

**Silent witness, using video to record and transmit tacit knowledge in creative practices.**

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"My method of working engages simultaneously with the two problems of what is to be learned and how it will be learned."

# Silent witness

## Using video to record and transmit tacit knowledge in creative practices

Over the last ten years, the duration of my ongoing practice-led design research work, video recording has developed from an expensive luxury to being ubiquitous. Whilst this opens up many opportunities for documenting and disseminating research projects, there are also potential drawbacks.

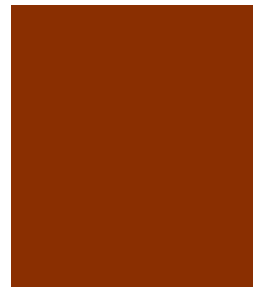
I am a multimedia designer who makes extensive use of video both as an observational tool and as a means of helping convey tacit / experiential knowledge in creative practices. In this paper I will discuss the use of video for such purposes, drawing on my own experiences and the research of others who use video in research.

### BACKGROUND

My research brings a designerly approach to the problem of capturing and passing on the skilled knowledge of expert craft practitioners. It follows a ten year investigation into tacit learning and multimedia and has led to an understanding of how craft skills may be elicited and embodied in learning resources.<sup>1</sup>

During this time I have worked closely with a wide range of craft practitioners, mostly from traditional British crafts with a focus on wood working and metal working. The craft skills they possess represent an important part of our cultural heritage but are in danger of being lost because many of them work alone and have little experience of, or interest in, teaching others their skills. My aim has been to record their practice in a way that enables those wishing to learn the skills to build their own knowledge.

My most recent work has been with craftsmen who use traditional techniques to make timber framed buildings. In August 2010 I travelled to Japan with a group of these craftsmen who come from various European countries to document a skills exchange project they were undertaking with a group of Japanese carpenters (Wood 2010). Together they built a traditional Japanese tea house and European pavilion using only hand tools and timber felled on site, working on each others buildings and using each others tools to gain experience of their different techniques.



**Nicola Wood**, PhD, is a multimedia designer and researcher at Sheffield Hallam University, investigating the use of digital media to support independent learning, addressing the problems of professional skills learning and transmission of tacit knowledge. Her earlier research has explored the design and use of multimedia as a means of recording and passing on the skilled knowledge of master craftsmen to new generations of craft practitioners.

1. This research has been carried out in association with Professor Chris Rust at Sheffield Hallam University and funded by the UK Arts & Humanities Research Council.

I have continued to work with one of the craftsmen from this project, Ulrik Hjort Lassen a doctoral student at Department of Conservation, Gothenburg University, who has been undertaking research into traditional methods for scribing the timbers for such buildings (Hjort-Lassen 2009). He had been making and testing learning resources for the French ‘piquer au plomb’ technique, applying some of my methods for transmitting craft skills (Wood 2006).

My method of working engages simultaneously with the two problems of what is to be learned and how it will be learned. It brings together experienced practitioners, learners and designer in hybrid activities that provide an arena for generating understanding of skilled practice, embodied in learning materials rather than stated explicitly in formal conclusions.

A central feature of this practice-led research is the use of video to record the practical knowledge of skilled craft practitioners and make it accessible to those wishing to learn the skill. To observe authentic activity often involves working in locations that are highly compromised by bad lighting, difficult sight lines and shifting objects of attention.

#### PRACTICE-LED RESEARCH AND TACIT KNOWLEDGE

Practice-led research and tacit knowledge are core concepts in my method of working with video record.<sup>2</sup> Methodologically, practice-led design research has much in common with action research, but for the latter there exist a range of definitions many of which are fundamentally different from the sort of research undertaken by myself and many other designer-researchers.

The action research definition provided by Archer (1995) has some accord: “systematic enquiry conducted through the medium of practical action, calculated to devise or test new, or newly imported, information, ideas, forms, procedures and to generate communicable knowledge.” However, many protagonists’ theories are more firmly based on the original concept developed by Kurt Lewin in the 1950s centred on an ‘action research spiral’ involving cycles of planning, action and fact-finding about the results of the action (Smith 2001). Whilst these elements are clearly identifiable in practice-led research, they do not occur

2. This passage is based on Wood (2006) *Transmitting craft knowledge: designing interactive media to support tacit skills learning*. PhD thesis, Sheffield Hallam University, available from <http://www.nicolawood.net..>

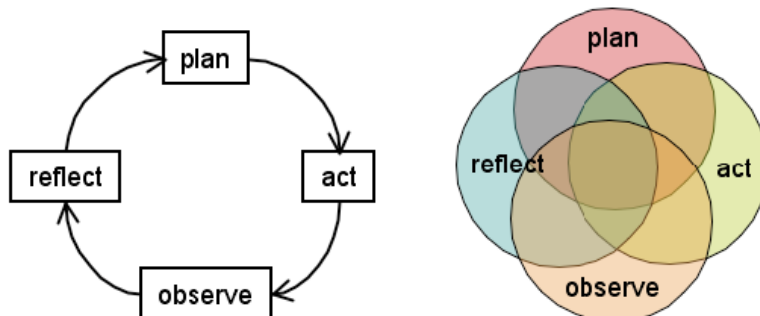
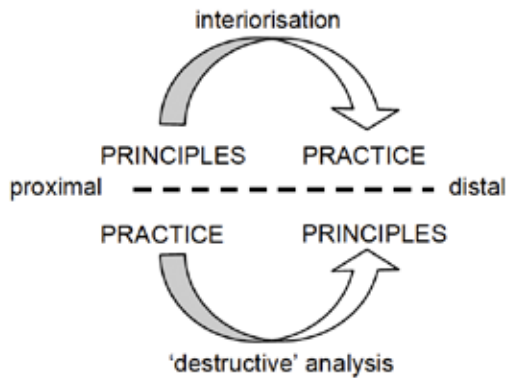


Figure 1-2. Action research (left) and practice-led research (right).



**Figure 3.** Interpretation of Polanyi's theory. This is purposefully represented as two separate processes above and below the dotted line as I do not wish this to be interpreted as a cyclical process.

as a sequence of separate and logically undertaken steps, rather the boundaries are blurred and at times elements are undertaken simultaneously.

So, the process of practice-led research is far from linear or iterative, but rather one of varying degrees. At times 'practice' is more dominant and at times 'research' is more dominant but at all times there is a tendency to be both practitioner and researcher.

The tacit nature of a craft practitioner's knowledge leads to it being largely internalised, often demonstrated by the difficulty articulating craft knowledge. The theory governing such a craft practitioners' actions is often only known through their undertaking those actions (Polanyi 1966: 17). On a purely functional level, tacit knowledge might be seen as offering advantage to the craft practitioner by reducing cognitive load, freeing the mind from one level of a task to enable thought to be directed at another.

To explain tacit knowing at a deeper level, Polanyi (ibid p. 10) proposed that it had two terms: the proximal (that situated nearer to oneself) and the distal (that situated further from oneself). He described the functional relationship between these terms as knowing the proximal only through what it tells us about the distal. Hence practitioners only know the tacit principles that govern their practice through their effects whilst in the act of undertaking that practice. Polanyi (ibid p. 17) further described the phenomenal structure of tacit knowing as attending from the proximal to the distal. The practitioner attends to the distal, the result that they are working for. They do this from their tacit principles and those principles can only be learned through practising their use, a process he called interiorisation.

Polanyi also considered the reverse of this process, where the focus of the practitioner's attention was returned to the principles. The immediate result of this is often a complete loss of meaning; "By concentrating attention on his fingers, a pianist can temporarily paralyse his movement" (ibid p. 18). However, Polanyi believed the long-term effect need not be negative, destructive analysis of such knowledge followed by re-interiorisation could result in a better developed basis for practice (ibid p. 19).



**Figure 4.** The author video recording the construction of a timber framed building during a Japanese / European skills exchange project.

## VIDEO OBSERVATION

The use of video for observation has the advantage that it can accurately capture very rich material, but there is a danger that the act of observation will change the situation being observed. On most occasions researchers are wishing to observe authentic activity rather than a performance for the camera. In my experience successful video observation depends on careful selection and use of equipment, along with good interpersonal skills to ensure that recording results in a useful record but does not intrude on the activity.

My aim is always to limit the intrusion of the recording process by using as little equipment as I can. Firstly I favour a very small (and often inexpensive) digital video cameras; as the footage is primarily for my own research purposes it does not have to be top quality although nowadays even very small cameras can take HD footage.

Wherever possible I use a tripod so I can keep my distance from the camera, favouring a G-clamp mini tripod that can be discreetly attached to a shelf

or door frame (Wood 2006: 21). If I need to be mobile I work with a monopod which takes up minimal room and allows me to move around quickly and quietly (see Figure 4).

I have also learned how to make the best use of natural light and find that additional lighting is rarely necessary. External lights tend to be very intrusive, making people feel very self-conscious about being under observation, as well as often making rooms very hot when working indoors.

Modern video cameras also have exceedingly good internal microphones which in most circumstances will capture sufficiently good audio for research purposes so there is no need for the intrusion of external microphones. When I have worked in very noisy workshops though, I have used discreet wireless lapel microphones that can pick up nearby voices whilst suppressing the sound of machinery behind. This however led to the need for a more sophisticated camera to take the audio input, but again I attempted to minimise intrusion by using a cut-down professional camera designed for TV documentary makers<sup>3</sup> (Wood & Horne 2008).

3. Sony HVR-A1E miniDV camera.

The behaviour of the researcher is easily as important as the equipment that is used. As Hutchinson et al comment in their workbook *Modern media and reflective practice* (1995: 15),

“... you must be aware of the threat of the medium and seek to assure those you use the medium with. You must attempt to suppress your own ego and respect the individuals who participate with you in this project. Always be overt with your aims and intentions, let people get used to the camera, you are not directing you are observing, video in this project is assisting your observation. ... the only way to achieve this is to use the camera with people rather than on them.”

In his research, Hawson (2006: 106) sought to give his participants an understanding of the importance of video recording to the project, and suggested that using the equipment right from their first meeting “helped reduce camera and microphone shyness.” Leon (2005) refers to his attempts at becoming invisible as he undertakes his research. Given a limited time span with those he is observing, he seeks to rapidly acclimatise them to his presence, relying on “interpersonal skills to gain intimate access and rapport to sustain the observation.”

In my experience there are a few, simple, practical steps that can be taken to help put participants at ease. I find it worthwhile spending time in advance becoming familiar with the workings of my equipment so I can use it with confidence, and I aim to minimise interaction with it whilst I am recording.

If I am hand-holding a camera, I try to keep it at waist level and use the external screen to frame the shot; this is far less intrusive than holding it in front of my face. I prepare and test all my equipment before I start, keeping a spare tape/memory card and battery in my pocket ready for a swift change-over.

I find if I am calm, confident and relaxed with my recording equipment, my participants are more likely to be so too.





**Figure 5-6.** A traditional Sheffield knife maker (left) and knife blade grinder (right) who both worked with the author during research.

## PROCESSING VIDEO DATA

The large volume of both visual and auditory data captured during video observation can present a challenge both for the immediate processing of the data, and making it accessible longer term during ongoing research. The more video that is captured, the more difficult it is to effectively index it, to make it usable and allow subsequent review of the material.

The social science approach to processing video and audio recordings is to use qualitative data analysis software such as Atlas Ti, NVivo or Transana which enables the dialogue to be fully transcribed then coded, mapped and linked. However, this is very time consuming if a significant amount of material is involved, so often the initial process is undertaken by a professional transcription service. This results in the researcher mostly engaging with the transcripts rather than the raw video data.

In my experience, reviewing the video in full myself shortly after the event is very enlightening. It has enabled me to pick up on subtle occurrences that I had not seen the significance of when I had been filming and to reflect on my own role as a researcher (Wood 2006: 23, Wood & Horne 2008). Similarly Hawson



**Figure 7.** The author being filmed by a conventional cameraman whilst carving spoons during a Japanese / European skills exchange project.

(2006: 147), a furniture maker whose research involved a series short work placements with Icelandic craft practitioners, highlights the importance of reviewing his video record as a reflective tool when subsequently undertaking work in his own workshop.

As I watch the video I use an approach I call “event logging” which quickly produces a concise narrative that acts as a key to the video for later use (Wood 2006: 22). As Buur et al (2000) propose, “video recordings ... are no longer hard data but rather the first attempts to create stories that frame the design problem and impose order on the complexity of everyday life.”

I produce my logs using a table in a Microsoft word document with one column for the video time code and one for a description of the event (see Figure 4). The digital versions are easily searchable and the paper versions soon become annotated with marginal notes and highlighter pen as I work to make sense of my observations.

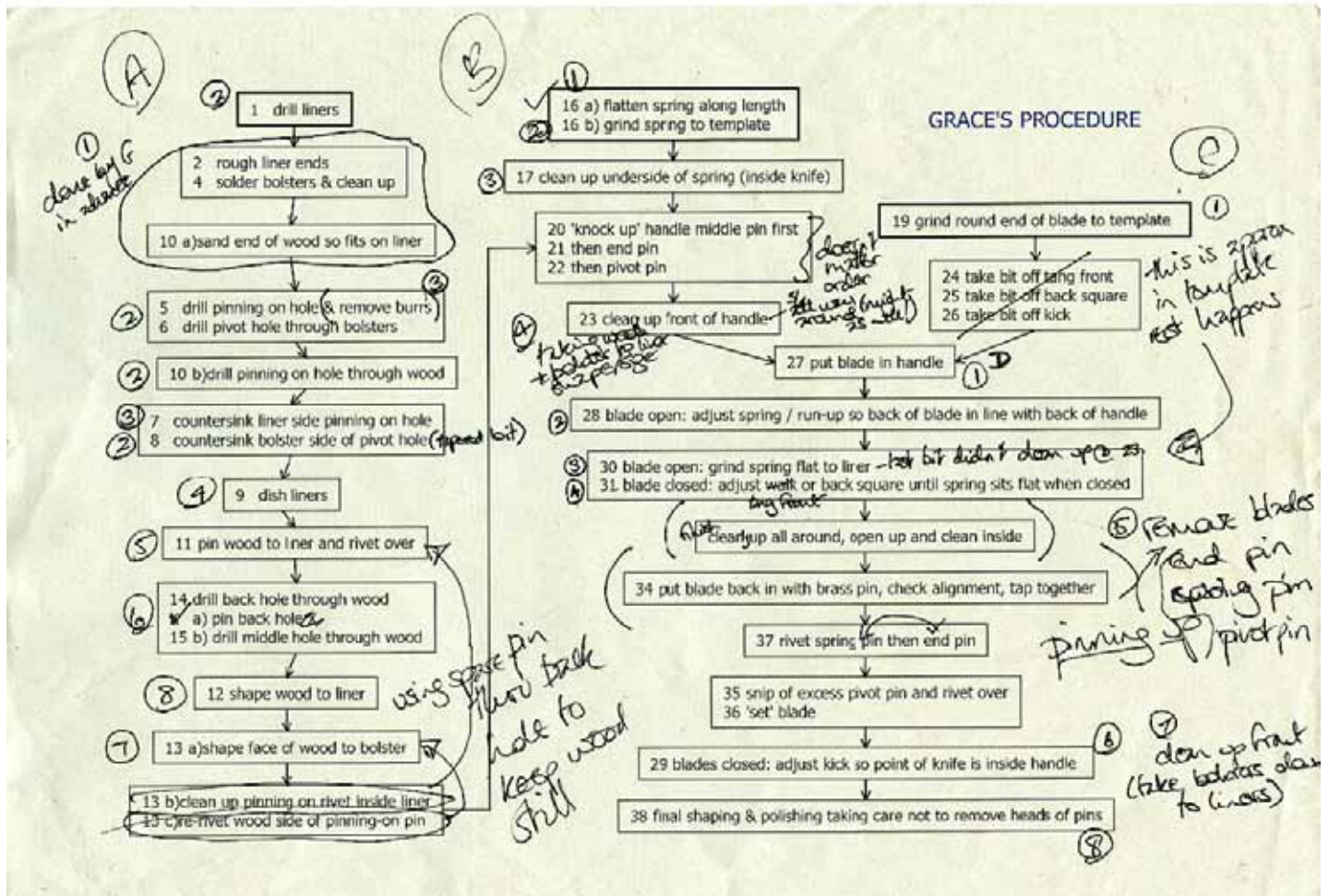
In this instance I was using the video to examine a craft practitioner’s procedure, so used the event logs as the basis for a flow chart summarising the key points observed. This flow chart was subsequently used by a more novice practitioner to test the procedure, with the event log providing a link back to the key points in the video which the learner watched when clarification was needed (Wood et al 2009: 5). The final outcome of this project was an online learning resource, a public version of which can be seen at <http://foldingknives.blogspot.com/>

Whilst this example is specific to this particular aspect of my research, very

Figure 8. Section from a video event log showing annotations highlighting key points in the procedure of the craftsman being observed.

- X 170*
- 1.06 T getting in and finishing off.
  - 1.07 T having a go at G fiddling too much.
  - 1.08 Changes belt then fining backs of blades.
  - 1.09 T puts knife back together - closes it and taps with a hammer.
  - 1.11 T telling G to come with an exercise book when he's not busy and write down in order what to do. G says she can get it off the tape. T says yes but I haven't said much.
  - 1.12 G fining the backs of her blades.
  - 1.13 Now putting in the brass pin when putting it back together - tapping pin and bolster to make sure not separated.
  - 1.15 T snipping off excess pin and riveting it over - then uses the swage end of the hammer to spread the rivet more.
  - 1.16 T hitting it on the sides to set the blades and taps down the spring.
  - 1.17 G doing hers - t stops her as she hasn't left enough of the pin sticking out then cut a bit more off other side.
  - 1.18 T explaining how to use hammer to spread pin
  - 1.19 G using swage end of hammer.
  - 1.20 T finishing off - G realises she has been working with the blades open and T had had his shut.
  - 1.21 T riveting over *some* middle pin and one at other end, then G doing hers
  - 1.23 G concerned about gaps between liners and springs - T reckons its ok but taps it a bit closer himself.
  - 1.24 Don't get it too hot or the spring will get coloured and will lose its temper and there is no way of getting at it now. Goes around end first - roughing - then from bolster to end.
  - 1.26 G doing hers - T keeps chipping in and telling G what not to do.
  - 1.27 T demos a bit then G does again (T goes away this time).
  - 1.28 T says that's lovely, then starts roughing sides of bolster - taking edges off.
  - 1.30 G can't remember which way around to hold it - T comes back to show her.
  - 1.31 G thinks she's made a mess of one edge - T comes to sort it and redoes them all.
  - 1.32 T changes belt then takes corners off length of wood - reminds her not to take too much off.
- rough to cut*  
*spring blades*

Figure 9. Flow chart developed from the key points highlighted by the event log.



commonly I use the logs for more general purposes such as locating key pieces of dialogue which might subsequently be transcribed in full, identifying discrepancies between what participants have told me at different times, or simply locating important pieces of footage for use in presentations.

In my experience, event logging is both an effective means of reviewing video for immediate reflection and also provides an efficient method of subsequently accessing video data.

## VIDEO AS AN OUTPUT OF RESEARCH

Finally, there is the use of video recordings as an output from research which, from my perspective, falls into two areas. First is the use of video for instruction, which had been my initial intention when I started filming craft practitioners, although subsequent experience has revealed that it is only suitable in certain circumstances. Second is the use of video as a means of disseminating research, which I believe opens up some exciting opportunities in the context of creating online multimedia documents.

When I first started working with craft practitioners I had imagined video providing the key to recording and transmitting craft knowledge (Wood 2003) as it is commonly used for that purpose; the “How to” section on the video sharing site YouTube has many thousands of videos covering a wide variety of topics. The HandMade project by DistanceLab [online] claims “HandMade captures an immersive record of the way someone uses their hands. ... The point-of-view camera angle allows viewers to map hand movements more directly to their own bodies, enhancing the ability to learn these techniques in the absence of the subject.”

HandMade provide no substantiation for that claim and my experience leads me to believe that such video is only useful for those already experienced in the skill. In my own research I have found that, for the beginner, video is a very difficult medium to learn from. In my work with wood turning learners I found they were keen to watch video of the expert demonstrating, but frequently struggled to relate what they had seen to their own work (Wood 2006: 126).

My interpretation of this is that, for complex skills, a large proportion of the knowledge of the expert performing the demonstration is tacit, so video has a tendency to conceal rather than reveal the practice. The expert practitioner makes the task look easy, tacitly responding to subtle cues that may be any combination of kinesthetic, visual, auditory or olfactory. Whilst they may be able to verbalise some of this, much will remain unspoken. The observer has to interpret what they are seeing themselves and attempt to replicate it in their own activity, a difficult task for the novice.

In response to this I have developed a multi-layered approach to interpreting the skills I have been recording, using interpretation based on images and text as a starting point for novices, providing them with a bridge across the knowledge gap between themselves and the expert (Figure 11). Video remains an



Figure 10. A learner watching video whilst learning wood turning skills.

important medium but is used for contextualising each stage of the process and for more advanced learning where the learner has the ability to form their own interpretation (Wood et al 2009: 3).

Finally, there is the use of video in disseminating research and in particular creating multimedia rather than paper-based documents as an output of research projects. When I was working on my PhD I had a feeling I wanted to produce a multimedia outcome rather than a traditional thesis, but by the time I was writing up my urge to finish overcame my desire to be experimental!

However I had the opportunity to progress the idea two years later on completion of my post-doctoral research project. The Transmitting Craft project involved working with traditional Sheffield knife makers to record their skills and make them accessible to a new generation of creative metalworkers. This research saw a major shift in my working practices away from highly structured conventional multimedia materials to the use of online web 2.0 resources that invite participation and encourage collaboration. In this project I used a private wiki<sup>4</sup>, initially to share with co-researchers the interpretive materials I was developing, and subsequently as a prototype learning resource to gain feedback from participant learners.

Working in this way presents a challenge to the designer who is used to hav-

4. On-line software that allows users to collaboratively create, edit, link, and organise the content of a website.

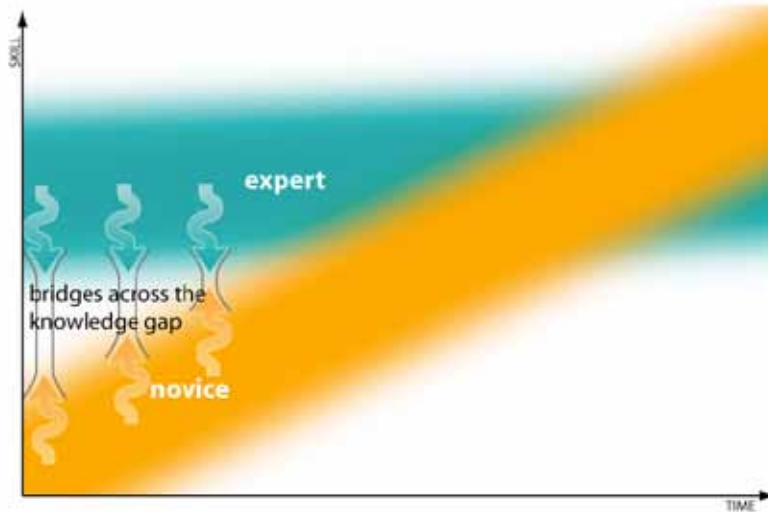
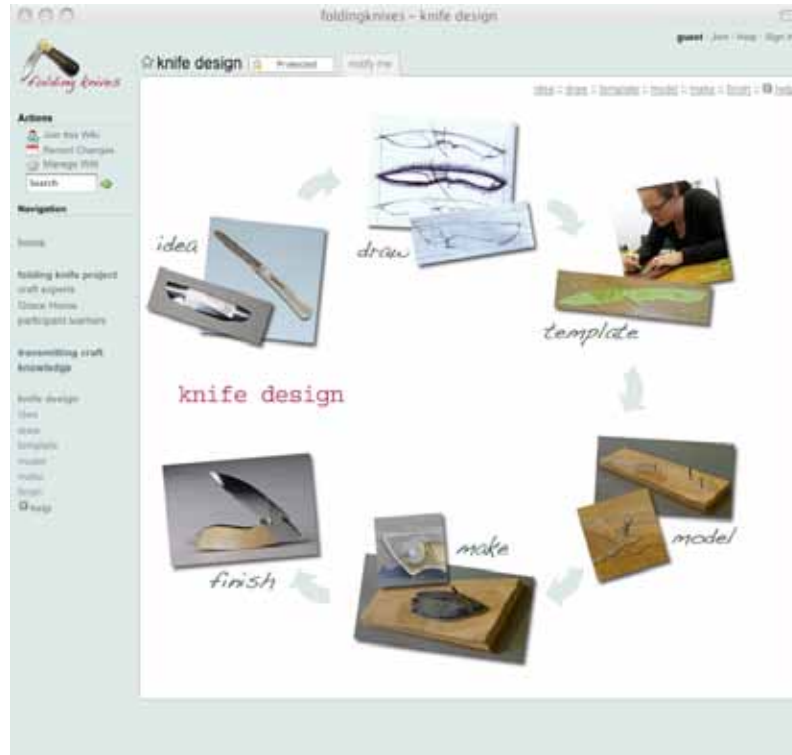


Figure 11. Interpretation offering bridges across the knowledge gap between expert and novice at an early stage of development.

ing close control over what is produced. Firstly, the wiki software offers only fairly basic formatting options, and secondly content can be generated by other users over which the designer has limited influence. However, my experience was that the benefits of being able to quickly generate content and the ease of sharing and collaborative working far outweighed these drawbacks. I also soon learned to manipulate the layout tools that are provided to produce a more ‘desgnerly’ output.

The two major outputs from this project were also initially produced using the wiki but have now been moved to a blog that similarly allows static content and also easy editing. These are a public version of the learning resource (Wood 2009a) and the final project report (Wood 2009b) which was primarily for the body who funded the project, but has also made accessible to the wider research community by publishing in this way.

Whilst in many ways this is a relatively modest achievement, it is significant because it enabled me to make accessible images and videos from the research alongside more conventional text and academic papers, and can continue to grow as we continue to write about the project. More recently I have been working on research projects outside my own field of enquiry, for which my remit has been both to document research methods and produce an observational record. For these I have produced multimedia outputs which have produced a more rich documentation than conventional publishing and made the research more widely accessible (eg Keypiece 2009).



**Figure 12.** A screenshot from the knife making learning resource web site.

## CONCLUSION

There is an increasing use of video in practice-led research because the equipment and consumables have become easily affordable. However, care needs to be taken if the resultant footage is to show authentic activity rather than a performance for the camera. Researchers need to be familiar with their recording equipment so they are relaxed and confident with it and develop their interpersonal skills to put those they are filming at ease.

Additionally the sheer volume of data generated by video can render it virtually unusable unless a strategy is developed in advance for how the footage will be processed. If this is contracted out to a third party a valuable opportunity to reflect on what has been recorded will be lost. Taking the time to review the material personally and also creating a concise log of the content enables immediate reflection and provides an index for future use of the footage.

Finally, video is an engaging medium that is useful as an output of practice-led research. For instructional purposes it needs using with care and often an interpretive layer is necessary as video of a skilled practitioner can conceal as

much as it reveals for the novice. However, it offers much potential for conveying rich contextual information about the research undertaken and can form an important part of an online multimedia document that can make research outputs widely accessible.

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