and strategies to overcome difficulties, safety and responsible acquisition and discard of experimental materials, and demonstration of a wide range of technical skills and material classes derived from numerous time periods and regions across the world all contribute to the broad-ranging benefits that might arise from engaging with web-based media such as YouTube knap-

Table 1

Subject knowledge and understanding
Familiarity with the diverse sources of evidence used by archaeologists
Familiarity with approaches to the analysis of archaeological materials (such as archaeological uses of assemblage, culture and style; approaches to classification, taxonomy and ancient technology)
Understanding the causes of variation in lithic assemblages by observing the products and by-products of reduction
Appreciation of the importance of the recovery of primary data through practical experience
Understanding the concepts and application of methods used in collecting, analysing and interpreting archaeological data
Understanding the use of analogy and experiment in archaeological analysis
Broad and comparative knowledge of the lithic technologies found in a number of geographical regions
Broad and comparative knowledge of the archaeology of a number of chronological periods
Deep understanding of one or more distinct classes of archaeological material (e.g. flaked stone)
Archaeology-specific skills
Understand and apply laboratory techniques including recording and documentation, measurement, analysis and interpretation of archaeological material
Discover and recognise the significance of material remains and landscapes in accordance with the principles embodied in the International Council on Monuments and Sites Charters, relevant legislation, and the ethical codes of local archaeological associations
Interpret human behaviour across space at a variety of scales, including within sites (through excavation or survey data) and across landscapes (between sites)
Observe and describe different classes of primary archaeological data and record their characteristics
Generic skills
Produce logical and structured arguments supported by relevant evidence
Make effective and appropriate use of relevant information technology (such as web learning)
Make critical and effective use of information retrieval skills using paper-based and electronic resources, in relevant languages
Appreciate the importance of health and safety procedures and responsibilities in the field and the laboratory

ping videos. We list in Table 1 a range of skills that we believe might be enhanced by use of appropriate and tailored use of web-based media like YouTube knapping videos in the classroom. The list is based on an Archaeology Benchmarking document recently developed in Australian universities (Australian Learning and Teaching Council, 2008) to list key knowledge areas expected of Honours

level graduates. We have selected those attributes that relate to the key learning areas that may be touched on by replicative flintknapping videos.

Flintknapping videos found on YouTube also have applications in a museum education setting. Used in conjunction with an archaeology exhibit, museum visitors could access one or more videos to view a dynamic presentation of the craft to enhance their experience of an otherwise static display. Obviously, it would be preferable to have an actual flintknapper present but most museums do not have one on staff and it would be impossible for him or her to be available the entire time the exhibit was open for public viewing. Flintknapping videos could be used to train docents to better understand and communicate about the process. A short video demonstrating flintknapping would also enliven a presentation to a school class or a distance-learning program.

YouTube Flintknapping Videos

YouTube allows individuals to create their own “playlists.” Thus, an educator can tailor a lesson to a specific set of videos revolving around any number of themes: geography, raw material type (e.g., obsidian, flint), time period (e.g., Middle Paleolithic, Late Prehistoric), or reduction sequence (e.g., bifacial). However, for some particular lessons, finding videos may be difficult. Our impression so far is that New World bifacial technologies (e.g., Clovis) and blade technologies (e.g., Mesoamerican pressure blades) are overwhelmingly represented. While there also exist some introductory videos describing flintknapping basics, there are few videos discussing Old World technologies (handaxes, Levallois reductions, Upper Paleolithic blade reductions, microblade reductions, etc.), which would be invaluable for classes on human evolution.

Though video counts vary depending on which search term one uses, as of 19 August 2009 there were over 600 flintknapping videos posted on YouTube. Interestingly, as Figure 1 shows, variations on the search term “flintknapping” bring up many videos, while the search terms “experimental archaeology” and “lithic technology” do not. These, albeit rough and ready, data suggest that while flintknapping videos may indeed be educational and provide instruction, they nonetheless are produced by and for hobby flintknappers, not university educators, students, or professional archaeologists.

One flintknapper of note using the YouTube format to its full potential is Mr. Jim Winn (YouTube screenname: Paleomanjim). He is a seasoned flintknapper

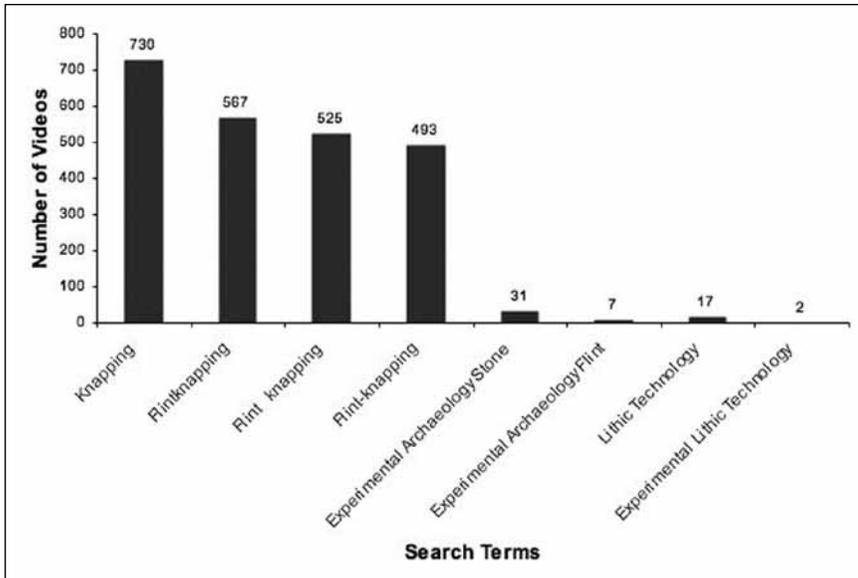


Figure 1. Depending on which search term one uses (x-axis), it is clear that there are hundreds of flintknapping videos (y-axis) potentially useful for educational purposes. However, there is a drastic difference in the number of videos one finds when using “academic” terms (“Experimental Archaeology Stone,” “Lithic Technology”) versus “non-academic” terms (“Knapping”). This suggests that the videos are posted by and for hobby flintknappers, and should therefore be carefully evaluated by an educator to ensure the video is appropriate both in content and quality.

and prolific poster of videos on YouTube. His videos range from making specific artifact types to step-by-step instruction on particular lithic techniques. His videos often show work on one particular piece from start to completion. Because of the YouTube format’s time constraints, he divided most of his videos into several parts. This enables the viewer to watch a particular knapping episode from start to finish or chose the segments that are of interest. Paleomanjim’s videos are filmed well and his voice-overs are informative and entertaining.

But not all videos represent the work of master flintknappers. The range of skill displayed on YouTube is quite broad — including experienced flintknappers sharing their expertise and novices documenting their first attempts are both represented. For this reason, YouTube may serve as an important reservoir of data regarding flintknapping skill-level studies, an important and currently “hot” topic in prehistoric archaeology (Bamforth and Finlay 2008). Likewise, the production values of the videos also vary greatly. Some are expertly edited and fea-

ture synchronized soundtracks while others include interference from overhead jet airplanes, barking dogs, and the occasional curse word.

Danish daggers, isolated platforms, Mesoamerican prismatic pressure blades, Solutrean Laurel Leaves — there are more and more unique reduction sequences posted every month. However, flintknappers are also providing new and creative ideas that push the boundaries of archaeological assumptions regarding flaked stone. For example, Mr. Charles Eaton (YouTube screename: Eaton-Charles) shows how hard-hammer percussion can result in flake morphologies that would generally be assigned by archaeologists automatically into the category of soft-hammer percussion. Perhaps less relevant, but extremely entertaining, an anonymous knapper (YouTube screename: Aquaknapper) pressure flakes a biface under water. However, as irrelevant as “scuba-knapping” may appear, the point is this: academic archaeologists busy publishing papers and teaching classes may not possess the time to investigate the material limits of flaked stone. Yet, flintknappers posting videos on YouTube are pursuing exploratory avenues that perfectly fulfill this niche. Archaeologists can take advantage of this vast reservoir to find and test new ideas against the archaeological record. We may eventually find, through innovative comparisons and rigorous testing, that some currently presumed “wild” ideas provide the most accurate reconstructions of the archaeological record.

Ethics and Beyond

There is no content ‘quality assurance’ built in to posting YouTube videos. Anybody can post almost anything and make any claims of ‘authenticity’. It is important that any educator using YouTube videos carefully the videos they select for classroom use. This is no different than anything else posted on the Internet. Of course selection of appropriate videos depends on the educational, or indeed entertainment, intent of the selector.

The fact that we found so few postings using ‘academic’ terms and concepts should make us wary about the use of some videos for academic purposes. The ability to make a particular tool’s form (e.g., a Clovis-looking point) does not automatically mean that the knapper used methods and techniques based on archaeological knowledge or comparisons. Therefore, we should critically evaluate videos before selecting them as representing an archaeological behavior. Claims of accuracy should be evaluated.

Another area where we should observe caution surrounds the fact that people can, and do, post videos without the knowledge or permission of the subject. This happened recently to one of the authors who agreed to be filmed for personal use, only to discover later that all of the demonstration had been posted on YouTube. Had permission been asked it may have been given, but the demonstration also might have been modified for this particular use. The knapper in question also markets instructional videos, one of which is on the same topic as the 'pirated' sequence. Nothing malicious was intended, but there are ethical considerations to be considered. However, many flintknappers can (and often do) elaborate on the importance of archaeological ethics. Additionally, documenting the creation of a particular stone tool helps ensure that it does not fall into the wrong hands to be sold as a genuine artifact.

YouTube flintknapping videos have other potential benefits that are only starting to be realized. As knapping catches on as a bona fide art form, YouTube videos can serve as one form of art promotion and artist identification. But more than this, learning to replicate one's ancestors' technologies can serve as both a physical and symbolic connection to past heritage. www.YouTube.com flintknapping videos provide the expertise necessary for this to happen. A comment on a video involving Caddo biface manufacture summarizes this sentiment: "My name is James and I am of Caddo blood. You do great work. I wish I could make the knife of my people the way you can."

How Could YouTube Videos be Better Tailored to, or Exploited by, an Academic Audience?

Most teaching academic archaeologists are also engaged in research to some degree, and endeavor to incorporate cutting edge elements of research and discovery into their teaching where possible. YouTube videos typically present material tailored to demonstrating techniques and material products of certain flaking processes and rarely specifically engage with archaeological interests. For example, postings rarely if ever specifically target discussion or demonstration of processes of scientific research in which a research design and hypotheses/expectations, methods, results and conclusions are presented for the subject matter as part of the video. This no doubt reflects the emphasis on replication, hobbyist knapping, teaching of craft skills and entertainment rather than academic pursuits. YouTube

offers tremendous potential for teachers and researchers to do much more than this and to tailor videos to addressing particular research questions and archaeological interests. Videos better tailored to an archaeological audience might include those presenting specific experiments in lithic technology with a commentary on research design and outcomes, covering anything from projectile macrofracture or trampling experiments to the effects of site formation processes. Educators could use YouTube videos to show variation in lithic assemblages, illustrate continuums or classificatory issues, discuss and contrast fracture or debitage features from different reduction processes, or to illustrate particular measurement techniques or analytical procedures to improve comparability between researchers or instruct students in specific techniques. Videos could also be posted to accompany journal articles, illustrating methods, results or conclusions of analyses, excavations, flintknapping or other kinds of experiments.

Currently YouTube videos tend toward showing the steps involved in producing a beautiful biface or blade core and in showing off the knappers' skill or passing on hints and tips. We less often see the failures with a commentary on what went wrong, and rarely do we see the actual flake products and other removed oddments. Greater focus on discussing the features of debitage, the strategies for overcoming problems and the points at which a reduction sequence failed might enhance the benefits of YouTube videos for teaching the reduction process, artifact identification, and laboratory analysis. Many archaeologists would be fascinated and curious to know more about the mistakes, debitage, and pieces that did not work out, as well as some commentary on skill and frequency of errors or failures. We might also hope to see more use of posted comments by archaeologists and students as a forum for discussing reduction sequences, Q&A and requests for specific information.

Once obvious gap in current YouTube content for archaeologists interested in lithics are videos specifically illustrating tool use actions and outcomes. Some aspects of tool use are not self-evident (as for instance the correct use action for certain stone adzes, drills or thrown projectiles) and difficult to learn without instruction. This could be an important resource for students undertaking functional experiments as part of training or research in usewear and residue studies. Likewise, Youtube could provide an excellent repository for videos illustrating and discussing the specific usewear or residue traces resulting from particular use actions and contact materials shown in the video.

Conclusions

We feel that archaeologists have so far failed to explore fully the power and potential of YouTube videos as a means of presenting, discussing, and storing information of direct relevance to the discipline. We encourage archaeologists to begin to design and post videos that more effectively exploit the potential of online videos to enhance pedagogical and research interests and outcomes of specific relevance to our discipline.

Not everyone has the time, talent, or desire to become a master flintknapper. Nor, we feel it very important to stress, does an anthropologist have to become a master flintknapper to become an expert on prehistoric stone tools. However, multiple approaches to any topic of learning or research can enhance and enrich the information, and subsequent interpretations, that come out of it. In this paper, we have identified a unique and cost-free educational resource that, when used appropriately, can substantially enliven the teaching of prehistoric lithic technologies. By linking students and anthropological educators with the flintknappers on YouTube, we hope that a synergy develops that pushes education and research into new and exciting directions.

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