The Importance of Proper Scanning

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Why is this topic important?

- Proper scanning goes hand-in-hand with the habit of making documents accessible.
- A growing number of people are relying on digital formats for readings instead of physical documents.

What do we mean by *scanning*?

- Scanning of any physical document.
- OCR scanning of any pre-existing image-based file.
- Editing of third party digital scans.

An increasing need for digital formatting:

- For Cornell's 2017 fall semester:
    - Nearly 250 book requests for digital formatting.
    - Roughly 850 individual OCR assignments for SDS.
    - Spring numbers are expected to be higher.
    - Many students that require digital formats are using text-to-speech programs to access content.

Who uses text-to-speech programs (TTS)?

- Those with print-based disabilities learning disabilities.
- Concussion victims
- Non-disabled, such as:
  - Multi-taskers
  - Foreign language students
  - Those avoiding eye strain

What exactly do text-to-speech (TTS) programs do?

- TTS programs have built-in OCR capabilities to read back information from image or text-based documents.
- OCR stands for Optical Character Recognition.
  - When a program OCR's a document, it is essentially taking the scanned image and recognizing text on the page. This then locks the letters, words, and symbols into an "underlying text" which can then be edited in programs like Adobe Acrobat. Without OCR'ing, your scanned document is simply an image, like a picture, and cannot be further adjusted or edited save photo-shop type procedures.
- These programs often rely on high quality scans for optimal results.
  - Even with high quality scans, the program can result in errors. It's important to check the OCR scan against the original document.
- Examples of TTS programs:
  - Read and Write
  - Capti Voice
  - Kurzweil 3000

The Don'ts

1. Open-Face Scanning

I think it obvious that these policies will succeed in pushing or cajoling or humiliating women who are now on welfare to search for work, and a good many of them will find it, especially if unemployment levels remain relatively low. I should note that many current welfare recipients already do work, although most do not report their earnings.[6] They rely on income from part-time or irregular work to supplement low and declining benefits. The new requirements will necessarily disrupt these informal arrangements and lead to lower family incomes.

A recently published study by Katherine Edin and Laura Lein makes clear how necessary these irregular sources of income are for these families.[7] It also illuminates the calculus underlying welfare or work choices among poor women raising children. Edin and Lein conducted a careful study of the household economies of two groups of poor mothers, one on welfare, another in low-wage work. Both groups lived precariously, managing to stay afloat only through elaborate stratagems, including some income from work and contributions from family and friends. But the women and their children endured periods of serious hardship nevertheless. For the most part, those on welfare did not match the caricature of people who have become "dependent" on welfare. Most of them had job experience—on average 4.2 years—and they expected to leave welfare for the labor force again. However, they had concluded that they could not afford to quit welfare for a low-wage job, and many were trying to acquire the education or skills that would make work a more practical alternative. As for the working mothers who do not use welfare, the Edin and Lein data show that they actually had a harder time than the women on welfare. Their income was a little higher, but their expenses were also higher, and they worried more about the supervision of their children. These women worked nevertheless because it made them feel better about themselves.

But when welfare is no longer an option, or when the terms worsen because benefits fall or harassment increases, or when the stigma intensifies, more women will inevitably choose work. The press has searched out the stories of such women, and reported delighted accounts of women pushed into the workforce by the new policies or by the threat of the new policies. The stories are told as morality tales that exemplify individual moral rejuvenation through work. We read of an Opal or of a Shari prodded by the new policies to pull herself together and get a job and of how her life and those of her children improve.[8] Of course other stories tell of women who don't manage to find work or hold their families together, and as time goes on, are likely to be more of these, especially if the economy weakens. Nevertheless, it is important to acknowledge that when the welfare-work trade-off worsens, or is eliminated altogether, more poor women will work. And there will even be a payoff. Edin and Lein show that welfare makes sense for poor women raising children, but it also exacts a toll in stigma and lost pride, and the din of publicity about the presumed moral deficits of recipients along with new sanctions necessarily raises that toll.

This helps explain the sharp decline in caseloads, by 44 percent from January 1993 to 1998, allowing the president and the press to proclaim that the new policies are a success.[9] To be sure, almost all of the drop began well before the implementation of the PRA, and the most important reasons are probably improvements in the job market and demographic shifts.[10] Nevertheless, welfare restrictiveness is a factor as well. Many states have been operating for several years under waiver plans which freed them to employ sanctions that could result in the termination of aid for one or another kind of disapproved behavior. We should not discount the impact of these increasingly restrictive welfare practices or the threat of more restrictions in the future. As the trade-off worsens and the level of insult rises, many poor mothers shrink from applying for welfare and exert themselves to find other ways of making do.

Although the impact of the trade-off on individual decisions has to be confronted, it is not my main point. Political talk notwithstanding, welfare is not mainly an institution to regulate individual morality. It is also, and more important, a labor market institution.[11] The impact of welfare

idea that women existed on government charity that, in junior high, while other students scribbled football plays, he designed plans to put women on welfare to work. DeParle appear to be approving of this odd childhood.

6. See Kathleen Mullan Harris, "Work and Welfare among Single Mothers in Poverty, *American Journal of Sociology*, 99, no. 2 (September 1993). See also Roberta Spalter-Roth, Beverly Burr, Lois Shaw, and Heidi Hartman, "Welfare that Works" (Washington, D.C.: Institute for Women's Policy Research, 1994).

7. See Kathryn Edin and Laura Lein, *Making Ends Meet: How Single Mothers Survive Welfare and Low-Wage Work* (New York: Russell Sage Foundation, 1997).

8. Shari Pharr was featured in John McCormick and Evan Thomas, "One Family's Journey From Welfare," *Newsweek*, May 26, 1997; Opal Caples was featured in the Jason DeParle article cited earlier.

9. See "CLASP Update" (Washington, D.C.: Center for Law and Social Policy, May 22, 1997). See also editorial, *New York Times*, August 20, 1997.

10. This conclusion was reached in a report by the Council of Economic Advisers, "Explaining the Decline in Welfare Receipt, 1993–96." The report is discussed in "CLASP Update" (Washington, D.C.: Center for Law and Social Policy, May 21, 1997).

11. On this point, see Richard Freeman, "How Labor Fares in Advanced Economies," in Richard Freeman, ed., *Working under Different Rules* (New York: Russell Sage Foundation, 1994).

- Why open-face scans are a problem:
  - TTS programs often read from top-to-bottom, left to right.
  - Certain programs may not be advanced enough to recognize the layout of an open-face scan, and will read out of order.

2. Poor resolution and/or poor contrast:

What does it mean to protest suffering, as distinct from acknowledging it?

The iconography of suffering has a long pedigree. The

- Scanning with poor resolution settings can lead to OCR mistakes.
- TTS programs may confuse words, or skip words.
- Even for those not using TTS programs for learning, poor resolution is not recommended due to potential eye strain.

3. Handwriting or Underlining on the Page:

● **Other necessary indications were entirely absent: emergency feedwater flow, and flow in the discharge line from the pressuriser relief valve were two that proved significant.**

- The OCR process takes every image on the page and attempts to recognize characters in order to form words/sentences.
- TTS or OCR programs may confuse underlined text (especially when done by hand) and handwritten notes as characters. And in the case of handwritten notes, it will often make an error in its OCR calculations.

4. Crooked Pages:

Territoriality, dominance relationships, and excessive emotions are not needed when people react to one another as nonpersons. There is every indication that strong emotion is presently dysfunctional in American society. Anyone who gets too excited about anything is likely to be a danger to his neighbors and/or the government. Evolutionary biologists maintain that a behavior pattern that is dysfunctional over a long period of time is likely to be selected out. Poets, playwrights, and artists have shown prescience in describing the world of lonely, alienated individuals. However, the protagonists of Kafka, Sartre, and Ellison have typically been viewed as unusual specimens— people who thought or saw too much and were in need of therapy or religion. That this should become the typical state of affairs in society —or to put it more accurately "asociety"—is a disconcerting thought.

More use is being made of territorial mechanisms to keep density down in public areas in the face of increasing population pressures. One current example exists in state campgrounds where population pressures are severe during summer months and holidays. Some years ago most state parks were open to as many campers as could squeeze into the campgrounds. As with New York subways during rush hour, there was always room for one more. The resulting crowding not only annoyed many campers, but it also posed a threat to the parks themselves where a delicate balance between natural elements such as trees, grass, flowers, and visitors existed. A surplus of people would drive away some animals, domesticate others, attract scavengers, pollute the streams, and ruin the meadows and flowers. Crowded campgrounds also presented health, safety, crime, and refuse disposal problems.

One solution has been to divide the campgrounds up into a finite number of territories based on expert opinion as to optimal population density for the specific park. This system has kept campground occupancy to a desired level, but it has produced many complaints about the unpredictability of the system. People do not know whether they can obtain a camping spot until it is too late to go elsewhere. This has resulted in a further solidification of territoriality with the introduction in California of a computerized reservation system for camping places. A family writes several months in advance to reserve camping space in a particular park. When the system is fully operational, it will eliminate the mad scramble for campsites that begins at two o'clock in the afternoon. There will be less waste motion at the campgrounds and fewer possibilities of disputes over spots and how long a family can stay since these will be programmed beforehand. The system should work well when the number of applicants coincides with the number of available places, but during summer months and holidays, it will certainly require procedures for selecting

- TTS programs work linearly.
- Often, crooked lines result in mismatched or broken sentences.

Improper Rotation:

- Improperly rotated pages cannot be read by most (if any) TTS programs.
- Often, when you OCR your documents, the program will automatically prompt to correct this mistake.

5. Dark Margins:

positioning of the keyboard and the mouse, the position of the computer screen, and whether the worker will be sitting or standing. If the worker also has to frequently access the CPU, then placing this close so that the worker can reach the CPU while still in a neutral posture is important.

1. Keyboard—If most of the work being done involves typing text, then the worker should be centered on the alphanumeric keyboard. Hedge (2004) summarizes the ergonomic considerations with computer keyboards and Kroemer (2001) provides an excellent annotated bibliography of the keyboard literature from 1878 to 1999. Rempel et al. (2008) have shown that the wrist extension during typing can elevate carpal tunnel pressure. Most modern keyboards are fairly flat and asymmetrical—the alphanumeric keyboard is to the left and a numeric keypad, to the right. If the outer edges of such a keyboard are used as landmarks for centering the keyboard and the monitor, the worker's hands, especially the right hand, will be ulnar-deviated because the alphanumeric keys will be to the left of the user's midline. Positioning such a keyboard so that the center of the alphanumeric keys, the H key, is centered on the midline of the user will reduce the hand deviation. However, if most of the entry work that is being done involves using the number pad, then aligning this with the right hand with the arm relaxed by the side of the body will reduce hand deviation. If the person is left-handed, then a left-handed keyboard or a separate number pad can be

- Darkened margins, or "gutter spaces" can confuse the OCR functionality of TTS programs or screen readers.
- TTS and OCR programs can mistake the darkened areas as characters or words.
- This error often occurs when performing open-faced scans.

The Do's

- Check to see if a digital version of the necessary document already exists.
  - Check with the publisher.
- If you must physically scan the document yourself:
  - Scan one page at a time; avoid open-face scanning.
  - Scan at a high resolution
    - 300-350 DPI minimum.
    - For complex pages, scan at 600DPI
  - Save the file as a PDF.
  - OCR the file and crop out any shaded borders, if possible.
  - Quality Check the OCR against the original image file.

Additional Tips

- Get to know your equipment.
  - Every scanner operates differently, but they generally share some basic setting options.
  - Familiarize yourself with how to generate the highest possible output from your on-hand equipment.
- If you are receiving scans from a publisher or third party source, be sure the files are "unlocked."
  - Unlocked files are simply those that can be edited.

Tools and Resources

- SensusAccess
    - An online tool free for anyone with a Cornell Net ID and password.
    - This tool allows the user to upload documents for conversion.
        - There are several input/output options.
    - SensusAccess is user-friendly, and generally has a quick turnaround (depending on file-size and output request).
    - To find SensusAccess, simply type the name in the search field on Cornell's hopepage.
        - You will then be redirected to the link, and from there you will find a brief orientation on SensusAccess and how to use this tool.
- Capti Voice
    - Capti Voice is a TTS program.
    - The "basic" version is free for anyone.
        - You simply need to sign up and create an account.
        - It's easily searchable online, but the link is provided on the last page of this information sheet.
    - Capti Voice is a great way to test your documents with a TTS program.
    - It should be noted that Capti Voice is not a way of making your documents accessible, but it's a great way to test the accessibility of your document for TTS users.

Outsourcing

- There are many options available for outsourcing your scanning needs and using campus equipment for scanning on your own.
- Cornell Libraries have limited scanning services.
- DCAPS—Digital Consulting and Production Services
  - Although they specialize in archival scanning of rare objects, they also offer a number of services for high quality text scanning.
- Cornell Print Services offers scanning.
  - They can also breakdown books and rebind them.

The Order of Operations

- Take extra care in your scanning practices, but check to see if a digital version of your document already exists.
- OCR your scanned image files (even if you have received them from a third party source).
- Proofread your document against the original image file.
- Use the Adobe or Microsoft Accessibility Checker (previously mentioned in other Tech Talks) to search for non-obvious errors in accessible content.
- Test your document in a TTS program to see how it reads for someone reliant on such software.

Resources:

- Capti Voice
- Cornell's SensusAccess Log-in Page
- Digital Consulting & Production Services (DCAPS)
- Cornell Print Services

Demo: How Poor Scans Affect TTS Functionality:

- The following demonstration showcases the "real-time" OCR capability of a text-to-speech program from a poorly scanned document. Circles that appear on screen indicate an error, whereas arrows that appear on screen indicate out-of-sequence reading.
- The scan itself has several issues: open-face scan, poor resolution, darkened side margins, and slightly crooked pages.