

# Microstudy

User Preferences in Document Design

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## Abstract

In this study, I examined users' performance with and preferences for three versions of a short instruction set. The instruction set guided users through using the Remote Desktop Connection utility (RDC) in Windows to connect to and log into a remote computer. The text in the instruction sets was identical, but the position of the screen shots was different. In the first set, the screenshots were all shown after the full text of the instruction set. In the second set, the screenshots were in line with the text, with a screenshot after each relevant text instruction. The third set was in a column format, with the screenshots to the right of the text, and with the pages in a landscape orientation to accommodate the wider layout. The participating users overwhelmingly preferred the inline format, and there is slight evidence for better user performance when they use the inline and column versions.

## Introduction and Literature Review

I performed this study not only for the sake of research; it was also a "user edit" of an instruction set in use at my workplace, Cedar Valley College (CVC) in Lancaster, Texas. I am a PC Support Specialist in CVC's Department of Information Technology.

In December 2012, I wrote an instruction set to teach CVC's staff members how to use RDC during spring registration, which occurred during January 2013. The staff was working in the lab areas, handling overflow from the main registration area. To gain access to the software required to assist the students, staff members needed to open an RDC session to their office computers. They were able to use the instructions effectively, but the instructions were created on a very short deadline, and were just good enough to do the job. I believed that they could be improved, and made more effective.

The concept of the user edit is not new. Atlas [1] wrote about the idea in 1981, and described it as this: "Find someone who knows nothing about your machine and have him work with it, using only your manual as a guide; his errors and hesitations should tell you where the weak points are."

Technical communicators commonly use screen captures in computer documentation to illustrate tasks. Hans van der Meij and Mark Gellevij have done the most research on the subject of screen captures, and how to use them effectively. They published a general survey of the roles of screen captures in 1998 [2]. In that article, they described the four main roles of screen captures, and how they help users:

- *Switching attention* between the manual and screen, and providing a clear point of reentry to the manual
- *Developing a mental model of the program* by acquainting the user with the main windows, explaining the spatial layout of a window, and developing a sense of logical flow, or progression, of windows
- *Verifying screen states*, which allows users to verify if they have successfully completed a task

- *Identifying and locating window elements and objects*

They also described how screen captures vary in design:

- *Coverage*: How much of the screen is shown, from a full screen, to a window, to an interface element (icon, button, menu, etc.)
- *Positioning*: The placement of text and screen captures in relation to one another, reflecting their relationship or interdependence
- *Size*: The reduction rate of the desktop, window, or object in the screen capture compared with its actual screen size
- *Cueing*: the presence or absence of signaling techniques that draw the users' attention to relevant window elements or objects

Van der Meij and Gellevij published the results of three studies on use of screen captures in manuals. The first, published in 1999, compared three manuals [3]. One manual used screen captures showing only the relevant part of the screen. The second used full-screen images. A third manual contained no screen captures, only text. Seventy-three students at the University of Twente participated, using an authoring tool named SimQuest as the test software. The study results were inconclusive; screen captures in any format were not proven to be necessary. Also, the format of the test was not realistic, and the selection of users—who were experienced—did not represent the typical computer user.

Their second study, published in 2003, was more successful in proving that screen captures had worth in computer manuals [4]. They used more participants, and tested groups of participants performing different tasks. The study's results showed that use of screen captures improved development of mental models, identifying and locating interface objects, and verifying screen states. Screen captures had no discernible effect on switching attention. The authors also discussed the differences in genre-based and function-based approaches to instruction set or manual design. In a genre-based design, the page layout and format of the screen captures are fixed. Screen captures may appear anywhere in the text. In a function-based design, screen captures are used only if the user's tasks demand them, and if the information being supported needs them.

The third study was published in 2002, and focused on the effects of screen captures with older users who had less computer experience [5]. They tested four types of manuals:

- *Screen-input*: A screen capture shows the result of the user input.
- *Screen-no input*: A screen capture only shows the relevant window.
- *No screen-input*: Text describes task, and the result of the user input.
- *No screen-no input*: Text only describes the task.

Results:

- *Training Time*: The manual type did not significantly affect training time. Age was a far more significant indicator of performance.
- *Motivation*: The manual type did not significantly affect the users' motivation.

- Knowledge test: The manual type did not significantly affect the users' scores on the knowledge test. However, no-screen manuals tested worse with older users. Also, computer experience was a more significant predictor of performance.
- Skills test: As in the knowledge test, the manual type did not significantly affect the users' scores. Age was again a more significant factor, and as was computer experience. The authors did find that users develop a strong routine from using the manual that is retained after training, and that participants followed the same procedure presented in the manual in 93.1% of all successful solutions.

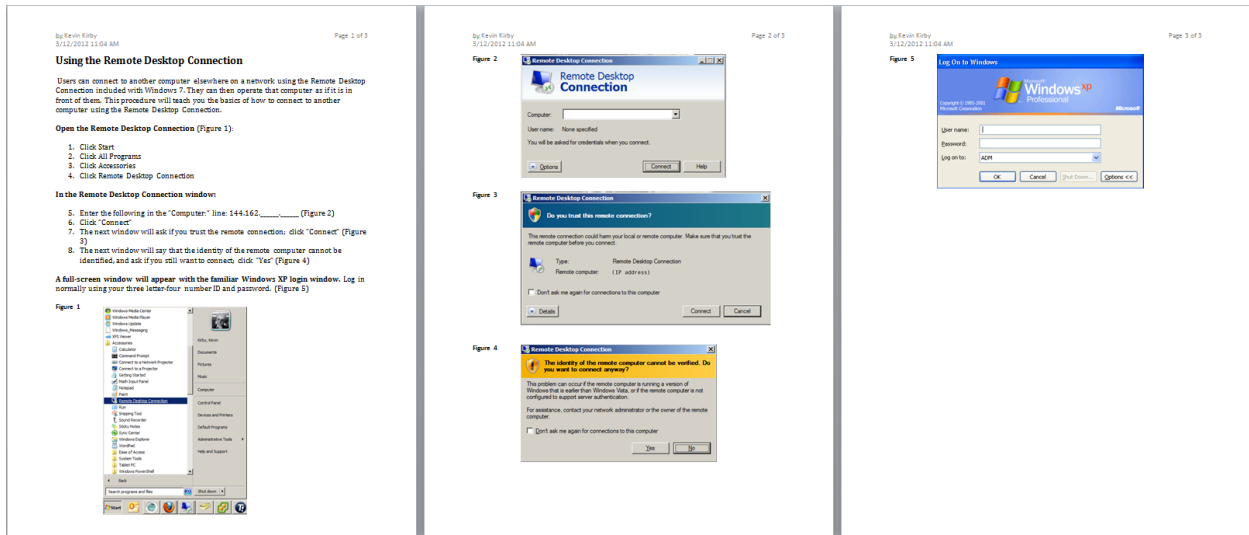
The authors found a correlation between age and use of screen captures, and recommended that they be used in manuals designed for older users.

# Methods

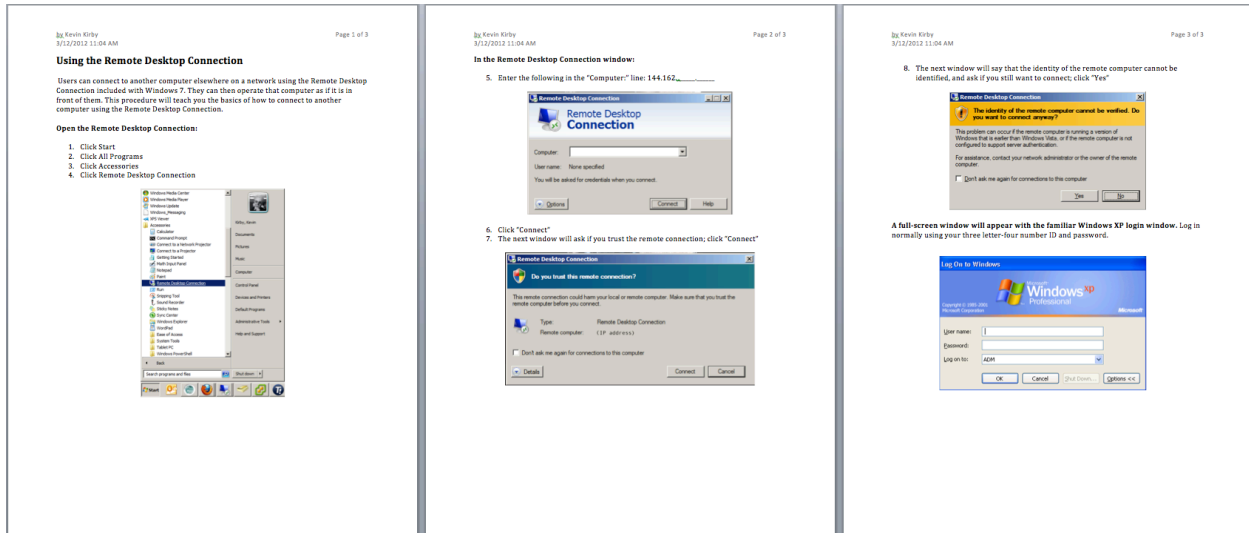
## Instruction Sets

Microsoft Word 2010 is the best available application in the CVC IT department for creating documents. Using Word, I created three versions of the instruction set:

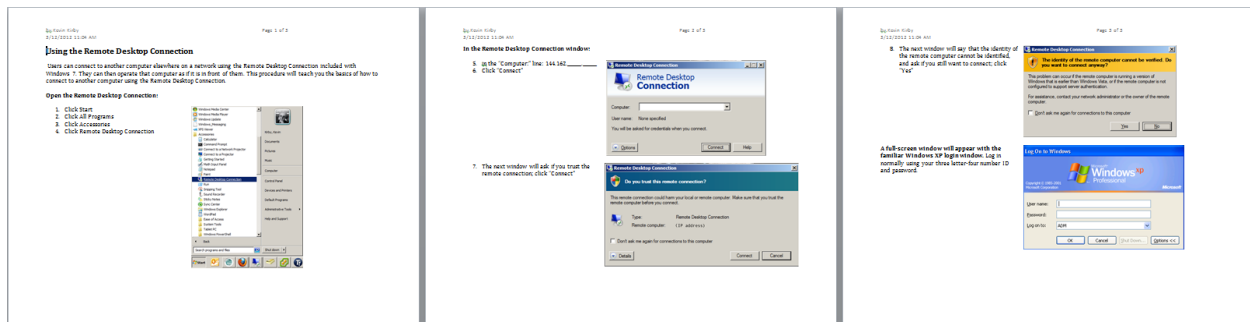
**Figures:** This version had all five screen captures placed after the text (Figure 1). This was the version used during the fall 2012 registration session.



**Inline:** This version had the screen captures placed immediately after the relevant instructions (Figure 2).



**Table:** I laid out this version using a table to create two columns. I placed the instruction text in the left column, and the screen captures to the right of the relevant instructions (Figure 3). To accommodate the table, I used a landscape layout.



## Selecting Subjects

I searched through the campus phone list for potential test subjects. I wanted subjects who I knew possessed a typical skill level for users on the campus. In particular, I wanted users who had not previously used RDC. I eliminated any users who had used RDC during the spring 2013 registration.

I emailed 27 users whom I believed met the experience profile. Eleven of them answered back within a day to volunteer. Of those eleven, eight scheduled appointments to perform the test. All eight kept their appointments, and one brought a second user to participate; luckily, that user fit the experience profile.

One note about the nine subjects: All were female. However, the workforce at CVC skews heavily female, so I do not consider that to be a problem with the sample population. See the Discussion section of this report for speculation on the reasons for this issue.

## Testing Procedure

I set up two computers for the test, located in different areas of the large CVC IT technical office:

- The subjects' host computer, a Dell Optiplex 790 running Windows 7
- The remote computer, a Dell Optiplex 520 running Windows XP

Most of CVC's users still have Windows XP on their office computers. Using a computer with Windows 7 as the host gave the subjects an unfamiliar experience, which better tested the instruction set. The subjects are used to the Windows XP login window, so having Windows XP on the remote computer simplified the login procedure on the remote computer.

When the subjects arrived for the test, I gave them a quick description of the testing procedure. I made certain they understood that the instructions were being tested, not their skills. Each subject was given one of the three instruction sets to follow to execute the RDC procedure.

I instructed them not to open the cover sheet on the instruction set until I told them to start, and that I would be timing them on how long it took to complete the procedure. Again, I assured them that the timing was to test the instructions, not their skills.

Questionnaire

After the subjects completed the procedure, I gave them a short questionnaire:

Age:

Gender:

Computer literacy level (choose one):

1. Beginner – can use email, browse websites, basic Office features (change fonts, etc.)
2. Intermediate – can install software, intermediate Office features (Track Changes, etc.)
3. Advanced – can build basic web pages, advanced Office features (merge documents, etc.)

Education Level (choose the highest level achieved):

1. High School Diploma
2. Associate’s Degree (or some college coursework)
3. Bachelor’s Degree
4. Some graduate courses
5. Master’s Degree
6. Some post-graduate courses
7. PhD

1. Did the instructions make the task easy to perform? (Circle your answer.)

|           |         |   |   |                |
|-----------|---------|---|---|----------------|
| Very Easy | ←—————→ |   |   | Very Difficult |
| 5         | 4       | 3 | 2 | 1              |

2. Was the document easy to read?

|           |         |   |   |                |
|-----------|---------|---|---|----------------|
| Very Easy | ←—————→ |   |   | Very Difficult |
| 5         | 4       | 3 | 2 | 1              |



3. Which document set would you prefer?

1. Figures
2. Inline
3. Table

Why?

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The subjects answered the two the final two questions after I showed them the two instruction sets they did not use, and had a chance to thoroughly look them over.

After they completed the test, I thanked them for participating, and made sure they could find their way out of the basement where the IT technical office is located.

## Results

I parsed the results in a master data table, using Microsoft Excel:

| Version | Subject                   | Age   | Computer Literacy | Education | Likert 1 | Likert 2 | Version Preferred | Time (seconds) |
|---------|---------------------------|-------|-------------------|-----------|----------|----------|-------------------|----------------|
| Figures | 1                         | 37    | 2                 | 3         | 4        | 3        | 3                 | 127            |
| Inline  | 2                         | 42    | 3                 | 4         | 5        | 5        | 2                 | 125            |
| Table   | 3                         | 32    | 2                 | 5         | 5        | 5        | 2                 | 172            |
| Figures | 4                         | 22    | 2                 | 2         | 5        | 5        | 2                 | 139            |
| Inline  | 5                         | 54    | 2                 | 2         | 5        | 5        | 2                 | 111            |
| Table   | 6                         | 35    | 2                 | 5         | 5        | 5        | 2                 | 135            |
| Figures | 7                         | 54    | 2                 | 7         | 3        | 2        | 2                 | 161            |
| Inline  | 8                         | 42    | 3                 | 4         | 5        | 5        | 2                 | 75             |
| Table   | 9                         | 51    | 2                 | 5         | 5        | 4        | 2                 | 87             |
|         | <b>Average</b>            | 41.0  | 2.2               | 4.1       | 4.7      | 4.3      | 2.1               | 125.8          |
|         | <b>Median</b>             | 42    | 2                 | 4         | 5        | 5        | 2                 | 127            |
|         | <b>Standard Deviation</b> | 10.19 | 0.42              | 1.52      | 0.67     | 1.05     | 0.31              | 29.70          |

**Table 1:** Master data table

The user comments, and my observations, are in a separate table:

| Version | Subject | Comments   | Observations  |
|---------|---------|--|---|
| Figures | 1       | Picture is exactly paired & in sync with the instructions. With the Figures set, I had to flip back and forth and would have to find my place again. Inline was better but the Table was the easiest and clearest to follow. |   |
| Inline  | 2       | The instructions with the photos are easier to decipher than the other two versions.   |   |
| Table   | 3       | I see the instruction then a sample immediately below it. It is easier on my eyes and brain to go up and down vs. side to side.  | User read the entire set before performing the task; may have not understood instructions |
| Figures | 4       | If I were to use this layout for a task I was not familiar with I would prefer the step-by-step instructions with the pictures in the layout as displayed in "Inline".   |   |
| Inline  | 5       | It was easier to follow.   |   |
| Table   | 6       | Providing the text followed by visual instructions allowed for greater understanding.  | Technical problem during test; had to simulate last three steps and estimate time         |
| Figures | 7       | I didn't have to flip pages to see the examples  | Subject was very deliberate   |
| Inline  | 8       | The inline had a more natural feel and flow as compared to the other formats.  | Very adept user   |
| Table   | 9       | It keeps the eye in the same general path. In using the table form, the eye has to search to the right to find the graphic.  |   |

**Table 2:** User comments and my observations

## Discussion

### Data Analysis

The subjects did not express any strong opinions on the Likert scales for the ease of use or ease of reading of the versions. The harshest critic of the documents was the Subject 7, who is also the only subject with a PhD. I believe that the subjects may not have wanted to be too critical with me in the testing area. If I run such a test in the future, I will likely remove my name from the documents, in order to make the subjects feel free to give more critical comments.

When we look at the data, there are no correlations between age, computer literacy, and education and performance. However, the versions of the instruction set do show a slight correlation (table is on the next page):

| Version | Subject | Time |
|---------|---------|------|
| Inline  | 8       | 75   |
| Table   | 9       | 87   |
| Inline  | 5       | 111  |
| Inline  | 2       | 125  |
| Figures | 1       | 127  |
| Table   | 6       | 135  |
| Figures | 4       | 139  |
| Figures | 7       | 161  |
| Table   | 3       | 172  |

**Table 3:** Results sorted by time

The three subjects that used the Inline version finished with three of the top four times. While this sample size is not great enough to prove that the Inline version will always result in a faster completion time, it does present an avenue for further study.

### Subject Preferences

The most striking result of the tests is the subjects' overwhelming preference for the Inline instruction set. Eight of nine subjects preferred it, one preferred the Table version, and none preferred the Figures version. Their comments clearly state that they found it the easiest of the three sets to follow. Comments such as "It is easier on my eyes," "a more natural feel and flow," and "it keeps they eye in the same general path" all indicate ease of reading and use.

Their dislike of the Figures version was apparent from their reactions: the six subjects who did not use it for the test immediately responded with comments like "I don't like that" or a flat "No." The three subjects who did use the Figures version immediately stated a preference for the Inline version, with one preferring the Table.

The subjects' preference for the Inline format is likely due to expectations. They have used manuals and instruction sets for years, and it is likely that most have used an inline image format. Their experiences with those manuals and instruction sets have created memory schema for the design, and even timing, of the information given in our manuals and instructions [6]. Users have come to expect the screen captures or other illustrations inline with the text; when they are not in the expected position, it makes the document less usable for the users.

### No Men?

I cannot explain the lack of male volunteer subjects for this study. My best guess is that they did not want to participate out of ego. I explicitly stated that they were not being tested—that the instruction sets, my work, were the focus of the test—I strongly suspect that they did not want to participate for fear of appearing incompetent. I find it difficult to believe that all six male users I emailed could not find less than 10 minutes to run through a simple instruction set. Again, I can only offer speculation regarding this anomaly.

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