APPLIED RESEARCH

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Illustrations in User Manuals: Preference and Effectiveness with Japanese and American Readers

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INTRODUCTION

With the increasing globalization of business, document designers are being required to localize user manuals. Many American companies that export their products to Japan and vice versa are localizing the manuals that accompany the products. In the localization process, texts are translated into target languages, yet in most cases, the manual format and the illustrations often remain the same. The use of a static format may be caused by document designers not knowing how different people from different cultures use and comprehend illustrations.

Although much has been written about how to design the “look” of illustrations for different cultures to ensure that the use of colors and symbols is appropriate for a given culture (for example, Horton 1993, 1994; Forslund 1996), we still do not know much about whether people from different cultures have similar attitudes about the use of illustrations in instruction manuals. Specifically, we do not know whether Japanese and American users have the same attitudes about the number and type of illustrations that make a manual most usable. Several studies have pointed out that Japanese users appreciate the generous use of graphics in user manuals, and other studies have revealed that American users perform tasks better when procedures are accompanied by illustrations. Despite such findings, Japanese and American manuals differ in their use of illustrations. Japanese manuals often include an illustration with each procedural step, but American manuals include fewer illustrations with procedural steps. Japanese manuals also use cartoon graphics to convey concepts, yet few American manuals do so.

We do not know, however, whether these document design tendencies reflect differences between audiences in these cultures or simply the difference in assumptions of document designers in these cultures. To appropriately localize manuals for each other’s culture, we need to understand whether these two cultures differ in their views on these issues. Therefore, we conducted a study to investigate Japanese and American users’ preference on first impression and perceived effectiveness for instructional formats that varied in their use of illustrations that accompany instructional steps. We were concerned with people’s first impressions because impressions can heavily influence their permanent perceptions of a manual. Another part of our study included the assessment of Japanese and American users’ attitudes about the use of cartoon graphics in manuals. After a brief review of the literature on the subject, we present our study.

Relevant literature

Several researchers have found that illustrations enhance the comprehensibility of instructions for American readers. In an investigation of different instructional formats, Stone and Glock (1981) had subjects assemble a loading cart while referring to one of three instructional formats. They found that subjects who viewed the format with both illus-

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trations and text made fewer assembly errors than subjects who viewed the illustration-only or text-only formats. By conveying 3-dimensional information, illustrations showed a significant advantage in preventing subjects from making errors in orienting parts. Booher (1975) found that illustrations were effective in facilitating the performance of operational tasks. In his study, subjects who used the formats with text and illustrations performed tasks faster and more accurately than those who used text- or illustration-only formats. His results indicate that illustrations facilitate operational tasks—especially when the illustrations convey spatial information about the location of the objects to be manipulated.

Another study assessed the effectiveness of illustrations in a chemistry laboratory manual. In a test of a written manual with and without the addition of pictures and diagrams, Dechsri, Jones, and Heikkinen (1997) found that text accompanied by graphics led to higher scores on achievement and psychomotor skill tests and more positive attitudes toward laboratory activities. Devlin and Bernstein (1995) assessed the effectiveness of text and graphics with a “wayfinding” task, in which subjects were instructed to navigate their way on a computer simulation of a college campus. Using one of seven types of instructional aids, which consisted of various combinations of text, photographs, or maps, with or without landmarks noted in the text or labeled on the graphic, subjects made the fewest errors with text accompanied by photos or with the maps that had labeled landmarks. Further, subjects performed the fastest with the text accompanied by photos. Regardless of task, these studies have shown that instructional text accompanied by illustrations positively affects comprehension, performance, and task attitude.

Maitra and Goswami (1995) mentioned that American and Japanese readers differed in terms of expectations for the roles of visuals. In their study, American subjects, who were document designers and engineers, were confused by illustrations and graphics in the annual report of a Japanese company. They found it difficult to comprehend the relationship between the text and graphics. The Japanese president of the company explained that some of the graphics sought to give readers a good impression and did not necessarily relate to the text. But his intentions seemed contrary to the expectations of the American subjects who expected the visuals to convey or clarify information and to act as reference tools. Whereas the company report was probably quite appropriate for its original Japanese readers, it fell short with the American readers.

In contrast with these studies with American subjects, few researchers have examined the effects of illustrations on task operation with Japanese subjects. A study conducted by Hiruma and Kaiho (1991) implies that illustrations that show the results of actions may enhance the quality of user manuals. In their study, native Japanese college students and technical writers were asked to imagine that they were using a word processor and to evaluate nine instructional formats. In a comparison of formats that had either written descriptions of the results of actions or no descriptions of the results of actions with formats that also included a screen shot of the results, both subject groups gave higher evaluations to the formats with the added screen shots. Subjects also evaluated the formats on four criteria for defining good user manuals. The student subjects regarded degree of confidence as the second most important of four criteria (comprehensibility, degree of confidence, facilitation of manipulation, and ease of learning, in order of importance). In contrast, the technical writers regarded degree of confidence as the least important criterion (comprehensibility, facilitation of manipulation, ease of learning, and degree of confidence, in order of importance). These results reveal that the students and the writers gave different emphasis to their criteria for defining good user manuals, thus suggesting a possible perceptual gap between users and designers.

The studies reviewed here clearly herald the positive effects of illustrations that accompany instructional text. American document designers, however, tend to use fewer illustrations to support verbal context than Japanese document designers. This tendency is apparent in various kinds of documents. Moriguchi (1998) points out that books in the Dummies series, some of the most popular computer primers in the U.S., in general contain one illustration per two pages, whereas Japanese primers use two to four illustrations per page. Beniger and Westney (1981) found that the Asahi shimbun, a Japanese newspaper, contained 3.2 times as many illustrations as the New York Times. Our brief comparison of two sets of user manuals revealed the same trend. The Japanese version of the manual for the Sony DCR-TRV9 digital camcorder contains 50% more illustrations than the Japanese-designed English version. The Japanese-designed user manual for the Vivace 350 copier (made by Fuji Xerox Co., Ltd., in Japan) also contains more illustrations for the same functions than the American-designed user manual for a similar copier—the Xerox 5343 copier (made by the Xerox Corporation in the U.S.).

Regardless of task, these studies have shown that instructional text accompanied by illustrations positively affects comprehension, performance, and task attitude.
These design tendencies may be based on assumptions that Japanese readers have a stronger preference for illustrations than American readers, in addition to the financial constraints of using more illustrations. Kohl, Barclay, Pinelli, Keene, and Kennedy (1993) point out the Japanese emphasis on visual communication. Lombard (1992) reported the reluctance of Japanese customers to read technical manuals with few illustrations. The Japanese subjects she interviewed wanted more “graphics, white space, conceptual images conveying tasks,” and “icons in the books to help the readers navigate” (p. 690). She also mentioned that comic characters (that is, cartoons) were used in all kinds of Japanese reading material, including technical manuals, to help make difficult tasks seem like fun.

Some Japanese technical writers use cartoons to motivate readers to read manuals. Aizu and Amemiya (1985) added cartoon-type illustrations to their Japanese computer manual that was localized from an American manual; they believed that the illustrations would create a friendly appearance. They reported that the localized manual received favorable responses from Japanese readers. Such cartoon graphics are not commonly found in American user manuals, although one study with American college students found that subjects preferred a “flashier” textbook with cartoons to a traditional textbook with few illustrations (Ramsey 1983). Relying on their first impressions, the majority of subjects thought the flashier format would help them learn more than the traditional format, which they saw as being more scholarly, more difficult, and more likely to be used in a graduate course by an older teacher. It is impossible to determine whether these students liked the flashier textbook simply because it contained illustrations or because the illustrations were cartoons.

In summary, previous studies have found that users comprehend more information and perform better with instructional materials that contain illustrations. However, previous research still does not tell us what combination of text and illustrations users prefer on first impression or believe to be most effective with step-by-step instructions, nor does the research compare the views of Japanese and American users on this topic. Previous research also has not compared Japanese and American users’ attitudes about the use of cartoon graphics in manuals.

Therefore, using American and Japanese subjects, we conducted an experiment to investigate both the perceived effectiveness of and preference for instructional formats that vary in their use of illustrations in an instruction manual. For the study, American and Japanese subjects examined four different page formats that provided instructions about setting an alarm function on a CD/radio cassette player. They also stated their opinions about the use of cartoon graphics in user manuals.

The literature review led us to the following three hypotheses:

- Japanese subjects will prefer the formats with illustrations more than American subjects.
- Both American and Japanese subjects will believe that formats with some illustrations will help them complete tasks more easily and more quickly.
- Japanese subjects will have more positive attitudes about cartoons than American subjects.

**METHOD**

**Design**

This study was a two-way design that included two independent variables: nationality with two levels (American and Japanese) and format with four levels (full, half, overview, and text-only). Four dependent variables were analyzed:

1. The most preferred format
2. The least preferred format
3. Format effectiveness in terms of subjects’ beliefs about the ease of following procedures and speed of finishing tasks
4. Subjects’ attitudes about the use of cartoons in a user manual

The reasons for subjects’ format preferences were also examined.

**Subjects**

Thirteen American and 16 Japanese volunteers were secured in Seattle, WA, through advertisements on University of Washington bulletin boards and two different newsletters for international students, and by word-of-mouth. The American subject group included eight females and five males, and the Japanese subject group included eight females and eight males. The mean ages of the American and
Japanese subjects were 27 and 26 years old, respectively. The majority of subjects were students at the University of Washington, majoring in various fields (for example, computer science, library science, geography, law). To qualify for the subject pool, American subjects had to have grown up in the U.S. and Japanese subjects had to have grown up in Japan and had to have been living in the U.S. for less than five years.

**Materials**
The test packets contained five parts:
1. A cover page with demographic questions
2. Four experimental manual formats
3. A full-page illustration of a CD/radio cassette player
4. Two questionnaires to examine format preference and effectiveness
5. A page with two cartoon graphics from a Japanese manual followed by a preference question

Test packets for the two groups were identical except that the text in the four experimental formats was written in either English or Japanese for the related subject group. All other parts of the test packet were in English.

**Experimental formats** The four experimental formats were created by modifying an instructional procedure excerpted from the English user manual for the Sony CFD-370 CD/radio cassette player (1996). This procedure contained six written steps about how to set the wake-up timer of the CD/radio cassette player. For the Japanese subjects, the instructional content was translated to Japanese by one of the Japanese researchers and checked for accuracy by another researcher and a professional Japanese translator. The Japanese and English instructions contained exactly the same written information. Each format was printed on a sheet of 11" × 14" (21.5 × 35.5 cm) legal paper.

The experimental formats differed in the amount, location, and detail of the illustrations that accompanied the six written, instructional steps:
- The full format used a single-step illustration beside each of the six steps.
- The half format used a single-step illustration beside three of six steps.
- The overview format had one generalized illustration at the top of the page.
- The text-only format contained only the written steps.

All illustrations, adapted from the original manual, showed the front of the CD radio/cassette player, but the labeling and detail level differed between the overview and the full and half formats. The overview illustration used labels and flow lines to provide spatial information regarding the location of four controls on the front of the cassette player (Figure 1). The illustrations for the full and half formats also showed the front of the cassette player, but they also contained a superimposed small blown-up diagram of a control on the front of the cassette player to highlight the control needed for a given step. Labels and flow lines provided spatial information about the location of the control, and a superimposed hand provided operational information about using that control (that is, the action of pressing the control), the latter of which might enable users to understand what actions to perform without reading the text. There was a total of three differently labeled illustrations (showing three different controls) in the half and full formats (Figure 2). The full format contained six illustrations, using some of the illustrations more than once (one illustration three times, another illustration twice, and another illustration once). Although we realized that the dif-

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**Figure 1.** Overview format.

**Figure 2.** Used in full and half formats.
REFERENCES between the detail level and labels on the overview versus the full and half formats would make our results more difficult to interpret (that is, a nonfactorial design with regard to illustration type), we wanted to use the two types of illustration formats that are common in user manuals, yet limit the number of conditions in this first experiment. The appearance of the English and Japanese instructional texts ensured equivalent quality (for example, the character size and line spacing).

Throughout the test packets, the formats were indicated by letters (A, B, C, or D) instead of by format names (such as “full format”). The letters were randomly assigned to the formats in different test packets so that subjects could not consistently rely on alphabetic preference in answering questions about the formats.

Besides the four experimental formats, a larger view of the front of the CD/radio cassette player (landscape orientation on 8 1/2" × 11" [21.5 × 28 cm] paper) was provided for use with the effectiveness questionnaire. The figure was excerpted from the original user manual and resized to half the size of the cassette player with the names of controls added.

Questionnaires Two questionnaires accompanied the experimental formats: one examined format preference and the other examined format effectiveness. The preference questionnaire directed subjects to spread out the four experimental formats on a table so that they could look at them simultaneously. It further instructed them not to read the content of the pages but to rely on their first impression. The questionnaire then asked subjects to select which formats they would most and least prefer to use if a 30-page user manual consistently followed the formats. Subjects were also asked to select the reasons for their preferences from a list of options or to write down their own reasons. Finally, subjects were asked whether they would want to use a manual that followed their least preferred format.

The effectiveness questionnaire instructed subjects to look at the full-page figure of the CD/radio cassette player and imagine that they were reading a user manual to do a task with the cassette player shown in the figure. The questionnaire then asked subjects to rate (on 5-point scales) how easy it would be to follow the steps with the different formats and how fast they would finish the steps with the different formats. Although this method may not replicate situations in which subjects actually perform a task with a real product in the fullest sense, a similar method has been used in several studies (for example, Hiruma and Kaiho 1991).

Cartoons The final page of the test packet showed two cartoons, one of an unhappy computer and one of a man flexing his biceps muscle (Figure 3), and then asked subjects how they would feel about a manual that used these illustrations to emphasize written information in the manual. The cartoons were excerpted from a Toshiba computer manual where they were used to emphasize cautions such as not turning off the computer before saving data and taking an occasional break from the computer while working for long periods to avoid eye strain and stiff muscles.

Procedure Test packets were randomly handed out to subjects to ensure the random distribution of the different, alphabetically labeled test formats. Some subjects answered the test packets at a place where the researchers were present, and others answered them at home and then returned the packets. The testing site differences were not deemed to be significant because the test packets were designed to be used by subjects on their own. All subjects followed written test instructions, proceeded through the test packet at their own pace, and were allowed to ask questions in person, by phone, or by e-mail, although none did. The data was analyzed using *Statview* 4.5 and *SPSS* 6.1.1.

RESULTS AND DISCUSSION After a brief discussion of the demographic results, the results are discussed in the following three subsections: format preferences, format effectiveness, and attitudes toward cartoons. With statistical tests, only results with a *p* value ≤ .05 are considered significant. In other words, a statistical test must show that there is at least a 95% probability that the results are due to the experimental conditions, and only a 5% probability or less that the results are due to chance.

The results of the demographic questions confirmed that the two subject groups did not differ in gender or age. A Chi-square test was used to assess the gender variable, and a *t* test was used to assess the age variable; the tests were nonsignificant. As stated earlier, there were eight females and five males in the American subject group and eight females and eight males in the Japanese subject group. The mean ages of American and Japanese subjects were 27 and 26 years old, respectively. Although Japanese
subjects qualified to participate if they had been living in the U.S. for less than 5 years, as it turned out, the majority of Japanese subjects (81%) had been living in the U.S. for less than 1.5 years.

Format preferences
Contrary to the hypotheses that expected differences between the nationality groups, there were no clear differences between Japanese and American subjects regarding preference for formats that varied in the use of illustrations. But the results of subjects' views about format preference are noteworthy.

Regarding the most preferred format, because a Chi-square test revealed no significant difference between the two nationality groups on this variable, the two groups' ratings were collapsed for further analysis. A Chi-square test revealed a significant difference across the four formats, $\chi^2(3) = 10.31, p = .0161$. As shown in the Total row in Table 1, all subjects preferred to use a format with illustrations (the full, half, or overview format) and no one preferred to use the text-only format.

Even though the two subject groups did not significantly differ in terms of their most preferred format, it is interesting to note that a preponderance of American subjects (46.2%) preferred the overview format, whereas a preponderance of Japanese subjects (43.8%) preferred the full format. One issue to consider is that all the illustrations in the full format looked identical at a quick glance, and subjects had been told to judge their preference on first impression. One American subject, who pointed out the similarity of the illustrations, did not select the full format as preferred because the format gave him the impression of redundancy. If the full format had used illustrations that show six distinctly different views, perhaps more American subjects would have preferred it.

As for the reasons for their choices, most subjects in both groups selected “the format looks more organized,” “the procedure steps look easier,” or “I would feel more confident with this format.” There was no clear difference between the reasons that each group selected.

Regarding the least preferred format, because a Chi-square test revealed no significant difference between the two nationality groups on this variable, the two groups' ratings were collapsed for further analysis. A Chi-square test revealed a significant difference across the four formats, $\chi^2(3) = 52.24, p < .0000$. As shown in the Total row in Table 2, the majority of subjects least preferred to use the text-only format.

As for the reasons for their choices, most American subjects selected “the format looks less friendly” and “I would feel less confident with this format.” Moreover, three American subjects explicitly stated that they preferred to see illustrations. On the other hand, most Japanese subjects...
selected “the procedure steps look more difficult” as well as the reasons selected by American subjects. This difference implies that Japanese readers might be more intimidated by texts without illustrations.

Further, a Chi-square test found no difference between the groups on their responses to whether they would want to use a manual that used their least preferred format. Most subjects stated that they would not mind using a manual with their least preferred format but that they would not like using it. However, four subjects (two Japanese and two Americans) stated that they would never want to use a manual with such a format. It is noteworthy that these four subjects selected the text-only format as their least preferred format.

The preference results overall show that both American and Japanese subjects preferred to use a format with illustrations and equally disliked a format without illustrations, at least when judged by subjects’ first impressions of a manual. These results imply that the assumption that Japanese readers like illustrations more than American readers is incorrect when it comes to the design of user manuals.

**Format effectiveness**

As hypothesized, both American and Japanese subjects believed that the formats with both texts and illustrations would help them follow procedures more easily. A repeated-measures analysis of variance (ANOVA) (nationality × format) on the perceived ease of following procedures revealed a significant effect for formats, $F(3, 27) = 19.28$, $p < .0001$, and no significant effect for nationality or any interaction. Figure 4 contains a bar graph of the results of subjects’ ratings on the four formats. On the questionnaire scale, 1 was hardest, 2 was harder, 3 was normal, 4 was easier, and 5 was easiest.

Given that the ANOVA revealed a significant difference for formats, the next question is which formats significantly differed from each other. We answered this question by using a statistical method appropriate for a within-subjects design—that is, a design in which subjects rate more than one format using the same instructions.

**TABLE 3: MEAN DIFFERENCES ON EASE RATINGS**

<table>
<thead>
<tr>
<th>Format Comparison</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full—half</td>
<td>.31</td>
</tr>
<tr>
<td>Full—overview</td>
<td>.83*</td>
</tr>
<tr>
<td>Full—text-only</td>
<td>1.86*</td>
</tr>
<tr>
<td>Half—overview</td>
<td>.52</td>
</tr>
<tr>
<td>Half—text-only</td>
<td>1.55*</td>
</tr>
<tr>
<td>Overview—text-only</td>
<td>1.03*</td>
</tr>
</tbody>
</table>

(Critical difference = .83)

* $p \leq .05$. 

**Figure 4.** Ratings on perceived ease of following steps.
one format (in this case all formats). This method reveals how much the means need to differ mathematically to represent a significant difference (Loftus and Masson 1994). The critical difference was .83 (that is, the means for the format ratings needed to differ by at least .83 to be significant). The full, half, and overview formats were rated significantly higher than the text-only format, and the full format was also rated significantly higher than the overview format (Table 3).

Clearly, subjects thought that any format with illustrations would make the instructions easier to follow than a format with text alone. But they also thought that instructions with an illustration beside each step would be easier to follow than a format with one illustration at the top of the page. It is difficult to be certain whether their preference for the full format resulted from the help provided by an illustration accompanying each step or the help provided by the highlighted control in the illustration. We suspect that the answer leans more toward the use of the step-by-step illustrations. If the higher ratings for the full format ($M = 4.00$) versus the overview format ($M = 3.17$) were due solely to difference in illustrations between the two formats, then it is likely that the half format would also have significantly differed from the overview format in that the half and full formats used the same type of illustrations.

As we had hypothesized, formats with both text and illustrations positively affected subjects’ ratings of task speed. A repeated-measures ANOVA (nationality x format) on the perceived speed of following procedures revealed a significant effect for formats, $F(3, 27) = 11.27$, $p < .0001$, and no significant effect for nationality or any interaction. Figure 5 shows a bar graph of the results of subjects’ ratings on the four formats. On the questionnaire scale, 1 was slowest, 2 was slower, 3 was normal, 4 was faster, and 5 was fastest.

To evaluate which formats significantly differed from each other, we again calculated how much the means needed to differ mathematically to be considered a significant difference. The critical difference for the speed ratings was .99. The full and half formats were both rated significantly higher than the text-only format; subjects believed

$$\begin{array}{|c|c|}
\hline
\text{Format Comparison} & \text{Mean Difference} \\
\hline
\text{Full—half} & .10 \\
\text{Full—overview} & .52 \\
\text{Full—text-only} & 1.38^* \\
\text{Half—overview} & .62 \\
\text{Half—text-only} & 1.48^* \\
\text{Overview—text-only} & .86 \\
\hline
\end{array}$$

(Critical difference = .99)

$^* p \leq .05$.

Figure 5. Ratings on perceived speed of following steps.

TABLE 4: MEAN DIFFERENCES (ABSOLUTES) ON SPEED RATINGS
that the formats with the step-by-step illustrations would help them complete the task faster (Table 4). Interestingly, the overview format did not significantly differ from the text-only format on the speed ratings as it had with the ease ratings.

At this point, it is interesting to think about the results for the four dependent measures all together. For the type of hands-on task assessed in this experiment, subjects most preferred formats with illustrations and least preferred a text-only format. They believed that any format with illustrations would make instructions easier to follow than text alone; they also believed that an instructional format with step-by-step illustrations would be easier to follow than a format with one overview illustration at the top of the page. Further, they believed that a format with step-by-step illustrations would help them complete a task more quickly.

This hierarchy of “the more illustrations the better” is quite logical when one thinks about how users would interact with the different formats. If a format has an illustration for each step (that is, our full format), that illustration will most likely highlight details relating to the step. Users can easily rely on this illustration for help in understanding the written instructions—or perhaps in ignoring the written instructions all together. If a format has an illustration for some steps (such as our half format), users can rely on the illustrations for some steps and, in doing so, reduce their reliance on the written instructions to some degree. If a format has one illustration at the top of the page that attempts to make itself useful for all steps (such as our overview format), then by its very nature the illustration will probably offer less instructional information than step-by-step illustrations do. Users will also have to continually shift their gaze from the text up to the illustration, back again, and then to the mechanism. The tight visual connection of text and graphics that occurs with the step-by-step illustrations is lost. Finally, if a format contains no illustrations (such as our text-only format), users will have to read all steps in detail, search for the appropriate controls on the machine, and then perhaps reread the text to remember what to do with the control.

Attitudes toward cartoons

Contrary to our hypothesis, both American and Japanese subjects had similar attitudes toward the cartoon graphics: a Chi-square test found no difference between the two groups. We, therefore, combined the data from both groups for another Chi-square analysis of the three response categories. This Chi-square revealed a significant difference, $\chi^2(2) = 6.28$, $p = .0434$. The majority of subjects (52%) stated that they would not care whether such cartoons were used in a manual to emphasize the contents of texts, 34% would like to see such cartoons, and only 14% would dislike such cartoons. Apparently cartoon graphics, which are so commonly used in Japanese manuals, would be equally acceptable in English manuals for American users.

CONCLUSION

Existing research suggests that illustrations are effective adjuncts to text in instructional manuals. But American manuals typically contain fewer illustrations than Japanese manuals. These document design practices may be based on different assumptions about the views that Japanese and American users have toward illustrations in manuals. Our study revealed no significant differences between American and Japanese subjects in terms of their preferences for and perceived effectiveness of illustrations in user manuals.

American and Japanese subjects found the formats that contained both text and illustrations more preferable and believed they would be more effective in terms of ease of following instructions. They did believe, however, that illustrations accompanying each instructional step would make instructions easier to follow than a format with a single illustration at the top. Similarly, they believed that formats with step-by-step illustrations would facilitate task speed more than a text-only format. These results suggest that preference and perception of effectiveness are not necessarily one and the same. Although users may, on first impression, prefer a manual with any amount of illustrations relevant to the tasks to be performed over a manual without illustrations, their perception of ease of following instructions and speed of completing tasks is somewhat more discriminating. Document designers should realize that a user’s first impression of a document may not necessarily reveal how effective a user would find a document.

These results provide some implications for the localization of user manuals. Although document designers may include overview illustrations in manuals to help orient users to a device or portion of a device, the designer should also provide step-by-step illustrations as often as possible beside individual instructions. Further, when preparing English manuals, Japanese document designers need not believe in the myth that Americans prefer fewer visuals than Japanese. In other words, they need not reduce the number of illustrations...
on the assumption that American readers will be annoyed by the inclusion of many illustrations. Second, American document designers should consider using more illustrations in manuals to help illustrate instructional steps.

The results of subjects’ attitudes toward the use of cartoon graphics in manuals also have implications for document designers. Because regardless of nationality, half of the subjects would not mind such graphics and one-third of the subjects would like such graphics, Japanese document designers should spend less time worrying about deleting cartoon graphics from manuals localized for American users. And perhaps designers of English manuals should consider using cartoon graphics to emphasize content.

As an initial investigation, this study has provided helpful information for document designers, but more work is needed. Another study should separate the variables of the number of illustrations from the amount and type of information shown and labeled. Further, a future study should reinforce our results by using Japanese subjects who have been living in Japan and have little experience abroad. Because this study used college students as subjects, it would be interesting to examine the views of other audiences in terms of age, gender, education, occupation, and native country. It would be extremely interesting to examine subjects’ perceptions of the formats used in this study if these formats were part of much longer manuals (for example, more than 100 pages). Finally, it would be informative to examine format preference and effectiveness with subjects actually conducting the assigned tasks. TC

REFERENCES


