

## Virginia Tech Digital Library Scenario

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for VTLD Planning, June 1998

Dr. Charity Miller is a specialist in history of technology. Today she is beginning a new research project in the history of photography. Dr. Miller is technically adept, as one might guess from her specialty, and has taken the time to load a VRML browser onto her high-end desktop computer. Thus, she interacts with the VT digital library through its virtual reality presentation mode, using keyboard and mouse. As Miller enters the virtual library, a keystroke takes her to her private space, her virtual carrel. Her carrel appears as a room with bookshelves, filing cabinets, and work surfaces. Art from the Tech electronic collection adds character and elegance to the space, while search and authoring tools are iconified as virtual objects resting on furniture or mounted on the walls. In one corner is a wooden case with many small drawers -- Miller's personal card catalog. Miller decides that she will ease into her research with a Web search, and uses her mouse to activate a Web searcher mounted on one of the walls. The Web searcher is an off-the-shelf tool, not part of the virtual

environment, and so the view of her carrel is temporarily overlaid with a more prosaic browser window. The searcher has been "wrapped," however, to fit into the VTDL environment, so when Miller finds a page of interest to her, she is able to export it directly to her DL work space. When she puts the browser away, she finds several new documents, iconified as pieces of paper, in the area she has designated "new." Using standard mouse gestures, she moves these to a new workspace on the carrel desk that she will dedicate to her photography project.

Miller is now ready to get serious. She activates a library catalog searcher, and selects a search of the entire OCLC WorldCat. The catalog searcher is a fully integrated part of the VTDL. Results from her search appear in her workspace as a bank of catalog cards, slightly offset so that short descriptions at the top of each one can be read. As she clicks through the list, details of each work are displayed, including whether there is a paper copy available locally or a digital copy accessible anywhere.

At this point in her research, local availability is not Miller's primary concern: she is interested in determining the most authoritative sources in

her new area. As she finds candidate sources, she drags copies of the virtual cards to her photography area. She also takes copies of some cards, both on her new topic and in other areas of interest, and drags them to her virtual card catalog. The personal card catalog holds metadata on all of the interesting documents she has accumulated in her research history in the VTDL, accessible by all of the standard library access points, but also viewable as a shelf-list (call number ordering), and by any personal notes that she has added to them.

One card refuses to drop easily into the catalog, requiring an additional click before it will gracefully disappear. Miller glances at it. The card now has a golden edge along its top, indicating that automatic quality rating mechanisms at work in her personal catalog have recognized it as a high-quality source. This could have happened in a number of ways; this time the rating is caused when the card catalog recognizes the work as one that was already flagged as high quality by other sources. Miller had not previously noticed this work: she had dumped it into the catalog with a bibliography of works on another topic, but it had a high rating already due to the source of the bibliography and

through quality tags added by library bibliographers during collection development. It is the coincidence of these ratings coupled with her action today in selecting the source that brings the work into a "gold" rating.

Before she completes the action of dropping the card into the catalog, Miller brings the card back to viewing distance, giving her access to the information and methods associated with the work. The work is not currently available in digital form; nor does the VT Library own a paper copy. A small icon on the card, however, allows Miller to forward the metadata to her Interlibrary Loan department as a request to borrow. That done, she continues her searching and filing.

When she has sufficiently digested the national search, she turns to sources available in the local library. She can use the same catalog searcher and the same query -- all her old queries are saved by the search system for easy reference -- this time restricting the scope of the search to the local collection. The library collection of a research institution like Virginia Tech is a finding tool in itself, as anyone knows who has browsed the stacks looking for books. Miller picks a point

in the stacks where several relevant books have been filed, and using one book as a clue, clicks herself to the virtual stacks. There she can see in filing order every book that the library owns in this range, even ones that are currently circulating or are physically in storage. Books in the VR stack are accurately sized by physical description and page count information from their MARC records. They can appear in random colors or be color-coded by quality, relevance to a search, or various other criteria. Titles and authors are uniformly clear on their spines when her point of view draws close and full metadata can be displayed for each one.

One primary advantage of the virtual stacks is that they can be displayed in a variety of orders, including LCCN, Dewey number, LCSH, and author, with books appearing in multiple places for multiple access points. Another is that unlike her personal carrel, this virtual space is shared among VTDL users. As Miller wanders through the stacks, she may encounter other researchers who are browsing the same section, with the possibility of serendipitous conversation and collaboration.

By this time Miller has a pile of documents, another pile of card images that will become the working bibliography for her research project, notes made concurrently on a word-processing tool, and a section of cards in her virtual card catalog. Now she is starting another document -- a list of works to retrieve from the library, assembled automatically in shelf order as she selects books in the virtual stacks. She could print this and carry it to the stacks, but today she chooses to email it directly to the VT Library Document Delivery department, which will pull the books for her and bring them to her office. In the meantime she is ready to assemble some raw research material. As a professional historian, Miller is of course familiar with the digitized photographs in the American Memory Project. She returns to her Web browser to access the project: as she discovers examples illustrating technological change in photography, she can again export them as undifferentiated documents to her workspace. There is a collection much closer to home, however; Virginia Tech has recently digitized its own photograph collection. Since these are now part of the VTDL, Miller has more control over how they appear to her and what she can do with them. Starting with a tantalizing example from the

American Memory collection, she cuts the JPEG image free with an off-the-shelf HTML editor and passes it to the VTDL image indexer. The indexer generates a signal from the image and matches it to the local collection of images. This produces a set of similar images, many of which are interesting to Miller. None, however, is quite what she is looking for.

Technically speaking, there are a number of reasons for this. Intuitively, the reason is very simple: Miller is looking for something new. The signals generated from images in the collection and the similarity functions used to match them have been optimized to produce good matches based on what people have looked for in the past, not what she is looking for today. Undeterred, Miller marks several of the images as likely prospects and turns to a collection visualization device.

The collection visualization device shows the entire VT image collection as a topographical map. The X- and Y- axes of the map are meaningless, but documents near each other in the map have similar visual content. Where many images map to the same point, the map pulls up into a mountain. Miller's marked documents can

be seen on the map as widely distributed points. Her goal is to bring the points together and see what other images cluster around the new group. The visualization system is some assistance in this, using heuristic methods to search for maps that bring her documents closer to each other, but Miller also uses overt controls. In the end, she discovers a set of photographs with which to begin her historical investigations.

[ TO BE CONTINUED ... What is the next step? Obviously, Miller can collect digital works into her carrel, where they might appear as a shelf of books. But we might best concentrate on publication. How is the VTDL of use in producing and disseminating her next paper? ]