Design Lessons from Deployment of On-demand Video

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ABSTRACT
Streaming video to the desktop is increasingly widespread. A key application is in training, making information available over the Internet or corporate intranets, in real time or as archived presentations. How should a presentation be redesigned for retrieval and viewing on demand? Detailed examination of usage logs of 6000 corporate on-demand video sessions provides suggestions.

Keywords
Video on-demand, streaming media, digital library

INTRODUCTION
With the steady rise in desktop computer performance and network bandwidth, on-demand digitized video will be routinely available in workplaces and educational settings. Digitized video presentations are not without cost and do not provide the same opportunities for direct interaction with a speaker and audience, but they provide several compensatory advantages. The content can be watched anywhere and anytime by audiences of any size. VCR-like operations and advanced compression and indexing methods can be made available. Viewers can time-share activities, selectively watch sections, or ‘leave’ without offending a speaker.

A single presentation may now be given to a live audience, with other viewers watching from a distance through videoconferencing or desktop videoconferencing, and yet other viewers watching later via archived video on demand. The presenter may have to develop materials and presentation style with all three audiences in mind.

In this paper, we focus on on-demand viewing. Just as designing text for effective viewing on the Web differs from text designed for other reading situations [1,2], speakers may wish to tailor presentations specially for on-demand viewing.

THE SYSTEM
Microsoft Technical Education (MSTE) provides internal technical education on a range of topics to employees. Over a year ago MSTE started making digitized videos of these talks available on an intranet web site and collecting detailed logs of system use.

The interface to a technical talk is three web-based frames: video of the presenter in the top left, a table of contents (TOC) in the bottom left, and the speaker’s PowerPoint slides in a large frame on the right.

The slides change automatically in synch with the video. The TOC contains one line for each slide title. When a TOC entry is clicked on, the presentation jumps to the corresponding spot in the talk. Audience questions are added to the TOC during the post-presentation preparation of the archived digitized video.

MSTE USE
From July 1997 to June 1998, 163 talks were digitized. Most were between 30 minutes and 2 hours. Over 2000 employees accessed archived presentations, 6685 viewing sessions in all.

Every viewer interaction with an interface element, such as TOC entries or play, stop, and other video controls, is logged. These records, numbering over 115,000, are the basis of our analyses, together with some interviews.

![Figure 1: User sessions by month and user type.](image-url)

Figure 1 shows the number of sessions by month (the drop in November and December reflects an interruption in logging during a system change and break in operation). Users are segmented into those who only accessed one video all year, those who accessed 2-4, 5-9, and 10 or more. These data indicate that MSTE steadily drew first-time users. In fact, 1234 of 2096 users only used MSTE once. However, the other 800 viewers accounted for over 80% of the accesses, so the results below are not inordinately due to one-time use.
Is the viewing of a talk concentrated in the days following its presentation? Figure 2 shows that this is not strongly the case. This has implications for operation (archiving video takes considerable storage) and also for presentation design.

Figure 2: Average number of distinct users accessing a talk as a function of weeks since the presentation was given.

Another interesting question is what percentage of a talk was watched? As shown in Figure 3, 51% of the sessions are less than 5% of the talk length. Although many longer sessions occurred, this surprised us. In addition, there is not much difference depending on frequency of accessing MSTE, although the most frequent (10+) viewers may be more likely to watch most or all of a video.

Figure 3: Session duration by length of talks.

Figure 4 shows the likelihood that a given minute of the video is being watched. Figures 3 and 4 have design implications. A live audience is less likely to walk out five minutes into a presentation. For on-demand viewing, presenters must pack an overview and major points into the first several minutes.

Figure 4: Viewing likelihood minute by minute.

People do use the TOC to index or jump into the video, and their use does not vary significantly for light and heavy MSTE users (Figure 5).

This also has design implications. In a live presentation, a slide can be understood by its context: its title can be whimsical or elaborated by the speaker. MSTE users rely more heavily on slide titles and slide contents when they inspect the TOC and jump from slide to slide. Presenters should put much more thought into slide titles and the clarity of slide organization and emphasis. They might also put more content on slides, sacrificing a little clutter for the live audience to provide clarity to later viewers.

Figure 5: Jump (TOC use) statistics.

CONCLUSIONS AND FUTURE WORK
MSTE use provides evidence that video on demand is used and may be worth the effort to make it available. We also find strong evidence that effective design of video presentations for access on the Web, like designing text for the Web, requires new approaches based on understanding the use of this potentially powerful educational medium.

A longer version of this report may be accessed at http://www.research.microsoft.com/pubs/ (search for “on-demand video”). We are presently extending these analyses, interviewing MSTE users, and extending the duration of the study.

ACKNOWLEDGMENTS
Thanks to the Microsoft Technical Education Group for giving us the data and Mary Czerwinski who reviewed the paper and gave us valuable suggestions for improvement.

REFERENCES