Prior Experience, Perceived Usefulness and the Web: Factors Influencing Agricultural Audiences’ Adoption of Internet Communication Tools

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Abstract
This study, using the Technology Acceptance Model as a theoretical framework, investigated the effect of prior experience on subjects’ perceptions of perceived usefulness and intent to use Internet communications tools. Results indicated that respondents who had relevant prior experience had the most favorable perceptions of the perceived usefulness of these technologies. Further, those subjects who had high levels of experience and perceived usefulness were most likely to use Internet communications technologies, while those subjects who scored low in both of these areas were least likely. Linear regression analysis indicated that, for all subjects, experience and perceived usefulness were the strongest predictors of behavioral intent to use Internet communications tools.

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group would not be appropriate in this culture. The same procedure was used as described in stage I for the Hmong focus group.

Results - focus group: first session

Responses to the various questions will be summarized below. Unlike the Hmong group, the Somali subjects tended to discuss the issues less, and come to a consensus fairly quickly.

Use of brochures. Most of the subjects had seen brochures and few had used brochures to attain information about health issues, housing, education, or other issues. Most of the women did not read English, and several did not know how to read. They said that they would not pick up a brochure if it was not written in Somali or did not have an image of a Somali person on it.

Multilingual presentation. Like the Hmong focus group, the Somali subjects also preferred brochures printed in both English and Somali. They said that this bilingual approach would help them learn the language and that for those who speak both languages they could read both and achieve greater understanding of the content. They also mentioned that in many households the younger members would be able to read English, but the older family members would only read Somali.

Layout of information. Subjects agreed that a short amount of information was most desirable. A bulleted list format was preferred. Information should be clear and succinct. They said that they would not bother to read brochures with long sections of writing.

Font preference. The group was shown the same text in four different fonts in black on a white ground. Subjects preferred a san-serif font called Myriad. They preferred this font because it was bold and clear against the background. They did not like the plainness of Helvetica, nor the serifed fonts such as Garamond and Garamond italic. They did not like fonts that might stereotypically represent an African culture such as Lithos. They emphasized that the font must be bold, very clear and easy to read, and must have good contrast with the background.

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Abstract

This study, using the Technology Acceptance Model as a theoretical framework, investigated the effect of prior experience on subjects’ perceptions of perceived usefulness and intent to use Internet communications tools. Results indicated that respondents who had relevant prior experience had the most favorable perceptions of the perceived usefulness of these technologies. Further, those subjects who had high levels of experience and perceived usefulness were most likely to use Internet communications technologies, while those subjects who scored low in both of these areas were least likely. Linear regression analysis indicated that, for all subjects, experience and perceived usefulness were the strongest predictors of behavioral intent to use Internet communications tools.

The Internet is said to be one of the fastest diffusing technological innovations of all time (Nielson, 1995), with an estimated 71 million users worldwide (Matrix Information and Directory Services, 1997). Although still seen as primarily an information carrier, the Internet is also an educational communications tool that represents a potential opportunity for...
agriculture, where developing more effective communications and a stronger frame of reference, whether it be with students, traditional stakeholders or the general public, has always been a key objective.

One of the oft-cited advantages of Internet use is the degree of interaction and asynchronous communication exchange potentially achievable between sender and receiver. Internet communication tools, which can be defined for the purposes of this study as those applications which facilitate interactive one-to-one communication exchange, include E-mail, chat, World Wide Web-based bulletin boards and on-line discussion forums. In the educational setting, adoption of interactive tools such as these has been shown to augment or extend instruction and information delivery. For example, some studies have found slightly higher student achievement levels when mode of instruction includes interactive computer applications that facilitate communication and collaboration (Martin & Rainey, 1993; Means, 1993). Yet, within the traditional stakeholder audiences of agricultural students and Cooperative Extension clientele, experience and perception of these technologies for educational communication purposes is still relatively limited. For example, in a three-year longitudinal study, Suvedi, Campo and Lapinski (1999) found that, although the percentage of respondents who used the Web to gain extension-related information increased from 1.4% to 10%, the vast majority of respondents did not use it. Trede and Whitaker (1998) found that beginning farmers rated “cutting edge,” Internet-delivered instructional technologies much lower than traditional instructional techniques, perhaps owing to lack of familiarity and prior experience with these technologies.

Greater usage of Internet communications tools may be a way to meet more effectively the communication needs of students enrolled in on- and off-site agricultural programs (Donaldson & Thompson, 1999; Miller & Pilcher, 1999), as well as to help agriculturists communicate with external audiences. Understanding the factors which influence attitude and user perceptions toward technology is therefore a critical need.

The information technology literature includes a number of studies (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Hendrickson & Collins, 1996; Chau, 1996) utilizing a theoretical framework called the Technology Acceptance Model, or males are more dominant than females in group discussions. Additionally, if a translator is needed, it is essential that the person not only be able to speak both languages (e.g., Hmong and English in this study), but that he/she understand the cultural variables that are being tested.

Many subjects were concerned about the writing and spelling of the text. Accuracy of information reflects the importance of a publication, as well as the perceived respectfulness of another culture. Most subjects were critical about many publications produced in Hmong that contain incomplete information or misspelled words. Proofreading the material is strongly recommended.

Because participation in the study was voluntary and meetings between the first and second stages were far apart, we lost six subjects for the second discussion session. In spite of this, it was predicted by the subjects that having another focus group would probably yield similar results.

Stage II: Study with Somali Focus Group

During the second stage of the study, the process used in stage one was repeated with focus groups consisting of recent immigrants from Somalia. Increasing numbers of Somali immigrants have come to live in Minnesota in the past two years. In contrast to the Hmong who resettled nearly 20 years ago and have developed strong cultural organizations and representation in professional and political life, the Somali are new to Minnesota and are only in the beginning stages of developing community service organizations.

Focus Group: First Session

Subjects and procedure

Subjects for the focus group are participants in an indoor air quality study group. They meet monthly with an interpreter and an Extension educator from the Minnesota Extension Service to discuss air quality issues. This group was selected as a focus group with the hope that there would be less attrition in an already formed group that met regularly than we experienced with the Hmong focus group. The interpreter is known within the local Somali community and works at a community center helping others adjust to life in Minnesota.

Eight subjects participated in the first session. They were all women and ranged in age from 25 to 65. A mixed gender
tions. If someone uses a red piece of paper or red writing, this is interpreted either as letters or words to kill people, or as a person showing disrespect for someone else.

In regards to image-related variables, subjects tended to agree that if the content is sensitive (e.g., breast cancer), a drawn picture would be more appropriate. Drawn pictures are also a better choice for children because drawings can help them to understand the subject matter. However, most participants think that photographs are a better option since they look more professional. Stereotyping, particularly in the use of native clothing, seems to be a problem for some participants because they don’t like being portrayed as minorities. They said that people don’t wear traditional Hmong clothes and head dress anymore and therefore, designers shouldn’t use this kind of image to represent Hmong culture. On the other hand, some participants said that such images don’t have negative connotations. As one person commented, “I don’t think that it depicts Hmong people in a negative way. It just looks like the brochure is talking about a particular group of people. If you draw an Asian person, he/she could be Chinese or any other Asian nationality. But if you draw a person with Hmong clothes with a Hmong head-dress, then you know immediately that it’s a Hmong person. It’s a symbol of our people.”

Discussion and Conclusions for Stage I

All of the above-mentioned factors need to be considered in order to map out effective processes for the development of material that includes one or more languages. First, the designers must learn about communication within a particular culture. Secondly, the design process will involve members of the targeted cultural groups before actual production of a piece takes place. Third, there must be a process for evaluating prototypes; who will evaluate them, what will be evaluated and how? Suggestions from this particular study included the following: (a) test prototypes with Hmong agencies, (b) randomly select people from different generations for feedback, and (c) utilize tracking systems at various organizations where the brochure is distributed. In regard to recruiting subjects into a focus group or testing the effectiveness of a brochure, participants in the study suggested that specific groups should be formed only if they have interest in the particular content of a brochure. Additionally, age and gender are important factors for focus groups. This is especially true in Asian culture, since

TAM, to examine the relationship between user perceptions and adoption of new technologies. Drawing on Fishbein and Ajzen’s Theory of Reasoned Action (1975), Davis (1989) developed the TAM to predict usage behavior based on the assumption that individual perceptions as to the ease of use as well as the usefulness of a technology can be used to predict its use. Subsequent research suggests, however, that these relationships are influenced by other external factors, the identification of which might prove useful in helping to predict the likely users of a technology, as well as their attitudes and subsequent usage behavior.

The objective of this study was to examine the assumption that a contextually relevant external factor, the individual’s level of prior experience, might exert a specific influence on perceived usefulness, defined in the TAM model as the degree to which a user believes that using a technology will be beneficial in some way. Using the TAM as a theoretical framework, this study was, therefore, designed to examine the effect of prior experience on intent to use Internet-based Internet communication tools to complete a communication task, with a view toward ascertaining how these factors influence adoption of Internet communications technologies. If it can be shown that prior experience is the most significant predictor of intent to use Internet communication tools, agricultural educators and communicators may be able to use this information in the development and positioning of Web-based communication and information delivery initiatives to agricultural audiences.

Conceptual and Theoretical Framework

The Technology Acceptance Model

The Technology Acceptance Model, or TAM, stems from the Theory of Reasoned Action, or TORA (Fishbein & Ajzen, 1975), well known as a seminal work in attempting to understand and predict behavior and behavioral intentions. The TAM attempts to explain user acceptance and adoption of a technology based on two specific behavioral beliefs, perceived ease of use (EOU) and perceived usefulness (U), the influence of which determine an individual’s behavioral intention (BI) to use a technology (Figure 1). Perceived ease of use is the extent to which it is believed that a technology will be easy to use, while perceived usefulness is the extent to which it is
believed that using a technology will be beneficial in some way (Venkatesh, 1999).

In both the TORA and the TAM, attitudes are a function of beliefs about and assessments of perceived benefits/risks of acting in a certain way, such as beliefs about the advantages or disadvantages of using a new technological innovation. However, two different formulations of TAM exist in the literature. Although many studies in the information technology literature omit attitude, the original model shows the perceived usefulness and perceived ease of use variables influencing attitude toward use, which subsequently impacts usage behavior (Hubona & Geitz, 1999).

Although Davis et al. (1989) suggested that external variables such as documentation and user support might influence perceived usefulness and ease of use, empirical research on the effect of external variables has been limited. Of the limited research that has been done, Agrawal and Prasad (1997) conducted a study which showed that innovation characteristics (i.e., an individual’s perception of the characteristics of an innovation) can predict acceptance behavior. In a subsequent study, the researchers identified a set of individual difference variables, including prior similar experience, that exerted significant influence on TAM’s belief constructs (Agrawal & Prasad, 1999). Doll, Hendrickson and Deng (1998) used multi-group invariance analysis to assess a series of incremental cross-validation studies, the results of which, while providing support for the validity and reliability of the model, also revealed variation from other sub-groups for individuals with no prior computing experience.

**Figure 1** The Technology Acceptance Model (Hubona & Geitz, 1999).

The design process of producing multilingual print materials. Subjects felt that the Hmong community relies more and more on brochures and other publications as a means of communication. There were a few suggestions by subjects about how to test the effectiveness of the brochure within the Hmong community before it is actually printed: (a) distribute the brochure to different Hmong organizations for comments and feedback, (b) draw a random sample of people for focus group discussions, and (c) find a group of people that is particularly interested in the topic of the brochure. Subjects also felt that focus groups were a good idea but thought that they should be specific to the topic at hand.

**Concluding open discussion**

Subjects prefer multilingual/bilingual publications as opposed to a separate publication in each language. This conclusion was made based upon the factor of comprehension rather than budget constraints. Participants were concerned about variables such as photos, number of colors, and paper quality. In addition, younger generations may prefer to read the entire text in one language (on one side of the publication). For older people, seeing both languages was not as bothersome as it was for young people.

One participant commented that the publication should have pictures since some people cannot read. In other words, including pictures would increase the recognition of the publication’s subject matter. If someone didn’t understand the text, he/she might find somebody to interpret it if the pictures were of interest to him/her. Information should be short and concise since nobody would read it if it were too verbose. The ideas need to be simple if the concept is to be represented by pictures. Important messages should be written or designed differently from the rest of the text. A clean, dark, and standard typeface is preferred since these characteristics are more recognizable and frequently used. In terms of color variables, red is the only color for which subjects have negative associa-
Results - focus group: second session

Positioning of bilingual information. Two variations of the same brochure were shown. One version placed English on one side and Hmong on the other. The other version placed English at the top of the page and Hmong underneath it. Subjects preferred the brochure with English on one side and Hmong on the other. They felt that the one with English placed at the top and Hmong underneath it was confusing. They preferred reading all of the information in one language, rather than switching back and forth. In other words, someone who can read English would prefer to read the entire text in English, and someone who prefers reading Hmong would just read the Hmong text.

Formatting of texts into lists. All of the subjects felt that the list format was very clear.

Length of information. Subjects preferred short and concise content. However, there was concern about the adequacy of the information presented in the brochure. One subject indicated that the content was not sufficient enough for conveying the message.

Font. In regard to the font styles, subjects liked the clarity of the headings and the text set in a bold, sans-serif font.

Graphic treatment of headings. Two brochures were shown to the group. The first used centered headings of black type on a white background. The second reversed white type out of black bar for the heading. Subjects preferred the second design in which the headings were white and placed on a black rectangular bar.

Color. Two sample brochures containing the same design elements and information were then presented. One was in black and white, and the other was in black and green. Green was used for graphic bars and headings. All subjects preferred the black and green version.

Imagery. The brochure featured an image of an Asian man on the cover. Subjects were asked about the appropriateness of this image. They tended to think

Prior Experience

Some researchers have argued that behavior is largely a function of an individual’s perceptions of an event and its potential outcomes (Fazio, 1995). In this context, one of the critical aspects related to user perceptions of new communications technologies might be relevant prior experience. Studies have shown that the attitudes of people who have had direct prior experience with an attitude object were moderately related to subsequent attitude-relevant behaviors, whereas attitudes of people without direct experience had slight or no relationship (Fazio & Zanna, 1978a).

Based on the above, prior experience of Internet-based communications tools such as E-mail, bulletin boards and on-line discussion forums should serve to strengthen user perceptions and enhance the consistency of the attitude-behavior relationship with respect to usage of these tools. Within the context of Internet communications technologies, subjects with prior experience would presumably be more likely to hold stronger perceptions as to the perceived usefulness of these technologies, based on their ability to generate more beliefs and past behaviors related to their experience. Yet, in a domain where weakly held attitudes based on limited experience are the norm, behavior and intention to behave might be influenced by a variety of factors that could make predicting outcomes difficult.

Attitude Toward Use

Attitude toward use has usually been conceived of, as in TAM and also the TORA, as a variable constructed on the basis of a subject’s belief perceptions and evaluations of the consequences of engaging in some behavior. In their original conceptualization of attitude toward use within the TAM model, Davis, Bagozzi, and Warshaw (1989) found three distinct attitude components: attitudes toward success, failure and the process of learning to use or using a technology. Hubona and Geitz (1999) saw attitude as a moderator variable within TAM, influenced by the belief perception constructs and directly influencing intentions to use a technology.

Fazio (1986) contended that variables such as experience strengthen the attitude-behavior relationship because they are more accessible (i.e., more easily called up from the subject’s memory upon contact with the attitude object). From Fazio’s
aid on a knee and the other showed how to use soap to wash your hands. Subjects seemed to agree that the choice to use drawn versus photographed images was dependent upon circumstances. Two of the older women liked photographs because they were in color. In general, the reaction was to prefer photographs over the line drawings. We then shifted the discussion to the proper representation of people. Most agreed that a brochure with a photo looked professionally done. Some participants agreed that photographs were better and that the subject should be Asian. They felt that if a Caucasian person was used on the brochure, it had nothing to do with them. In addition, two subjects commented that if the brochure was for Hmong people, the picture should have a person with Hmong clothes and Hmong head-dress. However, someone in the group disagreed with this comment as being too stereotyped.

How subjects would design a brochure. Most subjects agreed that budget and the target audience were critical components in determining these factors. In summary, elements that they preferred were bilingual presentation (Hmong and English), bright colors, and photographs.

Focus Group: Second Session

Subjects and procedure.

The researchers used results from the first focus group to develop and design sample brochures. The Minnesota Department of Health provided information for the sample brochure, which was about health assessment. The brochure was the topic of discussion for the second group meeting. Information in the brochure was available in both English and Hmong.

We began with two variations of the brochure. Both versions had both languages on the front panel. The first positioned English on one side and Hmong on the other. The second positioned English at the top and Hmong at the bottom of each page. This layout was based on the discussion from the first focus group session. We also asked questions about the length of information, the font used, the graphic treatment of the headings, and the imagery used. We concluded with an open discussion of what an effective process of designing bilingual brochures for Hmong people would be.

perspective, attitudes can be activated upon exposure to an attitude object, either called up from memory or automatically activated upon exposure. Attitudes can therefore have a greater or lesser degree of accessibility. Fazio held that the more accessible an attitude, the stronger it would be, and the stronger and more consistent the relationship between attitude and subsequent behavior.

Rationale for the Study and Hypotheses

Although significant evidence supporting TAM exists in the literature, limited research has been conducted on the effect of external variables and their influence on the perceived usefulness and perceived ease of use belief constructs. Further, researchers such as Robertson and Gatignon (1986) have argued that most research dealing with diffusion of technological innovations has typically utilized survey methodologies, as compared to experimental approaches designed to illuminate causal processes. Therefore, the rationale for this study is based on using a quasi-experimental approach to examine the effect of prior relevant experience on perceived usefulness and intent to use Internet-based communications tools to complete a communication task.

Based on Fazio’s direct experience research, as well as the TAM user acceptance studies focusing on individual differences, it can be expected that subjects with greater prior experience of a technology will be more likely to use it than those who lack experience.

H1: Behavioral intent to use Internet-based communications technology will be significantly higher among subjects with a high level of experience as compared to those with a low level of experience.

Further, those subjects with higher levels of prior experience should have a stronger sense of the perceived usefulness of the technology than those who lack a high level of experience.

H2: Perceived usefulness will be significantly higher among subjects with a high level of experience of Internet-based communications technology compared to those with a low level of experience.

In addition to the predicted main effects, this study sought to make predictions as to the effect of model relationships on...
were critical of the fact that many brochures in Hmong languages had misspelled words and incomplete information.

Multilingual presentation. Subjects preferred brochures printed in both English and Hmong. Subjects shared their ideas about the advantages of a multilingual publication. They felt that the content was important when printed in several languages. Also, bilingual individuals can switch back and forth between languages in order to clarify what they can not understand in one or the other. Multilingual brochures take less space for display purposes. One essential comment made by a younger subject was, “I like multilingual brochures because I can’t read Hmong. Sometimes, when people see that you have a Hmong name, they automatically send you Hmong brochures and it’s of no use to me. I read everything in English.”

Layout of information. Participants seemed to prefer a list rather than paragraph format because, as one of the subjects indicated, the list style separated important main points. Although there was not much discussion about the length of the printed information, subjects did prefer to read something short and concise rather than a lengthy paragraph.

Font preference. The group was shown the same text in four different fonts in black on a white ground. In regard to styles of fonts, subjects preferred darker, clearer and more structured typeface such as “Helvetica” and “Times” over cursive writing. They emphasized that the font must have high contrast with the background so that it’s easier to read.

Color preference. We began with a general discussion of color symbolism in Hmong culture. Subjects indicated that red was the only color that was perceived negatively. When shown text in six different colors (black, red, blue, green, purple, and yellow), blue, green, and black were the preferred colors due to their high contrast with the white background.

Imagery. Subjects were shown two examples of imagery. In each example there was both a line drawing and a photograph. One set showed how to position a band-

the basis of an experimental manipulation of the perceived ease of use variable. According to TAM, perceived ease of use and perceived usefulness are moderating variables that directly influence attitude toward use and behavioral intent to use. Within the context of this study, it seems likely that prior experience should directly affect perceived usefulness, but that manipulations of the subject’s perception of the ease of use of a technology might influence behavioral intention. Due to the attitudes and perceptions formed on the basis of their prior experience, subjects with a high level of experience might be less susceptible to this influence than those who lack any relevant prior experience. Subjects with a high level of prior experience exposed to a stimulus message framing use of Internet communication tools as easy/beneficial to use should have a more positive behavioral intent than either subjects with a low level of prior experience and those exposed to a message framing Internet communications tools as difficult to use.

H3a: Behavioral intent will be highest for those subjects with high levels of prior experience who are in the high perceived ease of use condition;

H3b: Behavioral intent will be lowest for those subjects with low levels of prior experience who are in the low perceived ease of use condition.

Finally, the effect of prior experience on perceived usefulness should serve to make a significant contribution to the prediction of intent to use Internet communications tools for all subjects.

H4: Perceived usefulness and prior experience will prove to be the most significant predictor variables of behavioral intent for subjects with and without experience of the target adoption behavior.

Methods

Research Design

Subjects were drawn from a random sample of college students (n=120) enrolled in an agricultural writing class. The research design was a 2x2x2 factorial consisting of two levels (high and low) of experience, perceived usefulness and the perceived-ease-of-use message stimulus. To conduct the study, a questionnaire instrument was developed which was
brochures was the subject matter for discussion.

At the first session, emphasis was placed on discussing and identifying design variables and strategies for producing an effective brochure. Following this section, four different prototypes for the identified brochure were generated based on the discussion. In the second session, the four prototypes were presented to the focus group. A preferred prototype was selected. Further discussion on revising the solution was also included.

**Stage I: Study with Hmong Focus Group**

**Focus Group: First Session**

**Subjects and procedure**

Nine Hmong immigrants participated in the first session. This group was composed of four men and five women ranging in age from 19 to 60. Subjects had been in the U.S. fewer than five years. A moderator, who spoke both English and Hmong and has a great deal of experience leading focus group discussions, was hired to lead the session. A note-taker, who was also fluent in English and Hmong, was hired to translate and recruit subjects for the study. The researchers met with the moderator and note-taker to discuss the project and questions prior to the focus group meeting. Researchers attended and audio recorded the focus group session.

The purpose of this session was to identify design variables that effectively communicate to the Hmong population. The session began with a brief introduction to the topic of print communication, and we asked the group members if they have seen and/or used brochures to attain information about healthcare or related issues. We also inquired as to whether they preferred multilingual or single-language print materials. Following these introductory questions, we proceeded to ask about the layout of information, preferred fonts, preferred color and color meaning within Hmong culture, and the use of drawn or photographed imagery. We finished with an open-ended question about how the subjects would design a brochure to best communicate to their peers.

**Results - focus group: first session**

Use of brochures. In response to this general question about brochures, participants liked bright colors, colorful pictures, and bold type. Most of the subjects
description of various graphic organizational frameworks that might support and promote effective communication in bilingual printed pieces.

The research questions are:

1. Text-related variables
   a. What typographic variables should be considered?
   b. Is there a hierarchical difference between the languages based on placement on page?

2. Image-related variables
   a. How and when should images be used?
   b. Are specific image styles (i.e., drawings, photos) more effective for certain cultural groups?

3. Layout (design format) variables
   a. When should the layout include multiple languages?
   b. How does the layout affect the perception and decoding of the message?

Procedures and Methods

Focus group was determined to be the most effective method of gathering the data necessary for this project. The direct interaction with subjects allowed for communication that “connected the research team with the participants” (Morgan & Krueger, v.1, 1998, p.9). The value of focus group in this situation is that discussion with recent immigrants provides “insider” information (Morgan & Krueger, v.5, 1998). Also, one goal of the project is to identify an effective process for multicultural communication. Focus groups, because of their interactivity, allow for a discussion of effective process (Morgan & Krueger, v.5, 1998).

Subjects in this study were Hmong and Somali immigrants in Minnesota who have limited knowledge of English. The Hmong focus group was recruited through the Centre for Asians and Pacific Islanders in Minnesota and the Somali focus group were participants in an indoor air quality study group from the Minnesota Extension Service. Both focus groups were scheduled to meet twice. An interpreter was hired for each group to facilitate the communication process between the investigators and the subjects. The designing of multilingual...

you sent it. It’s efficient, because such messages don’t require that you print out a hard copy version, so you save on paper, and convenient because you can do it right on your computer.

Subjects in the low perceived ease-of-use condition were exposed to the message that follows:

Sending a document electronically, either through an E-mail message that contains an E-mail attachment or by posting to an online bulletin board forum, may be a problematic form of communication, since your communication could get lost or deleted without your being aware of it. It requires that you have access to a computer that’s fast enough to access the Internet and run the special software that is needed, and it may not be very convenient, since you need to learn how to use the software in order to send your document.

In the items which followed, subjects were asked to indicate their perceptions as to the perceived usefulness, as well as their attitude and behavioral intent toward using two specific forms of Internet communication, sending an E-mail attachment and posting a message to an on-line discussion forum, to complete a communication task involving communicating details about an assignment required in the class they were taking. Finally, at the end of the questionnaire, subjects were asked to re-read the perceived ease-of-use message statement, and then to answer a series of four items designed to serve as a manipulation check on respondents’ interpretation of the message statement contents as a statement indicative of either a high or low perception of the ease of use of the specified Internet communication tools.

Results

Exploratory factor analysis was conducted on all of the variable indices in the study, resulting in a one-factor solution for all of the indices used in the analysis. For all hypotheses, descriptive statistics were obtained and mean splits were used to recode the independent variables into high and low levels. Reliability analyses for all of the indices used in the study were subsequently run using Chronbach’s alpha statistic. The resulting standardized item alpha for the experience scale was .62. Standardized item alpha for perceived usefulness was .90; for attitude .89; and for behavioral intention .72.
Hypothesis Tests

Hypothesis 1, which predicted that behavioral intent would be higher for subjects with a high level of prior experience than for subjects with a low level of prior experience, was supported. Multivariate analysis using ANOVA was conducted, results of which indicated a main effect for prior experience, F(1,118)=5.61, p < .02. Comparison of means as displayed in Table 1 revealed that subjects with a high level of experience had a stronger behavioral intent than did subjects with a low level of experience.

| Table 1 Comparison of Means for Effect of Experience on Behavioral Intent |
|-----------------|-----|-----|
| High level of experience | n=66 | M=3.42 | SD=.67 |
| Low level of experience    | n=53 | M=2.90 | SD=.80 |

Hypothesis 2, which predicted that perceived usefulness would be higher for subjects with a high level of experience of Internet communications tools than for those subjects with low levels, was supported. ANOVA results revealed a main effect for experience, F (1, 119) = 4.54, p < .03, which indicated that subjects with higher levels of experience had a more favorable perception of the usefulness of Internet communications tools than did subjects with a lower level of experience of these technologies. Table 2 displays these results.

| Table 2 Means for Effect of Experience on Perceived Usefulness |
|-----------------|-----|-----|
| High level of experience | n=67 | M=3.44 | SD=.75 |
| Low level of experience    | n=53 | M=3.14 | SD=.79 |

For hypotheses 3a and 3b, which predicted that behavioral intent would be highest for subjects with high levels of experience, the research questions are:

1. Decision-making processes in the development of single-language presentations (separate publications for each language) or multilingual publications (one publication including two or more languages).
   a. Are single-language publications more effective for certain target audiences?
   b. When are bi- or multilingual publications preferable?
2. Determining effective processes for the development of material that includes one or more languages.
   a. What are the research steps and available literature related to the culture and its system of communication?
   b. How does the design process change when developing multilingual communication?
   c. How should design prototypes be evaluated?
3. Identification of appropriate sources for translation and consultation.
   a. What variables need to be considered when selecting a translator?
4. Determining the necessary stages in the development of multilingual information.
   a. Can a distinct methodology be established?
   b. How can related research be applied to different cultural groups?

B. Objectives and Research Questions of Design Variables

Design variables focus on including layout and images used to construct the messages.

- identification of effective processes for the development of material that includes one or more languages.
- identification of design variables and elements that influence the understanding of multilingual printed pieces;
- identification of differences in visual perception and comprehension among diverse cultural groups;
have a terse, vivid, poetic style, characterized by carefully chosen words, condensed meaning, and alliteration (Somali in Minnesota, 1998 [on-line]).

**Importance of the Study**

The need for print communication for Hmong and Somali refugee populations has been cited by a number of service organizations (Berg, personal communication, October 5, 1997; Hirte, personal communication, October 18, 1997; Suga, personal communication, October 22, 1997). Designers familiar with the framework of their culture, language, and communication systems can use more informed means to reach these people. Providing them with written materials effective in conveying information about education, social services, medical care, job information, and housing will make their transition into American society easier. In addition, increased knowledge about communication will positively impact social service organizations and graphic design professionals through the publication of procedural and design guidelines for multilingual publications.

**Goals**

One goal of this study is to increase graphic designers’ awareness of procedural and design variables necessary to develop effective bilingual/multilingual printed information and to work with community service professionals in the development of design prototypes. The ultimate goal is to improve and enhance the visual communication of multilingual printed information in order to facilitate comprehension by culturally diverse immigrant groups.

**Objectives and Research Questions**

The objectives of this study are divided into two categories: procedural considerations and design variables.

**A. Objective and Research Questions of Procedural Variables**

Procedural variables address the question: “What steps are necessary in the development of visual messages for diverse cultural groups?”

- collaboration with community organizations in the development of effective collaborative procedures and design strategies;

| Table 3 Means for Effect of Experience and Perceived Usefulness on Behavioral Intent |
|----------------------------------|----------------------------------|
|                                   | High Perceived Usefulness         | Low Perceived Usefulness         |
| High Level of Experience          | 3.98 ± .75                      | 3.17 ± .63                      |
| Low Level of Experience           | 3.79 ± .73                      | 2.08 ± 1.33                     |

Hypothesis 4, which predicted that perceived usefulness and experience would be the strongest predictor variables of behavioral intent to use Internet communications tools, was supported. To test this hypothesis, all TAM predictor variables were loaded into a linear regression model that utilized the behavioral intent index as the dependent variable. Linear regression analysis was performed, and the regression proved to be significant, $F(3, 118) = 17.08, p < .001$. Results indicated that, for all subjects, experience and perceived usefulness were the most significant predictors of behavioral intent to use Internet communications tools (Table 4).

| Table 4 Prediction of Behavioral Intent to Use Internet Communications Tools |
|----------------------------------|----------------------------------|
| Variables                        | R      | Beta   | R²   |
| Attitude Toward Use              | .07    | .077   |      |
| Experience                       | .24    | .407** |      |
| Perceived Usefulness             | .38    | .247** | .555 |

**p < .01**
There are two main versions of Hmong oral language. The white dialect is the principal dialect, using words stressed within the throat. Green dialect requires a softer tone and more tongue rolling. There is some controversy as to the legitimacy of the other dialects, the Blue and the Striped. The difference in dialects equates to the difference between a Texas and a British accent of the English language. Subgroups of this culture are distinguished by the dialect they speak, the color of clothing they wear, and the variations on the rituals they perform.

Somali Language and Communication Systems

Somali immigrants are relatively new to the United States as their migration has taken place in the mid-to-late 1990s. Therefore, Americans know little about their religious customs and lifestyles. The Somali Center in Minneapolis, Minnesota, has found that once settled in the United States, the Somalis remain true to clan designations. A leader is appointed to serve as a liaison for its members to the outside world. The majority of this population is Muslim and bring with them strong religious practices and laws. For example, devout Muslims must take time to pray five times a day.

Until the 1969-70 revolution led by General Muhammad Siad Barre, the colonized country of Somalia had become divided through a socio-economic stratum based on mastery of the English and Italian languages. Under the rule of Siad Barre, in 1972, an official Somali script was created. Its use was enforced nationally and used within the government. The script removed the language barrier and provided the means to promote a massive literacy campaign. By the mid-1970s, the government had claimed 60% literacy. Modern public education was offered free at all levels.

Somali nationals speak one of several dialects. Of these, the most widely used is Common Somali. Coastal Somali and Central Somali are the others. “Facility with language is highly valued in Somali society; the capability of a suitor, a warrior, or a political or religious leader is judged in part by his verbal adroitness. In such a society, oral poetry becomes an art, and one’s ability to compose verse in one or more of its several forms enhances one’s status. Speakers in political or religious assemblies and litigants in courts traditionally were expected to use poetry or poetic proverbs. Even everyday talk tended to
The primary focus of this study is on the visual communication of public service information from community service organizations to an audience of culturally diverse readers. Many of these readers have limited or no English proficiency. There is an increased need for communications that include at least one other language in addition to English. Minnesota has the highest rate of refugee and new immigrant resettlement, as reported by the U.S. Office of Refugee Resettlement in 1996. New immigrant groups have an immediate need for information about health services, housing, nutrition, and education. Increased accessibility to this information will help in the resettlement process. Contemporary attitudes toward multiculturalism demand that professional communicators provide information in several languages.

Most visual communicators in the U.S. have little experience with designing for ethnic groups different from their own. There is a need for more research and information on how to design for specific immigrant groups. The purpose of this project is to develop both a set of design guidelines and a recommended procedure that designers can use to design effective materials. Using both Hmong and Somali focus groups, we examined preferred and culturally appropriate design elements, and attempted to establish an effective process that other designers could use when working on multilingual projects.

**Hmong Language and Communication Systems**

There are approximately 150,000 to 200,000 Hmong in the United States who have settled primarily in Wisconsin, Minnesota, and California between 1975 and 1995. Several million remain in China, Thailand, and Laos and speak a variety of dialects. There was no written script until the mid 1900s because of a history of upheaval which caused their stories to be passed from generation to generation orally.

There are at least three typographies of this language. “Latin,” which is the most widely used typography, was introduced by French Catholic missionaries in the early twentieth century. “Ntawv Paj Ntaub,” which means letters of embroidery, uses characters that look like the designs found on traditional Hmong costumes. The women passed the stories of their heritage through such stitchery by sewing stylized symbolic characters into their dresses. “Ai Pao Lo” was created in the early 1990s and was derived from the Hmong’s historical and religious heritage.

Of this finding are important, since although most individuals know of and have pre-existing attitudes about the Internet in general, it is a still a relatively young and still evolving communication medium. The level of usage, and consequently, experience of Internet communication tools within an agricultural audience is likely to be relatively low compared to usage of the Internet itself as a purely information tool. Even in the classroom setting, many students’ experience of these technologies is limited to browsing a Web page as part of a class assignment or to gain material for research.

Based on the results of this study, it would seem apparent that it is not only an audience’s level of experience, but also the quality of that experience that will be a critical factor in determining usage behavior. From the institutional perspective, there are obvious incentives in developing communications that utilize technologically innovative techniques such as Internet communications tools. But, while early adopters may be intrinsically motivated to adopt a new technological innovation and ignore any minor disadvantages or risks, the larger populations of late adopters and early majorities may have quite different experiences, perceptions and motivations which drive their adoption behavior. To be successful, a technologically innovative communication tool may need not only to be perceived as effective, but also capable of being framed according to the benefits of its use and the positive prior experiences of at least some users who are also members of the potential audience.

Based on the results of this study, it seems likely that whether in the classroom, or in communicating to an eternal audience, it would be helpful to integrate opportunities to let audiences try out a new communications technology before implementing it. The undeniable efficiency and potential of Internet communication tools, in the classroom, in the field, in the county extension office and with the public in general, provides a compelling rationale for continued efforts aimed at growing the experience base and providing opportunities for our constituencies to access and use these tools to communicate about important agricultural issues. In the classroom setting especially, it seems even more critical that our students continue to be exposed to evolving communications technologies. The skills and experiences they develop in these areas will not only assist the technology transfer process, but also
Designing Multilingual Communications

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Abstract

Focus groups of recent Hmong and Somali immigrants provided information about effective design variables for public service brochures. Each immigrant group participated in two sessions. The first session queried subjects on preferences for layout and bilingual text, and appropriate fonts and images. During the second session participants reacted to several variations of a brochure that was designed using findings from the first session. Both Hmong and Somali participants preferred a bilingual layout including both their language and English. Font legibility was important; good contrast between letterforms and background was essential. Images used should respect cultural expectations. The Hmong participants did not respond favorably to images showing native dress, while images of Somali immigrants must respect cultural aspects of dress.

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