Culture and International Usability Testing:

The Effects of Culture in Interviews

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Abstract

Designing global interfaces for users has always been a challenge. This challenge is even greater today with the current trend of globalization, which leads to highly diverse users of the same product. The global audiences for the software and information technology products belong to different countries, different religions, speak different languages, have different life styles, belong to different cultures and have different perceptions and expectations of the same product. A truly global product must inherently accommodate this diversity in order to be effective and successful. A major impediment is that there is very inadequate understanding of the role of culture in user interfaces and how they are built. This lack of understanding is further compounded by the fact that very little empirical work exists regarding the role of culture in usability testing. The objectives of this research are to study and empirically establish the effects of culture on the usability assessment technique of structured interviews.

A study was conducted to determine the effects of culture on Indian participants when structured interviews are used in usability testing. The experiment consisted of usability testing of two independent groups of Indian participants by two interviewers; one belonging to the Indian culture and the other to the Anglo-American culture. The findings from the study clearly demonstrate the effects of culture on structured interviews during international user testing. Participants found more usability problems and made more suggestions to the interviewer from their own culture than to the interviewer from a foreign culture. The results of the study prove that culture affects the efficacy of structured interviews during international user testing.
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Dedication

To you my Maya,
for the testing times and sparse spaces,
for being there beyond the time zones; IST, EST; EDT; HST…
for being there as the changing constant
for love and care and life.
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Chapter 1: Introduction

Designing global interfaces for users has always been a challenge. This challenge is even greater today with the current trend of globalization, which leads to highly diverse users of the same product. The global audiences for the software and information technology products belong to different countries, different religions, speak different languages, have different life styles, belong to different cultures and have different perceptions and expectations of the same product. A truly global product must accommodate this diversity in order to be effective and successful. Think globally and act locally had long been the paradigm for success in the global market. To achieve this, products must be localized to incorporate the local preferences and expectations. Products must be customized to the local culture.

The true measure of the success of localization of the product is found by the usability evaluation with real users. This is done by employing usability assessment techniques like questionnaires, interviews, think-aloud etc. These techniques are inherently flawed when used to test a localized product in the target culture in the sense that they belong to the culture in which the product was developed, in most cases the US. Just as different cultures call for different versions of the same software and products, different usability methods might be needed for different cultures. Usability testing might not provide accurate information when a localized product is tested with techniques that are from a different culture. International usability testing generally involves a usability expert from the product country and a local facilitator in the target country [29]. When differences in cultures exist between the interviewer and the users, structured interviews may mask the usability problems instead of discovering them.

Prior research has found that culture affects the usability evaluation process [2, 4, 5, 8, 9, 16, 32, 42, 43]. For example, culture affected the functioning of focus groups [2], the think-aloud protocol [43], questionnaires [5] and the understanding of metaphors and interface design [8, 9]. However, the role of culture during structured interviews remains unexplored.
During structured interviews, does culture influence the thinking, feeling and behavior of the users? The efficacy of the current structured interview technique to produce accurate information during international user testing has not been empirically determined before.

1.1 Research Statement
This research concerns itself with evaluating the efficiency and reliability of current structured interview techniques when international user testing involves participants from large power distance countries. Power Distance is defined “as the extent to which the less powerful members of institutions and organizations within a country expect and accept the power that is distributed unequally” [13, Page 28]. People in large power distance cultures are much more comfortable with a larger status differential than small power distance cultures.

A controlled study was conducted to determine the effect of the culture of interviewers on the performance of large power distance participants. The experiment consists of usability testing of two independent groups of Indian participants by two interviewers one belonging to the Indian culture and the other to the Anglo-American culture.

1.2 Research Objectives
There are no empirical studies that establish the efficacy of structured interviews in international user testing. The objectives of this research are to:

1. Determine the efficiency of structured interviews in international user testing of large power distance participants when interviewers belonging to the local and foreign cultures are used. Participants may respond more to the interviewer from the same culture and this may affect the efficacy of the usability assessment technique of structured interview itself.

2. Determine if people from large power distance cultures would be more critical of the interface when interviewed by people from the same culture. Participants maybe guarded in their appraisal of the interface and less critical of it with the interviewer from a foreign culture.
1.3 Research Questions and Hypothesis

The usability assessment technique of structured interview is a case of human-human interaction, which means that social and cultural rules and norms play a role. This may effect the efficacy of the structured interview technique in the cross-cultural setting of international user testing. Quantitative and qualitative information obtained from structured interviews maybe enhanced or diminished depending on the cultural match or mismatch of the interviewer and the participants when the participants belong to a different culture.

**Research Question 1**

In international user testing involving participants from a large power distance culture, is the interviewer from the same culture as that of the participants more effective in elicitation of responses than the interviewer from a different culture?

**Hypothesis 1**

The interviewer from the same culture as that of the participants is more effective in elicitation of responses than the interviewer from a different culture. The differences in the number of responses given to each of the two interviewers will identify the effect.

**Research Question 2**

In international user testing involving participants from a large power distance culture, does culture of the interviewer have an effect on the number of usability problems found by the participants during structured interviews?
Hypothesis 2

The interviewer from the same culture as that of the participants will be more effective than the interviewer from the foreign culture. The differences in the number of usability problems identified by the participants with each of the two interviewers will identify the effect.

Research Question 3

In international user testing involving participants from a large power distance culture, does culture of the interviewer have an effect on the number of suggestions made by the participants during structured interviews?

Hypothesis 3

The interviewer from the same culture as that of the participants will be more effective than the interviewer from the foreign culture. The differences in the number of suggestions made by the participants with each of the two interviewers will identify the effect.

Research Question 4

In international user testing involving participants from a large power distance culture, does culture of the interviewer have an effect on the number of positive comments made by the participants during structured interviews?

Hypothesis 4

Participants will be more positive in their appraisal of the interface with the foreign culture interviewer. The interviewer from the foreign culture as that of the participants will elicit more number of positive comments than the interviewer from the same culture. The differences in the number of positive comments made by the participants with each of the two interviewers will identify the effect.
**Research Question 5**

In international user testing involving participants from a large power distance culture, does culture of the interviewer have an effect on the number of negative comments made by the participants during structured interviews?

**Hypothesis 5**

Participants will be more critical of the interface with the interviewer from the same culture. The interviewer from the same culture as that of the participants will elicit higher number of negative comments than the interviewer from the foreign culture. The differences in the number of negative comments made by the participants with each of the two interviewers will identify the effect.

**Research Question 6**

In international user testing involving participants from a large power distance culture, does culture of the interviewer have an effect on the number of culture related comments made by the participants during structured interviews?

**Hypothesis 6**

Participants will make more culture related comments to the interviewer from the same culture due to the common ground of culture. The interviewer from the same culture as that of the participants will elicit more number of culture related comments than the interviewer from the foreign culture. The differences in the number of culture related comments made by the participants with each of the two interviewers should identify the effect.
Table 1: Experimental Design

| Interviewer     | Total Responses Given | Usability Problems Found | Suggestions Made | Positive Comments Made | Negative Comments Made | Culture Related Comments Made |
|-----------------|-----------------------|--------------------------|------------------|------------------------|------------------------|-----------------------------|
| Indian          | T1                    | U1                       | S1               | P1                     | N1                     | C1                          |
| Anglo-American  | T2                    | U2                       | S2               | P2                     | N2                     | C2                          |

**Null Hypothesis H0: Hypotheses 1,2,3,4,5,6 are all false.** Culture does not affect the results of using the structured interview technique when participants are from a large power distance culture.

*Hypothesis 1: T1 > T2*  
*Hypothesis 4: P1 < P2*  
*Hypothesis 2: U1 > U2*  
*Hypothesis 5: N1 > N2*  
*Hypothesis 3: S1 > S2*  
*Hypothesis 6: C1 > C2*

1.4 Justification

This research will empirically establish the effect of culture during structured interviews in international user testing. The direct contribution of this research will be the evidence that interviewers from the same culture are more effective when participants belong to a large power distance culture. This will help usability professionals to recognize the effects of culture during structured interviews in international user testing. This will result in accurate and improved elicitation of information from the users, which in turn will lead to improve the usability of the product.
Chapter 2: Literature Review

2.1 Cultural Anthropology

Culture refers to human activity; different definitions of culture reflect different theories for understanding, or criteria for valuing, human activity.

2.1.1 Definition of Culture

Culture has been defined in different ways by different researchers. A compiled list of over 200 different definitions of culture can be found in Kroeber and Kluckhohn’s book [18]. This research uses Geert Hofstede’s definition of culture: “Culture is the collective programming of the mind which distinguishes the members of one group or category of people from another” [13]. Hofstede’s cultural model of dimensions is best suited for empirical research as scores for each individual member of the culture can be computed unambiguously. Many other cultural models are typologies, which are problematic in empirical research as individuals rarely fall into an ideal type.

Selected definitions of culture are listed below:

"Culture is learned and shared human patterns or models for living; day-to-day living patterns. These patterns and models pervade all aspects of human social interaction. Culture is mankind’s primary adaptive mechanism" [3, Page 367].

"Culture is the shared knowledge and schemes created by a set of people for perceiving, interpreting, expressing, and responding to the social realities around them" [19, Page 9]

These two definitions are close to Hofstede’s definition of culture. Culture is defined as patterns or schemes. Hofstede’s term “programming of the mind” implies patterns and schemes. Culture is shared and is a factor in an individual’s social interactions.
2.1.2 Hofstede’s Cultural Model

Cultural models can be used to identify the differences in cultures that affect the usability assessment techniques. There are different kinds of cultural models: models that use typologies and models that use dimensions. Typologies describe a number of ideal types each easy to imagine. Dimensional models group together a number of phenomena in a society, which were empirically found to occur in combination into dimensions. Typologies are difficult to adopt in empirical research as real cases very rarely correspond to one single ideal type. A dimension-based model is best suited for empirical research as cases can be classified unambiguously.

Hofstede’s cultural model consists of five dimensions. Each dimension groups together phenomena in a society that were empirically found to occur in combination. Hofstede’s seminal work on cultures in organizations formulated a framework of four dimensions culture identified across nations. The fifth dimension of Long- vs. Short-term Orientation [14, 15] was added after Michael Harris Bond discovered it.

2.1.2.1 Power Distance—“the extent to which the less powerful members of institutions and organizations within a country expect and accept the power that is distributed unequally” [13 Page 28]. People in large power distance cultures are much more comfortable with a larger status differential than small power distance cultures. Marcus and Gould outline the following possible influences of power distance on aspects of user-interface and Web design: information access, hierarchies in mental models, value given to authority and official symbols and preference for explicit vs. implicit security regulations [22].

2.1.2.2 Collectivism vs. Individualism—“individualism pertains to societies in which the ties between individuals are loose: every one is expected to look after himself or herself and his or her immediate family. Collectivism as its opposite pertains to societies in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people’s lifetime continue to protect them in exchange for unquestioning loyalty” [13 Page 51]. This dimension describes the degree to which a culture relies on the self or the group. The following aspects can
be influenced by this dimension: importance given to personal achievement, rhetorical style of the contents, projected sense of social morality, and emphasis on change and privacy issues [22].

2.1.2.3 Femininity vs. Masculinity-“masculinity pertains to societies in which the gender roles are clearly distinct; femininity pertains to societies in which the gender roles overlap” [13 Page 82]. This dimension refers to expected gender roles in a culture. The cultures that score towards what Hofstede refers to as "masculine" tend to have very distinct expectations of male and female roles in society. The more "feminine" cultures have a greater ambiguity in what is expected of each gender. Marcus and Gould mention the following aspects of interfaces that may be preferred by the masculine cultures: traditional gender/family/age distinctions, distinction of tasks, roles and exploration oriented navigation and control. On the same lines, feminine cultures would prefer the user-interface aspects of blurring of gender/family/age roles and mutual cooperation [22].

2.1.2.4 Uncertainty Avoidance-“extent to which the members of the culture feel threatened by uncertain or unknown situations” [13 Page113]. This dimension refers to how comfortable people feel towards ambiguity. Low uncertainty avoidance cultures feel much more comfortable with the unknown. High uncertainty avoidance cultures prefer formal rules and any uncertainty can express itself in higher anxiety High uncertainty avoidance cultures will prefer the following aspects of interfaces: simplicity, navigation schemes that maintain a high degree of location awareness to the user, error reducing mental models and redundant cues. On the other hand, low uncertainty avoidance cultures would prefer the exact opposite: complexity of content, less control of navigation, task-oriented mental models [22].

2.1.2.5 Long- vs. Short- term Orientation-“long-term orientation stands for the fostering of virtues oriented towards future rewards, in particular perseverance and thrift [13 Page 261], short-term orientation stands for the fostering of virtues related to the past and the present in particular respect for tradition and fulfilling social obligations ” [13 Page 262]. This dimension focuses on the degree the society embraces devotion to traditional values and to forward thinking values. Marcus and Gould mention the following aspects of interfaces that long-term orientation countries would emphasize: practice and practical value focused content and use of relationships as a source of information and patience. They say that short term oriented countries would
emphasize the opposite: truth focused contents, use of rules as a source of information and impatience at long tasks [22].

2.1.3 Measurement of Power Distance Dimension
The dimension of power distance derives its name from the experimental social psychology research of Mauk Mulder [13]. Mulder focused on the emotional distance that separates subordinates from their bosses. Hofstede measured the scores on power distance for 50 countries and 3 multi-country regions from the answers from IBM employees in the same kind of position on the same survey questions. The questions were designed by Hofstede. The questions had pre-coded answers so that the answers were represented by a score number. For an equally composed sample of people from each country, either a mean score or the percentage of people choosing particular answers was computed. A table was thus composed of mean scores or percentages for each question and for all countries. Factor analysis was then used to sort the survey questions into clusters for which mean scores or percentages varied together. 32 questions were used in the factor analysis. One of the clusters formed related to power and inequality. Hofstede selected from this particular cluster three questions that were most strongly related to power and inequality. The power distance index (PDI) was calculated from the mean scores of the standard sample of IBM employees in a country for these three questions.

The power differential scale developed by Earley and Erez [6] will be used to measure the power distance of the Indian participants Group. The power differential scale is similar to the power distance questionnaire used by Hofstede and is more robust and reliable [6].

2.1.3.1 Power Distance Index
Power distance of a country is measured by its score on the power distance index or PDI. The countries/regions are ranked from large to small power distances. India along with West Africa is ranked 10/11 on the power distance index. This means that India has 10/11th largest power distance among the countries and regions surveyed by Hofstede.
| Score Rank | Country or region     | PDI Score |
|------------|-----------------------|-----------|
| 1          | Malaysia              | 104       |
| 2          | Guatemala             | 95        |
| 3          | Panama                | 95        |
| 4          | Philippines           | 94        |
| 5/6        | Mexico                | 81        |
| 5/6        | Venezuela             | 81        |
| 7          | Arab countries        | 80        |
| 8/9        | Ecuador               | 78        |
| 8/9        | Indonesia             | 77        |
| 10/11      | India                 | 77        |
| 10/11      | West Africa           | 77        |
| 12         | Yugoslavia            | 76        |
| 13         | Singapore             | 74        |
| 14         | Brazil                | 69        |
| 15/16      | France                | 68        |
| 15/16      | Hong Kong             | 68        |
| 17         | Colombia              | 67        |
| 18/19      | Salvador              | 66        |
| 18/19      | Turkey                | 66        |
| 20         | Belgium               | 65        |
| 21/23      | East Africa           | 64        |
| 21/23      | Peru                  | 64        |
| 21/23      | Thailand              | 64        |
| 24/25      | Chile                 | 63        |
| 24/25      | Portugal              | 63        |
| 26         | Uruguay               | 61        |
| 27/28      | Greece                | 60        |
| 27/28      | South Korea           | 60        |
| 29/30      | Iran                  | 58        |
## Table 2: Power Distance Index

### 2.1.3.2 Hofstede Dimensions Comparison: India vs. USA

| Rank | Country    | PDI  | IDV | MAS  | UAI  | LTO |
|------|------------|------|-----|------|------|-----|
| 10/11| India      | 77   | 21  | 48   | 56   | 40  |

Table 2: Power Distance Index

2.1.3.2 Hofstede Dimensions Comparison: India vs. USA

| Rank | Country       | PDI  | IDV | MAS  | UAI  | LTO |
|------|---------------|------|-----|------|------|-----|
| 29/30| Taiwan        | 58   |     |      |      |     |
| 31   | Spain         | 57   |     |      |      |     |
| 32   | Pakistan      | 55   |     |      |      |     |
| 33   | Japan         | 54   |     |      |      |     |
| 34   | Italy         | 50   |     |      |      |     |
| 35/36| Argentina     | 49   |     |      |      |     |
| 35/36| South Africa  | 49   |     |      |      |     |
| 37   | Jamaica       | 45   |     |      |      |     |
| 38   | USA           | 40   |     |      |      |     |
| 39   | Canada        | 39   |     |      |      |     |
| 40   | Netherlands   | 38   |     |      |      |     |
| 41   | Australia     | 36   |     |      |      |     |
| 42/44| Costa Rica    | 35   |     |      |      |     |
| 42/44| Germany       | 35   |     |      |      |     |
| 42/44| Great Britain | 35   |     |      |      |     |
| 45   | Switzerland   | 34   |     |      |      |     |
| 46   | Finland       | 33   |     |      |      |     |
| 47/48| Norway        | 31   |     |      |      |     |
| 47/48| Sweden        | 31   |     |      |      |     |
| 49   | Ireland       | 28   |     |      |      |     |
| 50   | New Zealand   | 22   |     |      |      |     |
| 51   | Denmark       | 18   |     |      |      |     |
| 52   | Israel        | 13   |     |      |      |     |
| 53   | Austria       | 11   |     |      |      |     |
| USA | 38 | 40 | 1 | 91 | 15 | 62 | 43 | 46 | 17 | 29 |
|-----|----|----|---|----|----|----|----|----|----|----|

Table 3: Hofstede Dimensions Comparison: India vs. US

Where

PDI: Power Distance Index   IDV: Individualism Index
MAS: Masculinity Index      UAI: Uncertainty Avoidance Index
LTO: Long-term Orientation Index

Indian and US cultures differ on Power Distance, Individualism and Long-term Orientation indices [13]. India and US are close to each other on the Masculinity and Uncertainty indices. With regard to power distance, India is ranked 10/11 with a score of 77 whereas US is ranked 38 with a score of 40.

2.1.4 Discussion of Large (India) vs. Small (USA) Power Distance

In the large power distance cultures children are expected to be obedient towards their parents. Respect for parents and elders is seen as a basic virtue. Children are looked after, they are not supposed to experiment for themselves, decisions are not made by them, and they are supposed to accept the decisions of the elders. In the small power distance cultures children are more or less treated as equals; children take control of their own affairs as soon as they can. Children are in a way held responsible for their own acts and decisions. They should grow up to become independent individuals [13].

In the large power distance cultures teachers are treated with respect; the educational process is teacher-centered, teachers outline the intellectual paths to be followed. Students in class only speak up when invited to. Teachers are never publicly contradicted or criticized. The process is also largely personalized in such a way that the quality of one's learning is highly dependent on the excellence of one's teachers. In the small power distance cultures teachers are supposed to
treat the students as basic equals. The educational process is student-centered, with a premium on student initiative. Students are expected to find their own intellectual path. Students speak up freely, argue and contradict their teachers when they feel that the teacher is wrong. The process is rather impersonal; the knowledge that is transferred is independent of a particular teacher [13].

In large power distance cultures, there is considerable dependence of subordinates on bosses. The boss is the one who "knows", he is to be respected as such. In small power distance cultures, there is limited dependence of subordinates on bosses, and a preference for mutual consultation, teamwork. In the larger power distance cultures, power is seen as a basic fact of society that prevails over the choice between good and evil. A desire for status consistency is typical for large power distance cultures. The powerful are entitled to privileges and are expected to use their power. In the small power distance cultures, a feeling dominates that the use of power should be legitimate and subject to the judgment between good and evil. Inequality is considered undesirable. Power, wealth and status need not go together. It is even considered a good thing if they do not [13].

These aspects of power distance can affect the efficacy of the usability assessment technique of structured interviews. Participants may respond more freely and openly to the interviewer from the same culture than to the interviewer from a foreign culture. They may tone down their negative comments and make comments that are more positive to the foreign interviewer to save the face of the designers/developers and not to appear rude. The cultural common ground between the same culture interviewer and the participants will help in effective communication and in identifying culture-related usability problems and/or design issues.

2.1.5 Addressing Acculturation in Cross-Cultural Research

Acculturation is a process that occurs when two or more cultures interact together. Acculturation occurs as the dominant host culture absorbs to a certain extent the minority immigrant culture or because both the cultures co-exist [35]. Although once certain patterns of thinking, feeling and acting have established themselves within a person’s mind during early childhood reside there and to learn new patterns one has to unlearn the old patterns, close contact with another culture can lead one to adopt some if not all of the dominant host culture’s values.
In cross-cultural research, the user’s perception of his/her identity is important, as it is a subjective statement of cultural character. Individuals from the minority immigrant culture with high acculturation may behave like the individuals from the dominant host culture. This becomes an external variable in cross-cultural research.

This external variable can be controlled by measuring the acculturation level of the participants belonging to the minority immigrant culture [39]. Participants with high level of acculturation can be best used as members of the dominant host culture or not included in the study [39].

This research will use the Suinn-Lew Asian Self Identity Acculturation (SL-ASIA) scale [35] to measure the acculturation levels of the Indian participants. This scale is chosen as it is specifically designed for Asians. Suinn-Lew Asian Self Identity Acculturation scale (See Appendix D)

Other acculturation scales are discussed below.

The Stephenson Multigroup Acculturation Scale (SMAS) [34] developed by Stephenson consists of 32 questions each with a 4-point likert scale of true, partly true, partly false and false. It measures the individual’s degree of acculturation with the dominant host culture. When used in a cross-cultural study the participants are classified into four categories based on their scores on two dimensions. The two dimensions are the Ethnic Society Immersion (ESI) and the Dominant Society Immersion (DSI). The four categories are Assimilation, Integration, Separation, and Marginalization. Means and standard deviations are computed to determine which mode in Stephenson’s model one belongs. Acculturation for epidemiological research in Mexican-American populations was developed by Hazuda et al [12]. Flannery Listing Index of Preferences (FLIP) [11] measures culture and gender. Shiang’s Cultural Beliefs and Behaviors Adaption Profile (CBBAP) [33] measures an individual's cultural beliefs and behaviors based on the concepts of independence and interdependence. The SASH-Y [1] is a summated rating scale designed to measure level of acculturation of Hispanic children. Since the Suinn-Lew Asian Self Identity Acculturation scale specifically designed for Asians it is a better fit than the above scales when participants of a cross-cultural study are from Asia.
As a note of caution, Suinn [35] says that even though an individual has high level of acculturation, self-definition of the individual might be in contrast to the actual behavior or values. Triandes et al. [39] discuss the ping-pong effect of participants biasing the responses to either extreme of the dominant host culture or the minority immigrant culture. Many of the acculturation scales linearly measure the unidirectional effect of the dominant host culture influencing the minority immigrant culture but the effects can be bi-directional in some cases.

Cultural anthropology research has been successfully applied to the fields of advertising and management but is largely left unapplied in HCI. This research aims to apply Hofstede’s cultural model to usability testing in the broad sense. Specifically Hofstede’s cultural model will be used to predict and to explain the results produced by the usability assessment technique of structured interview in international user testing of large power distance participants.

2.2 Cross-Cultural HCI Research

Research done by Nass [23, 24, 25, 26] in social aspects of HCI has shown that even computer-literate users tend to use social rules and display social behavior in their interactions with computers. Social behavior is strongly grounded in culture as every person carries within himself or herself patterns of thinking, feeling and potential acting. Much of this is learned during early childhood. As soon as certain patterns of thinking, feeling and acting have established themselves within a person’s mind they reside there. To learn new patterns of thinking, feeling and acting one has to unlearn the old patterns, which is more difficult than learning for the first time [13]. Further Hofstede’s cultural model of dimensions indicates what reactions are likely and understandable given one’s past.

International usability testing is inherently cross-cultural. Further, it is conducted in a social setting and particularly in the case of structured interviews, the social context is pronounced. Thus, the thinking, feeling, perception and reactions of users during international usability
testing can be understood and predicted by application of Hofstede’s cultural dimensions in conjunction with Nass’s work.

### 2.2.1 Culture and Interface Design

Fernandes [10] has identified various cultural issues of nationalism, language, social context, time, and currency, units of measure, cultural values, body positions, symbols and esthetics that need to be addressed during global interface design. The various solutions suggested are to provide ample space for accommodating varying width of date formats and top-level menu design taking the languages with large words into account. Fernandes calls for the development of a set of international guidelines for the designers and developers. Similarly, Russo and Boor [31] present a checklist of cross-cultural items to be considered in interface design. The checklist consists of text; number, date and time formats; images; symbols; colors; flow and functionality. They discuss each item on the checklist, the problems encountered in practice and propose solutions to avoid them. Russo and Boor emphasize the conducting of international usability tests at every stage of the development process. They place high importance on testing with native users as they can help in finding out the subtler issues of the interface. They mention the issues of working out the logistics and justifying the time and cost of implementation as outstanding.

Khaslavsky [17] describes the impact of culture on usability and design, presents variables useful for incorporating culture into design and various design implications and mentions issues in localization of design. Khaslavsky agrees that further research is needed to determine the effect of culture on interface perception and modeling so that a standard practice for software design can be developed. Khaslavsky suggests conceptual localization that matches a user’s culturally specific mental model of the software and functionality as an effective way to design international interfaces. Development of software for international use is mostly done by the recommended process of internationalization and localization [21, 36, 40]. Internationalization is the process of generating a generic core of the software that is devoid of all cultural
characteristics and localization is the process of developing the culture-dependent product for each particular culture. Elnahrawy has given culture specific recommendations and guidelines for website designers [7]. Elnahrawy concludes that differences between cultures affect the understanding of the websites and calls for further research on cross-cultural effects in user interface design.

However, the cultural issues addressed by all the above are on a surface level. They do not consider cultural models in evaluating the cultural issues in interface design. Symbols, heroes, rituals values and practices are the most important manifestations of culture [13]. Together, they cover the total concept of culture [13]. The cultural issues identified by Fernandes, Russo and Boor, Khaslavsky and Elnahrawy consider only the symbols and rituals of different cultures ignoring the rest of the cultural manifestations. The cultural issues thus identified are the most visible and superficial aspects of culture. Cultural issues in interface design due to the differences in cultural values and practices are left unidentified. This research will aim to identify the cultural effects when users from India, a large power distance culture, participate in structured interviews.

### 2.2.2 Culture and Usability

Beu et al. emphasize that explication and understanding in a foreign cultural context is only possible if there is intense cooperation between representatives of the different cultures. Large power distance participants will be more comfortable interacting with the interviewer from the same culture than with one from a foreign culture. As part of an internal research project on intercultural usability engineering, the Department for User Interface Design at Siemens Corporation, Germany Honold and Beu et al set up focus groups with Chinese people living in Germany. Focus groups involve group discussions centering on a particular topic and are given structure by a discussion leader. However, a doubt was cast on whether the results of the discussions could be applied to Chinese needs accurately. They decided that there is no substitute for conducting investigations with in the target country. The established methods of usability engineering, such as focus group discussions, expert evaluation and usability testing were used in the expanded international environment. However, there were problems in the long run though
the earlier results were good. Conducting focus group discussions in China was four times costlier than in Germany. In China despite the fact that participant profiles had been drawn up invitations had to be sent out to decision makers instead of end users. This was along the lines of the Chinese notion of hierarchy. The quality of the usability tests and the focus group discussions varied greatly depending on the discussion leader and the setting. Beu et al. report that there were problems when data from different cultural sectors had to be compared to draw conclusions about the design. Beu et al. note that requirements relating to the operation of a product were very quickly distorted, misinterpreted, or dropped if they did not tally with the indigenous cultural standard. This is explained mostly by the differences in the way people from different cultures work.

To make it possible for user-interface projects to be handled by multidiscipline teams as well as by multicultural teams to the same high standards the authors were part of a team that set up a laboratory in China, and a laboratory in the United States. Beu et al. found culture-related barriers in China particularly that hinder discussions within a focus group if the discussions are held as they are currently in Germany or the United States. The main barriers are listed by Beu et al. as:

• Modesty and reserve with regard to one’s achievements.
• Respect and consideration for others.
• Caution and thoughtfulness in speech.
• Fear of losing face.
• Standardization of language usage with differentiated speech and action depending on hierarchies and situations.
• Avoidance of direct criticism.

All of these cultural barriers are characteristics of a large power distant, collectivist, and long-term oriented culture like India. These cultural barriers can appear in structured interviews too as the social context is much similar to that of focus groups. Based on the results from their research, they conclude that during intercultural usability testing, usability constructs, usability operators and usability assessment process should be strictly similar. They identify the expansion
and enrichment of the existing repertoire of usability assessment methods with culture-specific procedures as a further challenge.

Yeo [43] describes a study conducted to examine the efficacy of the global-software development lifecycle (global-SDLC), a Western software development approach employed to derive software for the global market. In the study, the global-SDLC was applied to adapt a US English spreadsheet for a non-Western market, Malaysian. Global-SDLC involves the two-step globalization and localization process.

An American English spreadsheet known as TCALC was selected for adaptation. The target culture of this spreadsheet was Bahasa Melayu literate speakers in Malaysia. Bahasa Melayu is Malaysia’s national language. Malaysia was selected as the target culture because the author of the paper is himself a Malaysian. As a result, the background knowledge to adapt the software application for Malaysian users was available. In the internationalization stage of the spreadsheet, culture-sensitive items such as prompts, error messages were extracted and placed in a message file. A generic core was thus obtained. The messages in the English message file were then localized to Bahasa Melayu. In the design evaluation phase, the design was assessed by the author. In the coding/implementation phase, the generic core was implemented to accommodate the Bahasa Melayu and English message files. After the design and implementation of the product, the adapted spreadsheet known as FIRST was usability evaluated in an experiment in accordance to the global-SDLC techniques mentioned by the author.

17 Malaysians who had experience using Microsoft Excel 5.0 on a Windows platform were recruited to evaluate the usability of the spreadsheet utilizing three usability assessment techniques: think aloud, questionnaire, and interview. The think aloud technique collected objective data. The questionnaire System Usability Scale (SUS) and the interview collected subjective data. Participants needed to perform six assigned-tasks using FIRST. After the think aloud session, the participants rated the FIRST’s usability using the SUS. Then the participants were interviewed to obtain their opinions of the spreadsheet and to garner suggestions for improving FIRST.
The think aloud and interview transcripts done by the author were then scrutinized for usability problems. The participants’ perceived usability of the spreadsheet, rated via the SUS, was obtained. The think aloud transcripts were scrutinized for positive and negative behaviors. Each positive-behavior identified contributed “+1” to an aggregate “think aloud behavior” score; and each negative-behavior contributed “-1”. The aggregate scores of all participants were then sorted in descending order and ranked from 1 (highest score) to 17 (lowest score). A low score or rank would indicate that the participant had relatively more negative than positive behaviors compared to a participant with a higher rank. These scores also reflect the performance of the participants in the think aloud. A low rank would suggest the participants performed poorly, that is, the participant encountered relatively more problems since more frustrations and negative comments were expressed compared to a participant with a higher rank. The seventeen SUS scores were also ranked from 1 to 17; rank 1 was assigned to the participant with the highest SUS score, and rank 17, the lowest SUS score. The interview responses were ranked from the most positive interview response, as rank 1, to the most negative interview response, as rank 17. After rankings of all three UATs’ had been determined, the Spearman’s Ranked Correlation Coefficient was calculated to determine how well or consistent the ranking of one UAT correlated with the ranking of another UAT.

The design and implementation phase of the global-SDLC were found to be efficacious. However, the results of the usability evaluation were found to be inconsistent. The author attributes inconsistencies to the large power distance and collectivist culture of Malaysia. Malaysia is the country having the highest power distance. The author says that it would appear that the inconsistencies stem from the participants’ reluctance in providing critical negative comments, because of preservation of face and respect for hierarchy. Yeo explains the inconsistencies found in the usability evaluation phase by the predictions of behavior made by Hofstede’s cultural model. The study provides evidence that culture effects usability testing but the prime objective was to find the efficacy of entire global-SDLC process consisting of design, development and usability evaluation phases. A controlled study needs to be done to establish empirically the effects of culture in structured interviews.

Marcus and Gould [22] applied Hofstede’s cultural dimensions to web and user-interface design. The authors mention each of Hofstede’s five cultural dimensions and the aspects of design that can be influenced by that particular dimension. They present screen shots of different web sites
developed in different nations and point out the cultural influences on design. The findings amplify the cultural differences but are without empirical evidence.

Honold examined the notion of culture and its relevance to Human-Computer Interaction and discusses the theories of culture in HCI [16]. Honold found cultural influences when a washing machine developed in Germany was used in India. Honold identifies eight cultural factors that have to be taken into consideration in any investigation of the context in which the product is used: objectives of the users, characteristics of the users, environment, infrastructure, division of labor, organization of work, mental modes based on previous experience and tools.

Day and Evers [4] studied the role of culture in interface acceptance and have found existence of cultural differences in interface acceptance. They ignored the Internet and studied globally marketed software packages only. They found that Asians (Chinese and Indonesians) mix private and business matters, consider relationships and trust to be important and prefer to work in teams. These traits can also be observed in the Indian users as they are close to the Chinese and the Indonesians in Hofstede’s dimensions. Day and Evers [5] have done an instrumentation analysis of a questionnaire for multicultural data collection. The participants consisted of computer users from several different cultures. Based on the results they recommend not using unmodified questions from other studies due to the multicultural context. They discourage the use of open-ended questions involving substantial reading, substantial writing and questions that are visually not separated well. A six point scale is recommended to avoid response centering. An important suggestion is not to group related questions together as it might be lost on participants in a multicultural study. Evers et al. [8,9] report that results from a pilot study indicate that cultural aspects led to differences in user’s expectations and understanding of the website of a virtual campus.

Lee [20] conducted a study to identify how cultural characteristics influence people’s interaction with products and to evaluate using the WWW as tool for multicultural study. 172 participants from 15 countries participated in the study. They answered questions and performed tasks of operating a computer-simulated microwave oven through world-wide web. Participants from Japan, Korea and US are compared in their interaction styles and cultural characteristics. The
results of the study showed significant differences between Japan, Korea and US in interaction styles. Depth of the interface was turned out to be most contributing factor for usability of Korea and USA whereas most insignificant factor for Japanese who emphasized layout. Lee concludes that the difference in the cultural characteristics accounted for the different interaction styles.

Sears et al. [32] examined the international differences and effect of high-end graphical enhancements on the perceived usability of World Wide Web. They found significant differences between the users belonging to the two different cultures of United States of America and Switzerland. Country was significant in most questions regarding information organization. Teng et al. [37] have found that culture had limited impact on some specific aspects of IT decision making. Tractinsky [38] found that culture effects the users’ perception of aesthetics and apparent usability.

Nielsen recommends traveling to the target country and conducting usability tests as the best choice in international usability testing. Another alternative suggested by Nielsen is to employ local staff to conduct the usability testing [29]. Both the above suggestions ignore the effects of culture in the interactions between the evaluators and the participants. A strong conclusion can be reached from the above body of work that culture does play a role in usability testing. However, the specifics of the effects have not been addressed before. Usability assessment techniques have not been carefully studied in a cross-cultural context to evaluate their efficacy. Further more several researchers have pointed out there is a need for the empirical establishment of the cultural effects in usability testing. This will help to arrive at a standard set of design and development guidelines for the practitioners.

2.2.3 Interviews as Usability Testing Techniques

Interviews have the capacity to collect more information than a questionnaire as they can go into more detail. Interviews are of two types: Structured and Open-ended [41]. Structured interviews have a pre-defined set of questions. Open-ended interviews ask broad questions with out a pre-defined set of answers. The main advantage is that this allows uncovering unexpected information. Such information can be of high value during the
requirements phase. The main disadvantage is biases in the line of questioning. A structured approach usually provides more reliable and quantifiable data than an open-ended interview and can be designed rigorously to avoid biases in the line of questioning. Sometimes the middle way of semi-structured interviewing is used by combining both the structured and open-ended interview techniques.

An overview of how interviews can contribute to the usability life cycle is described by Rubin [30].

Figure 1: Role of interviews in Usability Life Cycle

In Rubin's model, interviews are used in the development stage and in the evaluation stage of usability testing. Interviews are used in the beginning of the development stage to design the questionnaire. They are used in the last stage of the evaluation to clarify user responses and collect additional information. This research explores interviews in the last stage of the evaluation. The lack of standardization and evaluation of usability assessment techniques results in the inability to suggest a particular technique to use in a particular stage beyond speculation and doubt.

This research will use structured interviews due to the following reasons:

1. All the questions will be very carefully phrased, presented in a standardized manner and an invariant order.
2. Most of the user's answers are determined by a fixed set of choices since the interviewer is seeking specific answers to usability questions. This will simplify collection of quantitative data suitable for statistical analysis.

3. The subjective design preferences questions will also be well defined and the users’ responses to them will help gather their subjective preferences.

2.2.4 Interview Guidelines

The following recommendations are standard interview guidelines taken from ISSUE Usability Evaluation Guidelines [41].

2.2.4.1 Social context

- **Inform the subject**: The participants must be put at ease. The interview must begin with a brief summary of who the interviewer is avoiding jargon and unnecessary technical detail, what information the interviewer is trying to collect and what it will be used for. The better informed the subjects are the more involved they will feel and the more likely they are to provide the cooperation required. Present the informed consent form and/or non disclosure agreement if your organization needs them.

- **Assure Confidentiality**: Assure the interviewees that any information volunteered will kept strictly confidential. If the interview is to be tape recorded, interviewee's consent should always be requested first.

- **Be Non-Evaluative**: Assure the participants that it is the system's performance that is being tested and not their performance. The interviewee must be made to feel like a co-evaluator. It is helpful to assure the participants that their contribution is important even if their comments or views seem trivial to them.

- **Relative numbers**: It is necessary to have an additional note taker in attendance for group interviews. If only one person is being interviewed, it is better to have only one interviewer.

2.2.4.2 Planning
• **Advance preparation**: It is essential to plan interviews carefully.

• **Ordering questions**: Group questions according to the major usability issues to be investigated. The sequence of groups should seem logical to the interviewee and should reflect the structure of the usability test tasks given.

• **Timetable**: Determine a maximum duration for the interview (up to 1 hour) and then allocate time accordingly. Write this information on the interviewer's schedule. This will help prevent all the time being taken up on the first few questions.

• **Form of questions**: Questions should begin with “How, Why, When?” rather than “Is it true that? Have you ever?” For example, ask ”What problems do you encounter when doing ...?” rather than "Has the machine ever failed when you have been using it?". Questions should not indicate a preferred answer (e.g. 'Some experts believe that would you agree with this?

• **Level of questions**: Make sure that your questions are appropriate for the interviewee concerned.

• **Pilot before use**: An interview should be tried out before it is implemented for data collection purposes. This should involve collecting and analyzing sample data. This precaution should determine whether the questions could be fully understood, whether they are liable to misinterpretation, and whether they will produce comprehensive answers.

### 2.2.4.3 Implementation

• **Location**: It is better to conduct the interview at the interviewees' normal workplace or desk since their 'home ground' is likely to be less threatening. However, if the content of the interview is potentially sensitive and privacy is necessary or there are likely to be frequent interruptions or significant background noise then a quiet room nearby may be required.

• **Manner**: The interviewer must be businesslike rather than either overly familiar or too formal. The interviewees must be allowed to express themselves without interruption but ensure that they are reminded of the question if they stray 'off the track'. A moderate degree of positive reinforcement, uniformly distributed, can significantly improve the amount of information volunteered by the respondents. This only requires the interviewer
to appear interested, make comments such as "good" and "fine" after the respondent's answers and smile and nod appropriately. Finally, the participants must be thanked.

- **Records**: Notes should be taken even with taped sessions. Tapes can be used as back-up to interview notes, particularly if the participant speaks rapidly.

- **Remain detached**: The interviewer must avoid offering his/her opinion. If there are apparent contradictions in the participant's account, they should not be pointed out but asked for a clarification. If the subject matter is procedural or technical, it is useful to have paper and pencils available so that the participants can draw a sketch if they wish.

- **Afterwards**: The interview must be written up from the notes as quickly as possible. A note must be made of any internal inconsistencies and any new issues that should be raised with subsequent participants. It may be appropriate to send a copy of the summary to the participant so that they can check it for accuracy.

### 2.2.4.4 Limitations of Interviews

Although interviews often yield valuable information, they have certain limitations. Interview relies on human memory, which can be inaccurate. User memory for task information can be unreliable if the user is asked to recall it away from the testing place after a long time. Users find it difficult to describe semi-automated tasks.
Chapter 3: Methodology

The review of literature points out to the lack of empirical data on the effects of culture in interviews. The application of Hofstede’s cultural anthropology model to usability testing allows the prediction as well as measurement of the cultural effects in usability testing. A two-phase experiment was designed to explore the effects of culture in structured interviews when international user testing involves participants from large power distance cultures.

3.1 Phase One

The main objective of Phase one is to gather the demographic data, the power distance score and the acculturation score for each participant. An issue of secondary importance was to find if there existed a correlation between the power distance score and the acculturation score of a participant. Phase one also served the purpose of providing the participant pool for Phase two of the experiment. Participants of Phase two were selected from Phase one.

In phase one, 25 Indian participants were given three questionnaires namely, Demographic Questionnaire, Power Differential Scale, and Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA).

3.1.1 Participants

Participants were all from the graduate study programs at Virginia Tech to ensure similar and comparable educational experience and age. Indian graduate students had been requested to voluntarily participate in the experiment. Various channels of communication like Indian Students Association (ISA)’s list serv, posters in departmental bulletin boards and discussion board of ISA were used to recruit the participants.
### 3.1.2 Questionnaires

Three questionnaires were used in Phase one. They were

1. **Demographic Questionnaire**
2. **Power Differential Scale**
3. **Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA)**

The Demographic questionnaire was used to collect information about participants’ age, gender, first language, ethnicity etc. Please refer to Appendix B for the demographic questionnaire. The purpose of power differential scale is to measure the individual power distance of each participant. Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA) was administered to measure the acculturation of the Indian students in to the dominant US culture.

### 3.1.3 Procedure

Participants were recruited after the experiment was approved by the Institutional Review Board (Refer to Appendix E for the IRB application). Recruited participants were provided with an Informed Consent Form (Refer to Appendix F for the Informed Consent Form) that details the experiment procedures and the participant responsibilities. All prospective participants were asked to read the Informed Consent and sign only if they are in agreement with it. Participants had the choice to leave at any time during the experiment. After the Informed Consent Form was signed by the participants the Demographic Questionnaire, Power Differential Scale and the Suinn-Lew Asian Self-Identity Acculturation Scale were given in that order. This concluded Phase 1 of the experiment.

The demographics data was collected from the demographic questionnaire. Average Age, average stay in the US and average stay in India were calculated.

The power differential scale is based on eight questions. Answer to each question is a number between 1-5. The sum of all eight answers is computed. Higher the sum larger is the power distance. The power differential questionnaire can be found in Appendix C.
The original SL-ASIA scale had 21 questions but questions 22-26 had been added to accommodate the current theory that acculturation is not linear and uni-dimensional but multi-dimensional and orthogonal. However, the validity and reliability of the newly added questions has not been tested by the authors. So although the SL-ASIA with 26 questions is used, this research will consider the scores on first 21 questions only for analysis.

For the first and original 21 questions, a total value is obtained by summing across the answers for all 21 items. The final acculturation score is then calculated by dividing the total value by 21. The range of scores can be from 1.00 (Low Acculturation) to 5.00 (High Acculturation). Because of the nature of the multiple choices content, a low score reflects low acculturation, while a high score reflects high acculturation. A different interpretation is that the total score indicates three kinds of acculturation. The Asian who becomes completely identified as a part of the dominant Western society is called "Western identified" or "assimilated" and will have a SL-ASIA score of 5. The Asian who retains identity with ethnic heritage and refuses attempts to become integrated within the Western society is called "Asian-identified" and will have a SL-ASIA score of 1. The third kind is the Asian who is capable of assuming the better of two worlds, with denial to neither, called “bicultural" and will have a SL-ASIA score of 3. The SL-ASIA questionnaire can be found in Appendix D.

Further, the power distance and acculturation scores of the participants were analyzed for correlation. A significant positive or negative correlation between power distance and acculturation can be used in international usability testing to screen participants to get the closest representative sample of the target users possible.
3.2 Phase Two

Phase two of the experiment consisted of usability testing of two independent groups of Indian participants by interviewers having two different cultural profiles. The two interviewers are from Indian and Anglo-American cultures. The Indian participants represent the large power distance culture. The Indian interviewer is from the same culture as the participants and the Anglo-American interviewer represents the foreign culture. Phase two of the project commenced three weeks after the completion of phase one.

3.2.1 Participants

Participants for Phase two were selected from the 25 participants of Phase one. 16 participants with 8 for each interviewer profile were recruited for Phase two by email correspondence and telephone conversations. Each group consisted of 7 male participants and 1 female participant.

3.2.2 Experimental Design

The experiment consisted of two groups representing the two types of interviewers. The two levels between the subjects are represented by the two interviewer cultural profiles; one Indian and the second, Anglo-American. A website intended primarily for Indian students at Virginia tech was used in the experiment. Usability problems were introduced into it and the experiment was designed to simulate an international user test.

| Interviewer     | Total Responses Given | Usability Problems Found | Suggestions Made | Positive Comments Made | Negative Comments Made | Culture Related Comments Made |
|-----------------|-----------------------|--------------------------|------------------|------------------------|------------------------|-------------------------------|
| Indian          | T1                    | U1                       | S1               | P1                     | N1                     | C1                            |
| Anglo-American  | T2                    | U2                       | S2               | P2                     | N2                     | C2                            |

Table 1: Experimental Design
The independent variables of the experiment are the two cultural profiles of the interviewers. The dependent variables in the experiment are the total number of replies made, number of usability problems found, suggestions made, positive comments made, negative comments made, culturally related comments made by the participants. Definitions of the terms used follow:

**Total Replies:** Sum total of all responses made by the participant during the structured interview.

**Usability Problem:** Interaction design flaw or a user difficulty directly associated with an interaction design flaw.

**Suggestion:** Subjective preference of the participant to the implemented design choice/tradeoff.

**Positive Comment:** Participant’s subjective approval of a design choice/tradeoff.

**Negative Comment:** Participant’s subjective disapproval of a design choice/tradeoff.

**Culture related Comment:** Participant’s reference to his/her native culture, country, customs, symbols, rituals and tradition.

Large power distance users were the participants recruited from the Indian participants pool of Phase 1. Any differences in the two groups in the total number of replies made, number of usability problems found, suggestions made, positive comments made, negative comments made and culturally related comments made by the participants is due to the cultural effects since all the participants were given the same usability tasks on the same website and were asked the same questions during the structured interviews. All the participants filled the same questionnaires in Phase one. The space and time characteristics of the experiment were also the same i.e. all the participants performed the experiment in the same room with the same set up on the same machine and all between 2-8 PM.

**3.2.3 Facilities**

The experiment was conducted in the Usability Testing Laboratory facilities of 102 McBryde Hall of Virginia Tech. The following figure shows the schematic diagram of the experiment facilities.
3.2.4 Equipment

Participants performed the usability testing tasks of the redesigned Association for India’s Development (AID) Website on a Windows 2000 computer. The participants used Internet Explorer 6.0 as the web browser.

The choice of the website was made owing to two facts. The target audience of the website is primarily Indian students at Virginia who are interested in contributing towards development projects in India. This researcher is an Indian by birth as well as by citizenship. This researcher came to Virginia Tech in 2000 for graduate study. He has lived 22 years before that in India and has the required background knowledge and insight into Indian culture.
3.2.5 Redesign of the AID Website

Association for India's Development (AID) is voluntary, not-for-profit organization that supports a wide variety of social service and development projects such as literacy, health care, rural credit, vocational training, women's empowerment and children's welfare. A.I.D is registered with the US Federal Government as a non-profit charitable association under the category 501(C)(3). AID-VT gets funds to support projects in India mainly through fund-raising drives in Blacksburg (like film festivals, classical dances, music concerts) and through selling Kroger/Food Lion gift certificates, kurtas (Indian ethnic shirts) and calendars. A significant contribution to the AID-VT funds is also made by the many generous personal donors.

Using Nielsen’s Ten Usability Heuristics [27], usability problems were introduced in to the Association for India’s Development (AID) WebPages. AID website was redesigned using Microsoft FrontPage 2000 Premium. The content and information of the AID WebPages was not altered, modified or enhanced. No new WebPages were created and none of the existing ones was deleted.

The five test tasks of the controlled usability study were designed first. The main emphasis in the design of the test tasks was to closely match the objectives of AID-VT chapter. The test tasks as given to the participants are listed below.

Task #1: Become a member of AID and find out the time and location of the next community service hour of AID

Task #2: Find out the information about the current executive committee members and find out the web co-ordinator for the AID VT chapter.

Task #3: Know about the project co-ordinated by Mr. Sivaram Tumma. Note down his contact info.

Task #4: Learn about the home schools project (SSGS) and contact the co-ordinator for the project.

Task #5: Learn about the grocery certificates. Get involved in the program.
The list of generic usability problems follows:

- Home Page’s color background is changed from white to saffron (orange) and the navigational bar at the bottom has less links than on the original site.

Figure 3: Original AID VT Home Page

Figure 4: Redesigned AID VT Home Page
- Links are not consistent across pages. For example, the activities page in the redesigned site does not have the “Home” link.
- Links are arranged in inconsistent order. For example, link layout ordering on the ‘Contact Us’ page has been changed. ‘Activities’ link comes before the ‘About AID- VT’ link in the redesigned page.

![Original Contact Us Page](image1)

![Redesigned Contact Us Page](image2)
- Color background of some pages has been changed to culturally sensitive colors. For example, ‘Join Us’ page on the redesigned site has black background, which is considered inauspicious in Indian culture.

Figure 9: Original Join Us Page

Figure 10: Redesigned Join Us Page
Here is a list of the important task-specific usability problems introduced.

Task 1

- There is no Join Us link on the index page
- The user has to click the Contact Us link and then the Join Us link
- To find out the next community service hour of VT the user has to come back to the Contact Us page and click on the Activities link.
- The community service hour is only mentioned by the abbreviation CSH.

Task 2

- The user has to scroll all the way down the previous committees to view the current executive committee.
- Text and table alignments are not consistent.
- The user may select an earlier web-coordinator instead of the current one.

Task 3

- The Project page can be reached through the About AID-VT and Contact Us links only.

Task 4

- The Project page can be reached through the About AID-VT and Contact Us links only
- The users need to remember their last task path in order to easily complete this task.

Task 5

- This page has to reached by clicking on the Activities link in the About AID-VT page

3.2.6 Procedure

The participants were scheduled for the phase two through email and telephone correspondence. The controlled study took place in the usability laboratory in McBryde 102. The interview guidelines [41] reviewed in the literature review chapter were adhered to in conducting the interviews. The interviewers were given a copy of the guidelines and they read them at least twice to understand and follow them. The interviewer greeted the participant and welcomed the participant into the usability test room. Each interviewer was given a predetermined introduction script and was advised to use it. This was done in order to control the familiarity and other characteristic traits from effecting the participants’ first impressions. The Indian interviewer
leveraged the cultural background by referring to the home state and the Indian cultural events at Blacksburg, Virginia Tech.

The introduction scripts for the Indian and US interviewer were as follows.

**Indian Interviewer**

Good Evening. I am Ravi Shankar Pemmasani. How are you doing today? Which part of India are you from? I am from Andhra Pradesh. Did you attend the Indian Film festival held recently? I watched three movies. We are testing the design of AID website and want to get feedback from the Indian students here in VT. It’s so nice that you are willing to participate. Shall we get started?

**US Interviewer**

Good Afternoon. I am Josh Steele. How are you doing today? Which part of India are you from? We are testing the design of AID website and want to get feedback from the Indian students here in VT. It’s so nice that you are willing to participate. Shall we get started?

The participants were then given a written description of the five usability tasks (Please refer to Appendix F for the Task List). The participants were asked to read each task description carefully and then perform the task. After the completion of all the tasks, a structured interview was conducted by an interviewer belonging to one of the two cultural profiles mentioned before. The interviewer took notes of the interview. The structured interview questions were centered on the five test tasks of the study. The structured interview questions were strongly grounded in the interview guidelines [41].

The structured interview questions follow:

1. Did the website keep you informed about where you are and what is happening?
2. What do you think about the colors used?
3. Please tell me about the language and phrases used in the website?
4. How are the user control and freedom in exploring and navigating the site?
5. What about the error messages?
6. Did you have to remember information on each page like the link layout or you could recollect from previous pages?
7. Did you feel the need for help or a site map?
8. How easy or difficult was it to join AID from the website?
9. Did you identify that CSH on the AID website stands for community service hour?
10. Do you think the Community service hour should have been used instead of CSH on the website?
11. What do you think of the consistency of the lay out of the links in the website?
12. How you think that the current executive committee members page should be organized?
13. How do you think that the projects and activities pages should be organized?
14. How easy or difficult was it to learn about the grocery certificates program?
15. Do you think there are cases of lack of information or over information on the website?
16. What do you think of the aesthetic quality of the website?
17. What do you think of the acceptance of the website?
18. What do you think about the site’s appeal to the Indian students at VT?
19. What do you think of the site’s appeal to the non-Indian students at VT?
20. Over all on a scale of 1 to 5, 1 being the worst and 5 being the best, how much will you rate this site?

Questions 1-15 were based on the five test tasks. Questions 16-20 were subjective in nature. Questions 12 and 13 sought the opinion of the participants regarding content presentation. Questions 9 and 10 were designed to find the participants preference regarding abbreviations. Question 20 was designed to obtain the website rating from the participants.

This researcher acted as the meta-evaluator/observer of the participants and took notes in the adjoining observation room of the usability-testing lab. All the interviews were audio and video recorded. Participants were informed about this in the Informed Consent Form.

The transcripts from the interviews were made from the audio-video recordings and by cross checking with the notes. Usability problems, suggestions made etc by each participant was quantified by applying the definition of the specific terms to code the transcripts. ANOVA Two factor without replication was used as the statistical measure to verify the hypotheses of the research. Correlation between power distance scores of the participants and the various
categories of responses given (usability problems found, negative comments made etc.) is made. A strong negative correlation will imply that smaller the power distance score of the participant higher is his/her performance in the structured interview.
Chapter 4: Data Analysis and Results

4.1 Phase 1

Phase one of the experiment involved 25 Indian participants. After the informed consent was read and signed, each participant was given three questionnaires to answer: demographic, power distance and acculturation questionnaires. The purpose of phase one was to compute the power distance and acculturation scores for each participant. An interesting question was to find if there exists any correlation between the two.

4.1.1 Demographics:

The average age of the participants is 24 years. Of the 25 participants, 22 (88%) are male. Their average stay in US is 20.24 months with a high of 30 months to a low of 6 months. The average stay in India is 22.16 years. The participants belong to seven different states in India and speak seven different languages. Only 5 of the 25 participants have taken the CS 5714 Usability engineering class. 9 of the 25 participants have participated in usability experiments before.

4.1.2 Power Distance:

The power distance score of the participants averaged 19.56 with a lowest score of 11 and a highest score of 27. Only 6 participants (24%) were in the low power distance range of 5-16. The rest were in the medium to high power distance range. None of the participants has the maximum possible power distance score of 40 or the minimum possible score of 5.
4.1.3 Acculturation:

Acculturation was low at an average of 2.11. The lowest acculturation score was 1.71 and the highest was 2.57. None of the participants can be classified as bicultural or Anglo-American acculturated according to the rules of interpretation of scores given in the SL-ASIA scale [35]. The low acculturation scores mean that the influence of the majority host culture of US is not significant and the participants are reasonable representatives of the Indian culture.
4.1.4 Summary of Statistics

\(X=\) Power Distance, \(Y=\) Acculturation

\[
\begin{array}{|c|c|}
\hline
\text{Statistic} & \text{Value} \\
\hline
\text{Mean } X & 19.56000 \\
\text{Mean } Y & 2.118104 \\
\text{Variance } X & 18.006400 \\
\text{Variance } Y & 0.050997 \\
\hline
\end{array}
\]
Covariance X and Y | 0.307202  
Correlation X and Y | 0.320583  
Regression Y on X | 0.017061  
Regression X on Y | 6.023974

Table 4: Summary of Power Distance and Acculturation Statistics

**Regression Lines**

\[
y = 2.118104 + 0.017061(x - 19.560000)  
x = 19.560000 + 6.023974(y - 2.118104)
\]

Since the correlation between Power distance and Acculturation is only +0.32, it cannot be concluded that there is a significant linear relationship between the two. If there existed a significant positive or negative correlation between power distance and acculturation, it can be
used in international usability testing to screen participants to get the closest representative sample of the target users possible.

4.2 Phase 2

16 participants with 8 for each interviewer profile from the same pool 25 that participated in Phase 1 were recruited for the usability testing in Phase 2. The experiment consisted of two groups representing the two types of interviewers. The two levels between the subjects are represented by the two interviewer cultural profiles: one Indian and the second, Anglo-American. The independent variables of the experiment are the two cultural profiles of the interviewers. The dependent variables in the experiment are the total number of replies made, number of usability problems found, suggestions made, positive comments made, negative comments made, culturally related comments made by the participants. Large power distance users were the participants recruited randomly from the participants of Phase 1.

| Interviewer | Total Responses Given | Usability Problems Found | Suggestions Made | Positive Comments Made | Negative Comments Made | Culture Related Comments Made |
|-------------|-----------------------|--------------------------|------------------|------------------------|------------------------|----------------------------|
| Indian      | T1                    | U1                       | S1               | P1                     | N1                     | C1                         |
| Anglo-American | T2               | U2                       | S2               | P2                     | N2                     | C2                         |

Table 1: Experimental Design

The following definitions were used for the terms above:

**Total Replies:** Sum total of all responses made by the participant during the structured interview.

**Usability Problem:** Interaction design flaw or a user difficulty directly associated with an interaction design flaw.

**Suggestion:** Subjective preference of the participant to the implemented design choice/tradeoff.
**Positive Comment**: Participant’s subjective approval of a design choice/ tradeoff.

**Negative Comment**: Participant’s subjective disapproval of a design choice/ tradeoff.

**Culture related Comment**: Participant’s reference to his/her native culture, country, customs, symbols, rituals and tradition.

### 4.2.1 Demographics:

Indian Interviewer Group: The average age of the participants is 23 years. Of the 8 participants, 7 are male (87.5 %). Their average stay in US is 17.75 months with a high of 24 months to a low of 8 months. The average stay in India is 21.25 years. The participants belong to four different states in India and speak three different languages.

Anglo-American Interviewer Group: The average age of the participants is 24 years. Of the 8 participants, 7 are male (87.5 %). Their average stay in US is 18.25 months with a high of 24 months to a low of 8 months. The average stay in India is 22.75 years. The participants belong to four different states in India and speak five different languages.

### 4.2.2 Power Distance:

Indian Interviewer Group: The power distance score of the participants averaged 19.375 with a lowest score of 14 and a highest score of 23. Only 2 participants (25%) were in the low power distance range of 5-16. The rest were in the medium to high power distance range. None of the participants has the maximum possible power distance score of 40 or the minimum possible score of 5.

Anglo-American Interviewer Group: The power distance score of the participants averaged 19.375 with a lowest score of 11 and a highest score of 27. Only 3 participants (37.5 %) were in the low power distance range of 5-16. The rest were in the medium to high power distance range. None of the participants has the maximum possible power distance score of 40 or the minimum possible score of 5.

ANOVA of the power distance scores of the Indian and Anglo-American groups found the two groups to be similar.
ANOVA: Two-Factor Without Replication

| SUMMARY | Count | Sum  | Average | Variance |
|---------|-------|------|---------|----------|
| IND     | 8     | 155  | 19.375  | 13.41071 |
| US      | 8     | 155  | 19.375  | 40.83929 |

ANOVA

| Source of Variation | SS  | df | MS    | F     | P-value | F crit |
|---------------------|-----|----|-------|-------|---------|--------|
| IND and US          | 0   | 1  | 0     | 0     | 1       | 5.59146|
| Error               | 148 | 7  | 21.14286 | 1 | |
| Total               | 379.75 | 15 | |

Table 6: ANOVA Results of Power Distance Scores

4.2.3 Acculturation:

Indian Interviewer Group: Acculturation was low at an average of 2.08. The lowest acculturation score was 1.80 and the highest was 2.47. None of the participants can be classified as bicultural or Anglo-American acculturated according to the rules of interpretation of scores given in the SL-ASIA scale [35]. The low acculturation scores mean that the influence of the majority host culture of US is not significant and the participants are reasonable representatives of the Indian culture.

Anglo-American Interviewer Group: Acculturation was low at an average of 2.19. The lowest acculturation score was 1.71 and the highest was 2.57. None of the participants can be classified as bicultural or Anglo-American acculturated according to the rules of interpretation of scores given in the SL-ASIA scale [35]. The low acculturation scores mean that the influence of the majority host culture of US is not significant and the participants are reasonable representatives of the Indian culture.

ANOVA of the acculturation scores of the Indian and Anglo-American groups found the two groups to be similar.
ANOVA: Two-Factor Without Replication

| SUMMARY | Count | Sum     | Average | Variance |
|---------|-------|---------|---------|----------|
| IND     | 8     | 16.66667| 2.083333| 0.043246 |
| US      | 8     | 17.57143| 2.196429| 0.087099 |

ANOVA

| Source of Variation | SS      | df | MS       | F       | P-value | F crit |
|---------------------|---------|----|----------|---------|---------|--------|
| IND and US          | 0.051162| 1  | 0.051162 | 0.849412| 0.38738 | 5.59146|
| Error               | 0.421627| 7  | 0.060232 |         |         |        |
| Total               | 0.963577| 15 |          |         |         |        |

Table 7: ANOVA Results of Acculturation Scores

4.2.4 Transcripts:

The audio video recording of each interview was transcribed. The coding rules applied were to remove pauses like “um” and “argh”. “yeah” was interpreted as “yes”. These are the only two coding rules applied. The scoring from the transcripts was independently verified with four graduate students who have taken at least CS 5714 Usability Engineering apart from other HCI courses at Virginia Tech. The Indian interviewer group transcripts were codified by two evaluators and the other two codified the Anglo-American group transcripts. All four were given the transcripts and the definitions of the terms. Usability problems found and negative comments made by the participants caused the ambiguity of classification. The rule applied was that any negative comment made about the interaction design and/or interface design element/choice was also a usability problem found. Once this was made unambiguous the scores from each transcript agreed in the numbers. Please refer to Appendix I for the complete transcripts.

Some Negative comments of the type “Access is Bad”, “Black is very bad” are also classified as Usability Problems found. Thus, there was some overlap between Negative Comments and Usability Problems found. Apart from this, all the scores are unique.
Total Replies  = T  
Usability Problem  = U  
Suggestion  = S  
Positive Comment = P  
Negative Comment = N  
Culture related Comment = C  
Reply to the Website Rating Question = R =1  
Repetitions = Rep  
U and N = Negative Comments that are also Usability Problems Found  

\[ T = U + S + P + N + C + 1 + \text{Rep} – \text{Intersection (U and N)} \]

4.2.1 Total Responses Given

The average number of total responses given to the Indian Interviewer was 38.75 with a maximum of 52 replies and a minimum of 28 replies. The average number of total responses given to the Anglo-American Interviewer was 25.75 with a maximum of 27 replies and a minimum of 25 replies. From ANOVA Two-Factor without Replication of the two interviewer groups showed that the two groups vary significantly (F (1,7) = 19.39, p < 0.01) with respect to the total responses given. The correlation between power distance and total replies given was weak at –0.12.

This verifies Hypothesis 1 that participants were more responsive to the Indian than to the Anglo-American interviewer.

| SUMMARY | Count | Sum | Average | Variance |
|---------|-------|-----|---------|----------|
| IND     | 8     | 310 | 38.75   | 76.5     |
| US      | 8     | 206 | 25.75   | 0.5      |

| Source of Variation | SS   | df | MS  | F    | P-value | F crit |
|---------------------|------|----|-----|------|---------|--------|
| IND and US          | 676  | 1  | 676 | 19.39344 | 0.003142 | 5.59146 |
4.2.2 Usability Problems Found

The average number of usability problems found by the participants with the Indian Interviewer was 8.875 with a maximum of 11 and a minimum of 5 usability problems found. The average number of usability problems found by the participants with the Anglo-American Interviewer was 5 with a maximum of 8 and a minimum of 3 usability problems found. From ANOVA Two-Factor without Replication of the two interviewer groups showed that the two groups vary significantly (F (1,7) = 36.75, p < 0.001) with respect to the usability problems found. The correlation between power distance and usability problems found was weak at +0.14.

This verifies Hypothesis 2 that the participants will find more usability problems with the Indian interviewer than the Anglo-American interviewer.

| SUMMARY | Count | Sum  | Average | Variance |
|---------|-------|------|---------|----------|
| IND     | 8     | 71   | 8.875   | 3.839286 |
| US      | 8     | 40   | 5       | 2.285714 |

**ANOVA**

| Source of Variation | SS     | df  | MS     | F       | P-value  | F crit |
|---------------------|--------|-----|--------|---------|----------|--------|
| IND and US          | 60.0625| 1   | 60.0625| 36.75956| 0.000509 | 5.59146|
| Error               | 11.4375| 7   | 1.633929|         |          |        |
| Total               | 102.9375| 15 |        |         |          |        |

Table 9: ANOVA Results of Usability Problems Found
4.2.3 Suggestions Made

The average number of suggestions made by the participants to the Indian Interviewer was 7.375 with a maximum of 10 and a minimum of 5. The average number of suggestions made by the participants to the Anglo-American Interviewer was 5.5 with a maximum of 7 and a minimum of 4. From ANOVA Two-Factor without Replication of the two interviewer groups showed that the two groups vary significantly (F(1,7) = 7.91, p < 0.03) with respect to suggestions made. The correlation between power distance and suggestions made was weak at -0.17.

This verifies Hypothesis 3 that the suggestions made by the participants to the Indian interviewer will be more than the suggestions made to the Anglo-American interviewer.

| SUMMARY | Count | Sum  | Average | Variance |
|---------|-------|------|---------|----------|
| IND     | 8     | 59   | 7.375   | 4.267857 |
| US      | 8     | 44   | 5.5     | 1.142857 |

Table 10: ANOVA Results of Suggestions Made

4.2.4 Positive Comments Made

The average number of positive comments made by the participants to the Indian Interviewer was 4.375 with a maximum of 7 and a minimum of 2. The average number of positive comments made by the participants to the Anglo-American Interviewer was 6.875 with a maximum of 11.
and a minimum of 4. From ANOVA Two-Factor without Replication of the two interviewer groups showed that the two groups vary significantly (F (1,7) = 8.75, p < 0.03) with respect to the positive comments made. The correlation between power distance and positive comments made was weak at -0.09.

This verifies Hypothesis 4 that the positive comments made by the participants to the Indian interviewer will be less than the positive comments made to the Anglo-American interviewer.

### Positive Comments Made

| SUMMARY | Count | Sum   | Average | Variance |
|---------|-------|-------|---------|----------|
| IND     | 8     | 35    | 4.375   | 3.982143 |
| US      | 8     | 55    | 6.875   | 6.696429 |

**ANOVA**

| Source of Variation | SS   | df | MS  | F     | P-value | F crit |
|---------------------|------|----|-----|-------|---------|--------|
| IND and US          | 25   | 1  | 25  | 8.75  | 0.021164| 5.59146|
| Error               | 20   | 7  | 2.857143 |       |         |        |
| Total               | 99.75| 15 | 2.857143 |       |         |        |

Table 11: ANOVA Results of Positive Comments Made

**4.2.5 Negative Comments Made**

The average number of negative comments made by the participants to the Indian Interviewer was 10.125 with a maximum of 14 and a minimum of 5. The average number of negative comments made by the participants to the Anglo-American Interviewer was 3.875 with a maximum of 8 and a minimum of 1. From ANOVA Two-Factor without Replication of the two interviewer groups showed that the two groups vary significantly (F (1,7) = 22.90, p < 0.003) with respect to the negative comments made. The correlation between power distance and negative comments made was weak at +0.10.
This verifies Hypothesis 5 that the negative comments made by the participants to the Indian interviewer will be more than the negative comments made to the Anglo-American interviewer.

### Negative Comments Made

| SUMMARY  | Count | Sum  | Average | Variance |
|----------|-------|------|---------|----------|
| IND      | 8     | 81   | 10.125  | 12.98214 |
| US       | 8     | 31   | 3.875   | 4.696429 |

#### ANOVA

| Source of Variation | SS   | df | MS   | F     | P-value | F crit |
|---------------------|------|----|------|-------|---------|--------|
| IND and US          | 156.25 | 1  | 156.25 | 22.90576 | 0.001998 | 5.59146 |
| Error               | 47.75 | 7  | 6.821429 |          |         |        |
| Total               | 280   | 15 |       |        |         |        |

Table 12: ANOVA Results of Negative Comments Made

### 4.2.5 Culture Related Comments Made

The average number of cultured related comments made by the participants to the Indian Interviewer was 3 with a maximum of 7 and a minimum of 0. The average number of culture related comments made by the participants to the Anglo-American Interviewer was 0.5 with a maximum of 2 and a minimum of 0. From ANOVA Two-Factor without Replication of the two interviewer groups showed that the two groups vary significantly (F(1,7) = 5.64, p < 0.05) with respect to the culture related comments made. The correlation between power distance and culture related comments made was weak at -0.21.
This verifies Hypothesis 6 that the cultured related comments made by the participants to the Indian interviewer will be more than the cultured related comments made to the Anglo-American interviewer.

### Culture Related Comments Made

| SUMMARY | Count | Sum | Average | Variance |
|---------|-------|-----|---------|----------|
| IND     | 8     | 24  | 3       | 5.714286 |
| US      | 8     | 4   | 0.5     | 0.571429 |

**ANOVA**

| Source of Variation | SS   | df | MS    | F       | P-value  | F crit |
|---------------------|------|----|-------|---------|----------|--------|
| IND and US          | 25   | 1  | 25    | 5.645161| 0.049173 | 5.59146|
| Error               | 31   | 7  | 4.428571 |        |          |        |
| Total               | 69   | 15 |       |         |          |        |

Table 13: ANOVA Results of Culture Related Comments Made

### 4.2.6 Website Rating Given

Participants were asked to rate the website on a scale of 1-5 with 1 being the worst and 5 being the best. The average website rating given to the Indian Interviewer was 2.125 with a maximum of 3 and a minimum of 1. The average website rating given to the Anglo-American Interviewer was 3.0625 with a maximum of 3.5 and a minimum of 2. From ANOVA Two-Factor without Replication of the two interviewer groups showed that the two groups vary significantly (F (1,7) = 13.23, p < 0.01) with respect to the website rating given. The correlation between power distance and website rating given was weak at -0.21.

### Website Rating

| SUMMARY | Count | Sum | Average | Variance |
|---------|-------|-----|---------|----------|
| IND     | 8     | 17  | 2.125   | 0.696429 |
| US      | 8     | 24.5| 3.0625  | 0.245536 |
## ANOVA

| Source of Variation | SS      | df | MS      | F        | P-value  | F crit  |
|---------------------|---------|----|---------|----------|----------|---------|
| IND and US          | 3.515625| 1  | 3.515625| 13.23529 | 0.008309 | 5.59146 |
| Error               | 1.859375| 7  | 0.265625|          |          |         |
| Total               | 10.10938| 15 |         |          |          |         |

Table 14: ANOVA Results of Website Rating Given
Figure 14: Summary of Results of Phase 2
Chapter 5: Discussion and Conclusions

Participants found usability problems related to interaction design more regularly and consistently across the two groups. Participants’ comments on the colors used were either strongly positive or negative. Very few participants made mild comments on the colors used. Some of the comments related to color are listed below. The notation INDx / USx denotes Indian interviewer group participant /Anglo-American interviewer group participant ID#x.

IND2: “Red color scares me”.

US2: “They are nice. Not gaudy”.

Many of the cultural comments made were in reply to the question about the acceptance of the website by Indian students at Virginia Tech. Some of the interesting culture related comments are:

IND1: “I should say that no matter how the website is designed it should be acceptable. Every Indian student has a duty towards his motherland”.

US4: “More information about India needed”.

Favoritism was shown by one participant when asked to rate the website.

IND2: “As an Indian I would rate it 2 but not as an Indian I would rate it less”. All the participants were asked on to suggest ways of improving the Projects and Members pages of the website. All the participants suggested reverse chronological order for organizing the executive committee members. Some participants wanted more contact info in the projects page and suggested ordering the projects on a attribute like status.

The participants were more at ease with the Indian interviewer when compared to the Anglo-American Interviewer even though both the interviewers asked the same questions and in the same setting. Further, the participants performed the same tasks in the experiment. The differences found in the various measures of the experiment can be attributed to the cultural effects. The participants gave higher number of replies to the Indian interviewer, found more
number of usability problems and made more number of suggestions with the Indian interviewer. This means that the efficacy of the structured interview technique depends on the culture of the interviewer. More positive comments and less number of negative comments were made by the participants with the foreign culture interviewer leading to a false picture of subjective preferences of the participants. More importantly the participants were reluctant to make culture related comments to the foreign interviewer. The whole purpose of finding culture related data from the structured interviews can be lost if a foreign interviewer is used. On the other hand, with the interviewer from the same culture, participants will be more forthcoming.

The results from the experiment empirically establish that culture affects the behavior and performance of the participants in a structured interview. Difference in culture between the participants and the interviewer does effect the results obtained. Participants respond more freely and accurately to the interviewer from the same culture than to the interviewer from a foreign culture. The participants replied more, found more usability problems, made more suggestions, made less number of positive comments, more number of negative comments and cultural related comments with the interviewer of the same culture when compared to the interviewer from a foreign culture. They also rated the site lower. The quality and quantity of the information obtained by the interviewer from the same culture is significantly more than the foreign culture interviewer. This useful result can be applied during the international usability testing of participants from a large power distance culture. The results yielded by the method of structured interview depend on the culture of the interviewer in the case of participants from large power distance countries. This may be due to the effects of power distance. The cultural common ground between the same culture interviewer and the participants will help in the identification of culture related design issues. If the experimental design of this study is modified to have Anglo-American participants belonging to a small power distance culture and the same two types of interviewers – one each from a foreign and similar culture, there should be no significant difference in the results obtained. Then and only then, it can be conclusively said that large power distance is the necessary and sufficient condition that affects the efficacy of usability assessment technique of structured interviews. Right now, it can only be safely concluded that culture does affect the process of structured interviews. Although most of the results can be explained by attribution to the large power distance characteristics it will be an unsubstantiated
claim until an experiment is carried out to find the efficacy of structured interviews when participants come from a small power distance country.

5.1 Future Work

This research methodology can be employed to design and evaluate other cross-cultural HCI experiments. Successful integration of Hofstede’s cultural model and Usability engineering will result in exciting and useful results in cross-cultural HCI in particular and HCI in general. Future work will explore the effect of other cultural dimensions of Hofstede and other usability assessment techniques. This experiment needs to be done with the design modification of participants from a small power distance culture to establish beyond any doubt that large power distance effect the efficacy of structured interviews. Also of interest is the open-ended research question of whether interaction techniques and strategies of the users vary across cultural boundaries. Do web navigation strategies and online shopping patterns vary with uncertainty avoidance dimension? Exploring this research question will lead to highly useful results for e-commerce. More empirical studies are needed to arrive at a critical mass of research literature that can spawn and branch off into unexplored new territories of HCI. Further research can also aim at the comparison of different cultural models given a usability assessment technique.

5.2 Limitations

The results of this research are applicable to large power distance participants when the usability assessment technique of structured interviews is employed. This study empirically establishes that culture affects the structured interview technique. However, such a claim cannot be made with regard to power distance although it seems the main contributing factor. More empirical studies are needed to establish power distance as the primary factor effecting structured interviews. A similar claim cannot be laid to other usability assessment techniques and participants from small-medium power distance culture. However based on cultural theory and scant but significant cross-cultural HCI research, similar results can be expected. Only empirical studies can validate these theoretical speculations. Individual character traits like non-verbal communication by the interviewers were not fully controlled.
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Appendices

Appendix A: Hofstede’s Cultural Dimensional Values Table

Hofstede made statistical analysis of the answers to questions about the values of IBM employees in over 50 countries and formulated the five dimensions. Hofstede rated countries on indices for each dimension, normalized to values of 0 to 100 (usually).

Indexes from: Hofstede, Geert, *Cultures and Organizations: Software of the Mind: Intercultural Cooperation and its Importance for Survival*, McGraw Hill, New York, 1991, ISBN: 0-07-029307-4.

PDI: Power Distance Index

IDV: Individualism Index

MAS: Masculinity Index

UAI: Uncertainty Avoidance Index

LTO: Long-term Orientation Index

| Country          | PDI Rank | PDI Score | IDV Rank | IDV Score | MAS Rank | MAS Score | UAI Rank | UAI Score | LTO Rank | LTO Score |
|------------------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|
| Arab Countries   | 7        | 80        | 26/27    | 38        | 23       | 53        | 27       | 68        |          |           |
| Argentina        | 35/36    | 49        | 22/23    | 46        | 20/21    | 56        | 10/15    | 86        |          |           |
| Australia        | 41       | 36        | 2        | 90        | 16       | 61        | 37       | 51        | 15       | 31        |
| Austria          | 53       | 11        | 18       | 55        | 2        | 79        | 24/25    | 70        |          |           |
| Bangladesh       |          |           |          |           |          |           |          |           | 11       | 40        |
| Country          | 20  | 65  | 8    | 75  | 22  | 54  | 5/6 | 94  |          |
|------------------|-----|-----|------|-----|-----|-----|-----|-----|-----------|
| Belgium          | 20  | 65  | 8    | 75  | 22  | 54  | 5/6 | 94  |           |
| Brazil           | 14  | 69  | 26/27| 38  | 27  | 49  | 21/22| 76  | 6         |
| Canada           | 39  | 39  | 4/5  | 80  | 24  | 52  | 41/42| 48  | 20        |
| Chile            | 24/25| 63  | 38   | 23  | 46  | 28  | 10/15| 86  |           |
| China            | 1   | 118 |      |     |     |     |     |     |           |
| Columbia         | 17  | 67  | 49   | 13  | 11/12| 64  | 20  | 80  |           |
| Costa Rica       | 42/44| 35  | 46   | 15  | 48/49| 21  | 10/15| 86  |           |
| Denmark          | 51  | 18  | 9    | 74  | 50  | 16  | 51  | 23  |           |
| East Africa      | 21/23| 64  | 33/35| 27  | 39  | 41  | 36  | 52  |           |
| Equador          | 8/9 | 78  | 52   | 8   | 13/14| 63  | 28  | 67  |           |
| Finland          | 46  | 33  | 17   | 63  | 47  | 26  | 31/32| 59  |           |
| France           | 15/16| 68  | 10/11| 71  | 35/36| 43  | 10/15| 86  |           |
| Germany (FR)     | 42/44| 35  | 15   | 67  | 9/10 | 66  | 29  | 65  | 14        |
| Great Britain    | 42/44| 35  | 3    | 89  | 9/10 | 66  | 47/48| 35  | 18        |
| Greece           | 27/28| 60  | 30   | 35  | 18/19| 57  | 1   | 112 |           |
| Guatemala        | 2/3 | 95  | 53   | 6   | 43  | 37  | 3   | 101 |           |
| Hong Kong        | 15/16| 68  | 37   | 25  | 18/19| 57  | 49/50| 29  | 2         |
| India            | 10/11| 77  | 21   | 48  | 20/21| 56  | 45  | 40  | 7         |
| Indonesia        | 8/9 | 78  | 47/48| 14  | 30/31| 46  | 41/42| 48  |           |
| Iran             | 29/30| 58  | 24   | 41  | 35/36| 43  | 31/32| 59  |           |
| Ireland (Rep of) | 49  | 28  | 12   | 70  | 7/8  | 68  | 47/48| 35  |           |
| Country        | Column 1 | Column 2 | Column 3 | Column 4 | Column 5 | Column 6 | Column 7 | Column 8 | Column 9 | Column 10 |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Israel        | 52       | 13       | 19       | 54       | 29       | 47       | 19       | 81       |          |           |
| Italy         | 34       | 50       | 7        | 76       | 4/5      | 70       | 23       | 75       |          |           |
| Jamaica       | 37       | 45       | 25       | 39       | 7/8      | 68       | 52       | 13       |          |           |
| Japan         | 33       | 54       | 22/23    | 46       | 1        | 95       | 7        | 92       | 4         | 80        |
| Malaysia      | 1        | 104      | 36       | 26       | 25/26    | 50       | 46       | 36       |          |           |
| Mexico        | 5/6      | 81       | 32       | 30       | 6        | 69       | 18       | 82       |          |           |
| Netherlands   | 40       | 38       | 4/5      | 80       | 51       | 14       | 35       | 53       | 10        | 44        |
| New Zealand   | 50       | 22       | 6        | 79       | 17       | 58       | 39/40    | 49       | 16        | 30        |
| Nigeria       |          |          |          |          |          |          |          |          | 22        | 16        |
| Norway        | 47/48    | 31       | 13       | 69       | 52       | 8        | 38       | 50       |          |           |
| Pakistan      | 32       | 55       | 47/48    | 14       | 25/26    | 50       | 24/25    | 70       | 23        | 0         |
| Panama        | 2/3      | 95       | 51       | 11       | 34       | 44       | 10/15    | 86       |          |           |
| Peru          | 21/23    | 64       | 45       | 16       | 37/38    | 42       | 9        | 87       |          |           |
| Philippines   | 4        | 94       | 31       | 32       | 11/12    | 64       | 44       | 44       | 21        | 19        |
| Poland        |          |          |          |          |          |          |          |          |           | 13        | 32        |
| Portugal      | 24/25    | 63       | 33/35    | 27       | 45       | 31       | 2        | 104      |          |           |
| Salvador      | 18/19    | 66       | 42       | 19       | 40       | 40       | 5/6      | 94       |          |           |
| Singapore     | 13       | 74       | 39/41    | 20       | 28       | 48       | 53       | 8        | 9         | 48        |
| South Africa  | 35/36    | 49       | 16       | 65       | 13/14    | 63       | 39/40    | 49       |          |           |
| South Korea   | 27/28    | 60       | 43       | 18       | 41       | 39       | 16/17    | 85       | 5         | 75        |
| Spain         | 31       | 57       | 20       | 51       | 37/38    | 42       | 10/15    | 86       |          |           |
| Sweden        | 47/48    | 31       | 10/11    | 71       | 53       | 5        | 49/50    | 29       | 12        | 33        |
| Country          | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Switzerland      | 45  | 34  | 14  | 68  | 4/5 | 70  | 33  | 58  |     |     |     |     |
| Taiwan           | 29/30 | 58  | 44  | 17  | 32/33 | 45  | 26  | 69  | 3   | 8   | 87  |
| Thailand         | 21/23 | 64  | 39/41 | 20  | 44  | 34  | 30  | 64  | 8   | 56  |
| Turkey           | 18/19 | 66  | 28  | 37  | 32/3 | 45  | 16/17 | 85  |
| Uruguay          | 26  | 61  | 29  | 36  | 42  | 38  | 4   | 100 |
| **USA**          | **38** | **40** | **1** | **91** | **15** | **62** | **43** | **46** | **17** | **29** |
| Venezuela        | 5/6 | 81  | 50  | 12  | 3   | 73  | 21/22 | 76  |
| West Africa      | 10/11 | 77  | 39/41 | 20  | 30/31 | 46  | 34  | 54  |
| Yugoslavia       | 12  | 76  | 33/35 | 27  | 48/49 | 21  | 8   | 88  |
| Zimbabwe         |     |     |     |     |     |     |     |     |     |     |     | **19** | **25** |

Table 15: Hofstede’s Cultural Dimension Indices
Appendix B: Demographic Questionnaire

Please answer the following questions.

Age:

Gender:

Ethnicity:

First Language:

Which state in India are you from?

How long have you stayed in India?

How long have you been staying in the US?

Do you know about Association for India’s development?

If yes, have you visited their web site?

Yes  No

Which degree program are you in at VT?

BS  MS  Ph.D

Have you taken the Usability Engineering course?

Yes  No

Have you participated in Usability Experiments before?

Yes  No.
Appendix C: Power Differential Questionnaire

From Earley, P.C. and Erez, M. The transplanted executive: Why you need to understand how workers in other countries see the world differently. Oxford University Press, New York. 1997

Your responses to these questions reflect your general values that are influenced by your culture and your unique experiences. The following questions reflect opinions that you may or may not hold. Think about your own feelings concerning each of these statements and answer for yourself, not how you think other people would answer.

For each question, place a number in the blank at the right.

1 = I strongly disagree with this statement
2 = I slightly disagree with this statement
3 = I neither disagree nor agree with this statement
4 = I slightly agree with this statement
5 = I strongly agree with this statement

1. In most situations managers should make decisions without consulting their subordinates. -------

2. In work related matters, managers have a right to expect obedience from their subordinates. ---

3. Employees who often question authority sometimes keep their managers from being effective.

4. Once a top-level executive makes a decision, people working in the company should not question it.

5. Employees should not express disagreements with their managers.
6. Managers should be able to make the right decisions without consulting with others. ------------

7. Managers who let their employees participate in decisions lose power. --------------

8. A company’s rules should not be broken, not even when the employee thinks it is in the company’s best interest. ---------------
Appendix D: SUINN-LEW ASIAN SELF-IDENTITY ACCULTURATION SCALE (SL-ASIA)

INSTRUCTIONS: The questions which follow are for the purpose of collecting information about your historical background as well as more recent behaviors which may be related to your cultural identity.

Choose the one answer which best describes you.

1. What language can you speak?
   1. Asian only (for example, Chinese, Japanese, Korean, Vietnamese, etc.)
   2. Mostly Asian, some English
   3. Asian and English about equally well (bilingual)
   4. Mostly English, some Asian
   5. Only English

2. What language do you prefer?
   1. Asian only (for example, Chinese, Japanese, Korean, Vietnamese, etc.)
   2. Mostly Asian, some English
   3. Asian and English about equally well (bilingual)
   4. Mostly English, some Asian
   5. Only English

3. How do you identify yourself?
   1. Oriental
   2. Asian
   3. Asian-American
   4. Chinese-American, Japanese-American, Korean-American, etc.
   5. American

4. Which identification does (did) your mother use?
   1. Oriental
   2. Asian
   3. Asian-American
   4. Chinese-American, Japanese-American, Korean-American, etc.
   5. American
5. Which identification does (did) your father use?

1. Oriental
2. Asian
3. Asian-American
4. Chinese-American, Japanese-American, Korean-American, etc.
5. American

6. What was the ethnic origin of the friends and peers you had, as a child up to age 6?

1. Almost exclusively Asians, Asian-Americans, Orientals
2. Mostly Asians, Asian-Americans, Orientals
3. About equally Asian groups and Anglo groups
4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

7. What was the ethnic origin of the friends and peers you had, as a child from 6 to 18?

1. Almost exclusively Asians, Asian-Americans, Orientals
2. Mostly Asians, Asian-Americans, Orientals
3. About equally Asian groups and Anglo groups
4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

8. Whom do you now associate with in the community?

1. Almost exclusively Asians, Asian-Americans, Orientals
2. Mostly Asians, Asian-Americans, Orientals
3. About equally Asian groups and Anglo groups
4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

9. If you could pick, whom would you prefer to associate with in the community?

1. Almost exclusively Asians, Asian-Americans, Orientals
2. Mostly Asians, Asian-Americans, Orientals
3. About equally Asian groups and Anglo groups
4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

10. What is your music preference?
1. Only Asian music (for example, Chinese, Japanese, Korean, Vietnamese, etc.)
2. Mostly Asian
3.Equally Asian and English
4. Mostly English
5. English only

11. What is your movie preference?

1. Asian-language movies only
2. Asian-language movies mostly
3. Equally Asian/English English-language movies
4. Mostly English-language movies only
5. English-language movies only

12. What generation are you? (Circle the generation that best applies to you :) 

1. 1st Generation = I was born in Asia or country other than U.S.
2. 2nd Generation = I was born in U.S., either parent was born in Asia or country other than U.S.
3. 3rd Generation = I was born in U.S., both parents were born in U.S, and all grandparents born in Asia or country other than U.S.
4. 4th Generation = I was born in U.S., both parents were born in U.S, and at least one grandparent born in Asia or country other than U.S. and one grandparent born in U.S.
5. 5th Generation = I was born in U.S., both parents were born in U.S, and all grandparents also born in U.S.
6. Don't know what generation best fits since I lack some information.

13. Where were you raised?

1. In Asia only
2. Mostly in Asia, some in U.S.
3. Equally in Asia and U.S.
4. Mostly in U.S., some in Asia
5. In U.S. only

14. What contact have you had with Asia?

1. Raised one year or more in Asia
2. Lived for less than one year in Asia
3. Occasional visits to Asia
4. Occasional communications (letters, phone calls, etc.) with people in Asia
5. No exposure or communications with people in Asia
15. What is your food preference at home?

1. Exclusively Asian food
2. Mostly Asian food, some American
3. About equally Asian and American
4. Mostly American food
5. Exclusively American food

16. What is your food preference in restaurants?

1. Exclusively Asian food
2. Mostly Asian food, some American
3. About equally Asian and American
4. Mostly American food
5. Exclusively American food

17. Do you

1. Read only an Asian language?
2. Read an Asian language better than English?
3. Read both Asian and English equally well?
4. Read English better than an Asian language?
5. Read only English?

18. Do you

1. Write only an Asian language?
2. Write an Asian language better than English?
3. Write both Asian and English equally well?
4. Write English better than an Asian language?
5. Write only English?

19. If you consider yourself a member of the Asian group (Oriental, Asian, Asian-American, Chinese-American, etc., whatever term you prefer), how much pride do you have in this group?

1. Extremely proud
2. Moderately proud
3. Little pride
4. No pride but do not feel negative toward group
5. No pride but do feel negative toward group
20. How would you rate yourself?

1. Very Asian
2. Mostly Asian
3. Bicultural
4. Mostly Westernized
5. Very Westernized

21. Do you participate in Asian occasions, holidays, traditions, etc.?

1. Nearly all
2. Most of them
3. Some of them
4. A few of them
5. None at all

22. Rate yourself on how much you believe in Asian values (e.g., about marriage, families, education, work):

| -------------------- | -------------------|---------------------|-------------------|
| 1                          2                        3                           4                        5
| (do not believe)                                    (strongly believe in Asian values) |

23. Rate your self on how much you believe in American (Western) values:

| -------------------- | -------------------|---------------------|-------------------|
| 1                          2                        3                           4                        5
| (do not believe)                                    (strongly believe in American values) |

24. Rate yourself on how well you fit when with other Asians of the same ethnicity:

| -------------------- | -------------------|---------------------|-------------------|
| 1                          2                        3                           4                        5
| (do not fit)                                    (fit very well) |
25. Rate yourself on how well you fit when with other Americans who are non-Asian (Westerners):

|--------------------|-------------------|---------------------|-------------------|
| 1                          2                        3                           4                        5 |
| (do not fit)                (fit very well)            |

26. There are many different ways in which people think of themselves. Which ONE of the following most closely describes how you view yourself?

1. I consider myself basically an Asian person (e.g., Chinese, Japanese, Korean, Vietnamese, etc.).
   Even though I live and work in America, I still view myself basically as an Asian person.

2. I consider myself basically as an American. Even though I have an Asian background and characteristics, I still view myself basically as an American.

3. I consider myself as an Asian-American, although deep down I always know I am an Asian.

4. I consider myself as an Asian-American, although deep down, I view myself as an American first.

5. I consider myself as an Asian-American. I have both Asian and American characteristics, and I view myself as a blend of both.
Appendix E: Institutional Review Board Application

Form 4 – Expedited

# _____

Request for Expedited Approval of Research Involving Human Subjects

Investigator(s): Ravikiran Vatrapu

Faculty Advisor: Dr. Manuel A. Pérez-Quiñones

Department(s): Computer Science

Mail Code: 0106

E-mail: rvatrapu@vt.edu / perez@vt.edu

Phone: 540 - 231- 3986 / 540 - 231-2646

Project Title: Culture and International Usability Testing: The Effects of Culture in Interviews

# of Human Subjects: 120

Source of Funding Support: ___ Departmental Research  X Sponsored Research (OSP No: ______________)

[ ] All investigators of this project are qualified through completion of the formal training program or

Web-based training programs provided by the Virginia Tech Office of Research Compliance.

Note: To qualify for Expedited Approval, the research activities must: (a) present not more than minimal risk to the subjects, (b) not involve any of the special classes of subjects, except children as noted, and (c) involve only procedures listed in one or more of the following categories. The full description may be found in the Expedited Review section of the Virginia Tech “IRB Protocol Submission Instructions Document” or 45 CFR 46.110 (http://ohrp.osophs.dhhs.gov/humansubjects/guidance/45cfr46.htm#46.110)

Please mark/check the appropriate category below which qualifies the project for expedited review:

[ ] 1. Clinical studies of drugs and medical devices when proscribed conditions are met [see item (1), page 8 of the “Instructions” document].

[ ] 2. Collection of blood samples by finger, heel or ear stick, or venipuncture subject to proscribed limitations [see item (2), page 9 of the “Instructions” document].

[ ] 3. Prospective collection of biological specimens for research purposes by noninvasive means. Examples: hair and nail clippings, deciduous teeth, permanent teeth, excreta and external secretions, uncannulated saliva, placenta, amniotic fluid, dental plaque, mucosal and skin cells and sputum [see item (3), page 9 of the “Instructions” document].

[ ] 4. Collection of data through noninvasive procedures routinely employed in clinical practice, excluding procedures involving x-rays or microwaves [see item (4), page 9 of the “Instructions”].

[ ] 5. Research involving materials (data, documents, records or specimens) that have been collected or will be collected solely for non-research purposes (such as medical treatment or diagnosis [see item (5), page 10 of the “Instructions” document].

[X] 6. Collection of data from voice, video, digital, or image recordings made for research purposes [see item (6), page 10 of the “Instructions” document].

[X] 7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language communication, cultural beliefs or practices, social behavior), or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies [see item (7), page 10 of the “Instructions” document].
Outline of Protocol

Project Title
Culture and International Usability Testing: The Effects of Culture in Interviews

Justification of the Project
This project involves understanding the impact of culture on structured interviews during international usability testing. The findings of the study will contribute the body of knowledge of international usability engineering and will help to produce effective and usable products for global users.

Procedures
The experiment will consist of two phases.

Phase one consists of measuring Hofstede’s cultural dimension of power distance for Indian and Anglo-American cultures. This will be measured with a questionnaire (see Appendix). The participants of the phase one of the experiment will be Indians and Anglo-American graduate students. They will be recruited by using various channels of communication like Cranwell International center’s list serve, Indian Students Association (ISA)’s list serve, class list serves and posters in departmental bulletin boards. At least 120 participants will be recruited. The experiment will be conducted in the Usability Testing Lab located in 102 McBryde Hall of Virginia Tech’s Blacksburg Campus. Three questionnaires will be used in the phase one- 1) Demographic Questionnaire 2) Power Distance Questionnaire and 3) SL- ASIA questionnaire (for the Indian participants only). All three questionnaires are included in the Appendix. This phase takes about 30 minutes to complete.

Phase two of the experiment will begin two weeks after phase one. A total of 45 participants from the Indian participant pool of phase one will participate in the second phase. The participants will respond to the Demographic and SL- ASIA questionnaires. Then they will be asked to perform five usability tasks. The participants will be requested to think aloud during the tasks. After the completion of the tasks a structured interview will be conducted. Three interviewers will conduct the interviews. Each interviewer will interview 15 participants. Phase two of the experiment will be audio and video recorded. This phase takes about one hour fifteen minutes to complete.
Risks and Benefits
There are no risks to the participants of this study. Being involved in research that might improve the usability of international products is the benefit.

Confidentiality / Anonymity
The information gained in this research project will be kept strictly confidential. At no time will the researchers release the results of the study to anyone other than individuals working on the project without the participants’ written consent. Audio and video recordings are done in order to assist the transcription of the participants’ replies and responses. Only the transcriptions of the participants’ replies will be used in the research. At no time will we make the direct use of the participants’ original audio and video recordings. The recordings will be held under lock and key in Dr. Manuel A. Pérez-Quiñones’ office in 621, McBryde Hall. All the recordings will be destroyed once it has been assessed that the transcriptions have yielded the required data. Confidentiality of the participants is absolutely assured. Data will be stored securely and will be made available only in the context of research publications and discussion. No reference will be made in oral or written reports that could link participants to the data nor will they ever be identified as a participant in the project. All data gathered will have users names removed and only a user number will identify each user during analyses and any written reports of the research.

Informed Consent
Enclosed.

Appendix E.1: Informed Consent Form

Virginia Polytechnic Institute and State University

Informed Consent for Participant of Investigative Project

Title of Project: Culture and International Usability Testing: The Effects of Culture in Interviews

Investigators: Ravikiran Vatrapu, Dr. Manuel A. Pérez-Quiñones,

I. THE PURPOSE OF THIS RESEARCH

You are invited to participate in a study of the impact of culture on structured interviews during international usability testing. The findings of the study will contribute the body of knowledge of international usability testing and will help produce effective and usable products for global users.

II. PROCEDURES

The experiment will consist of two phases. In phase one you will participate in a study to measure Hofstede’s cultural dimension of power distance for Indian and Anglo-American
cultures. You will respond to the two questionnaires; Demographic and Power Distance questionnaires. Indian participants will also respond to the SL- ASIA questionnaire.

All the participants of the phase two of the experiment will be Indian students at Virginia Tech. Indian students interested in participating in phase two of the experiment can leave their contact information with the experimenter.

Phase two of the experiment will begin two weeks after phase one. You will respond to the Demographic and SL- ASIA questionnaires. You will then be asked to perform five usability tasks. After the completion of the tasks a structured interview will be conducted. Phase two of the experiment will be audio and video recorded. Phase one of the experiment takes about 30 minutes and Phase two takes about one hour fifteen minutes to complete.

Your role during the experiment is that of information provider. We are not evaluating you or your culture in any way; you are helping us to identify the cultural issues in international usability testing. All information that you help us attain will remain anonymous.

There are no risks to you. The questions and the tasks are not tiring, but you are welcome to take rest breaks as needed. You may also terminate your participation at any time, for any reason.

III. RISKS

There are no physical or emotional risks associated with this experiment.

IV. BENEFITS OF THIS PROJECT

Your participation in this project will provide information that will be used to improve the understanding of cultural effects in usability testing. No guarantee of benefits has been made to encourage you to participate. You may receive a synopsis summarizing this research when completed. Please refer the publications page of Dr. Manuel A. Pérez-Quiñones at http://perez.cs.vt.edu/publications/ for research results and publications.

You are requested to refrain from discussing the questionnaire with other people who might be in the candidate pool from which other participants might be drawn.

V. EXTENT OF ANONYMITY AND CONFIDENTIALITY

The results of this study will be kept strictly confidential. Your written consent is required for the researchers to release any data identified with you as an individual to anyone other than personnel working on the project. The information you provide will have your name removed and only a subject number will identify you during analyses and any written reports of the research.

Only the transcriptions of your replies will be used in the research. At no time will the direct use of your original audio and video recordings will be made of. The recordings will be held under
lock and key in Dr. Manuel A. Pérez-Quiñones’ office in 621, McBryde Hall. All the recordings will be destroyed once it has been assessed that the transcriptions have yielded the required data. Data will be stored securely and will be made available only in the context of research publications and discussion. No reference will be made in oral or written reports that could link you to the data nor will you ever be identified as a participant in the project. All data gathered will have your name removed and only a user number will identify each user during analyses and any written reports of the research.

VI. COMPENSATION

Your participation is voluntary and unpaid.

VII. FREEDOM TO WITHDRAW

You are free to withdraw from this study at any time for any reason and without penalty.

VIII. APPROVAL OF RESEARCH

This research has been approved, as required, by the Institutional Review Board for projects involving human subjects at Virginia Polytechnic Institute and State University, and by the Department of Computer Science.

IX. PARTICIPANT’S RESPONSIBILITIES

I voluntarily agree to participate in this study, and I know of no reason I cannot participate. I will keep the activities and information discussed confidential, since others will be participating in this research.
X. PARTICIPANT'S PERMISSION

I have read and understand the informed consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project. If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project.

_________________________   _______________________
Signature                          Date

_________________________   _______________________
Name (please print)                          Contact: Phone/Address/Email
(Optional)

Should I have any pertinent questions about this research or its conduct, I may contact:

Ravikiran Vatrapu 540-231-3986 / rvatrapu@vt.edu
Investigator

Dr. Manuel A. Pérez-Quiñones 540-231-2646 / perez@vt.edu
Investigator, Faculty Advisor

David M. Moore 540-231-4991 / moored@vt.edu
Chair, IRB

Office of Research Compliance

Research & Graduate Studies

Participants must be given a complete copy (or duplicate original) of the signed Informed Consent.
Appendix E.2: Demographic Questionnaire

Please answer the following questions.

1. Age:

2. Gender:

3. Ethnicity:

4. First Language:

5. If you are from India, please answer these two questions.
   
   i. Which state in India are you from?

   ii. How long have you stayed in India?

6. How long have you been staying in the US?

7. Which degree program are you in at VT?
   
   q BS
   q MS
   q Ph.D

8. Have you taken the Usability Engineering course?
   
   q Yes
   q No

9. Have you participated in Usability Experiments before?
   
   q Yes
   q No.
Appendix E.3: Power Differential Questionnaire

Your responses to these questions reflect your general values that are influenced by your culture and your unique experiences. The following questions reflect opinions that you may or may not hold. Think about your own feelings concerning each of these statements and answer for yourself, not how you think other people would answer. For each question, place a number in the blank at the right.

1 = I strongly disagree with this statement  
2 = I slightly disagree with this statement  
3 = I neither disagree nor agree with this statement  
4 = I slightly agree with this statement  
5 = I strongly agree with this statement

1. In most situations managers should make decisions without consulting their subordinates. ------

2. In work related matters, managers have a right to expect obedience from their subordinates. ---

3. Employees who often question authority sometimes keep their managers from being effective. 

4. Once a top-level executive makes a decision, people working in the company should not question it. -------

5. Employees should not express disagreements with their managers. -----------------

6. Managers should be able to make the right decisions without consulting with others. ----------

7. Managers who let their employees participate in decision lose power. -----------------
8. A company’s rules should not be broken, not even when the employee thinks it is in the company’s best interest.  

Appendix E.4: SUINN-LEW ASIAN SELF-IDENTITY ACCULTURATION SCALE (SL-ASIA)

INSTRUCTIONS: The questions which follow are for the purpose of collecting information about your historical background as well as more recent behaviors which may be related to your cultural identity.

Choose the one answer which best describes you.

1. What language can you speak?
   a. Asian only (for example, Chinese, Japanese, Korean, Vietnamese, etc.)
   b. Mostly Asian, some English
   c. Asian and English about equally well (bilingual)
   d. Mostly English, some Asian
   e. Only English

2. What language do you prefer?
   a. Asian only (for example, Chinese, Japanese, Korean, Vietnamese, etc.)
   b. Mostly Asian, some English
   c. Asian and English about equally well (bilingual)
   d. Mostly English, some Asian
   e. Only English

3. How do you identify yourself?
   a. Oriental
   b. Asian
   c. Asian-American
   d. Chinese-American, Japanese-American, Korean-American, etc.
   e. American

4. Which identification does (did) your mother use?
   a. Oriental
b. Asian
   c. Asian-American
   d. Chinese-American, Japanese-American, Korean-American, etc.
   e. American

5. Which identification does (did) your father use?
   a. Oriental
   b. Asian
   c. Asian-American
   d. Chinese-American, Japanese-American, Korean-American, etc.
   e. American

6. What was the ethnic origin of the friends and peers you had, as a child up to age 6?
   a. Almost exclusively Asians, Asian-Americans, Orientals
   b. Mostly Asians, Asian-Americans, Orientals
   c. About equally Asian groups and Anglo groups
   d. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
   e. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

7. What was the ethnic origin of the friends and peers you had, as a child from 6 to 18?
   a. Almost exclusively Asians, Asian-Americans, Orientals
   b. Mostly Asians, Asian-Americans, Orientals
   c. About equally Asian groups and Anglo groups
   d. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
   e. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

8. Whom do you now associate with in the community?
   a. Almost exclusively Asians, Asian-Americans, Orientals
   b. Mostly Asians, Asian-Americans, Orientals
   c. About equally Asian groups and Anglo groups
   d. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
   e. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

9. If you could pick, whom would you prefer to associate with in the community?
   a. Almost exclusively Asians, Asian-Americans, Orientals
   b. Mostly Asians, Asian-Americans, Orientals
   c. About equally Asian groups and Anglo groups
   d. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
e. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

10. What is your music preference?

a. Only Asian music (for example, Chinese, Japanese, Korean, Vietnamese, etc.)
b. Mostly Asian
c. Equally Asian and English
d. Mostly English
e. 5. English only

11. What is your movie preference?

a. Asian-language movies only
b. Asian-language movies mostly
c. Equally Asian/English English-language movies
d. Mostly English-language movies only
e. English-language movies only

12. What generation are you? (Circle the generation that best applies to you :)

a. 1st Generation = I was born in Asia or country other than U.S.
b. 2nd Generation = I was born in U.S., either parent was born in Asia or country other than U.S.
c. 3rd Generation = I was born in U.S., both parents were born in U.S, and all grandparents born in
   Asia or country other than U.S.
d. 4th Generation = I was born in U.S., both parents were born in U.S, and at least one
   grandparent born
   in Asia or country other than U.S. and one grandparent born in U.S.
e. 5th Generation = I was born in U.S., both parents were born in U.S., and all grandparents
   also born in
   U.S.
f. Don't know what generation best fits since I lack some information.

13. Where were you raised?

a. In Asia only
b. Mostly in Asia, some in U.S.
c. Equally in Asia and U.S.
d. Mostly in U.S., some in Asia
e. In U.S. only

14. What contact have you had with Asia?

a. Raised one year or more in Asia
b. Lived for less than one year in Asia
c. Occasional visits to Asia
d. Occasional communications (letters, phone calls, etc.) with people in Asia
e. No exposure or communications with people in Asia

15. What is your food preference at home?

a. Exclusively Asian food
b. Mostly Asian food, some American
c. About equally Asian and American
d. Mostly American food
e. Exclusively American food

16. What is your food preference in restaurants?

a. Exclusively Asian food
b. Mostly Asian food, some American
c. About equally Asian and American
d. Mostly American food
e. Exclusively American food

17. Do you

a. Read only an Asian language?
b. Read an Asian language better than English?
c. Read both Asian and English equally well?
d. Read English better than an Asian language?
e. Read only English?

18. Do you

a. Write only an Asian language?
b. Write an Asian language better than English?
c. Write both Asian and English equally well?
d. Write English better than an Asian language?
e. Write only English?

19. If you consider yourself a member of the Asian group (Oriental, Asian, Asian-American, Chinese-American, etc., whatever term you prefer), how much pride do you have in this group?

a. Extremely proud
b. Moderately proud
c. Little pride
d. No pride but do not feel negative toward group
e. No pride but do feel negative toward group
20. How would you rate yourself?

   a. Very Asian
   b. Mostly Asian
   c. Bicultural
   d. Mostly Westernized
   e. Very Westernized

21. Do you participate in Asian occasions, holidays, traditions, etc.?

   a. Nearly all
   b. Most of them
   c. Some of them
   d. A few of them
   e. None at all

22. Rate yourself on how much you believe in Asian values (e.g., about marriage, families, education, work):

   1  2  3  4  5
   [-----------------]------------------|-----------------|
   (do not believe)  (strongly believe in Asian values)

23. Rate yourself on how much you believe in American (Western) values:

   1  2  3  4  5
   [-----------------]------------------|-----------------|
   (do not believe)  (strongly believe in American values)

24. Rate yourself on how well you fit when with other Asians of the same ethnicity:

   1  2  3  4  5
   [-----------------]------------------|-----------------|
   (do not fit)  (fit very well)

25. Rate yourself on how well you fit when with other Americans who are non-Asian (Westerners):

   1  2  3  4  5
26. There are many different ways in which people think of themselves. Which ONE of the following most closely describes how you view yourself?

a. I consider myself basically an Asian person (e.g., Chinese, Japanese, Korean, Vietnamese, etc.). Even though I live and work in America, I still view myself basically as an Asian person.

b. I consider myself basically as an American. Even though I have an Asian background and characteristics, I still view myself basically as an American.

c. I consider myself as an Asian-American, although deep down I always know I am an Asian.

d. I consider myself as an Asian-American, although deep down, I view myself as an American first.

e. I consider myself as an Asian-American. I have both Asian and American characteristics, and I view myself as a blend of both.

Appendix E.5: Task List

Test Tasks

Please read each of the following tasks carefully before performing them. Please feel free to think aloud during the experiment.

Task #1
Become a member of AID and find out the time and location of the next community service hour of AID

Task #2
Find out the information about the current executive committee members and find out the web co-ordinator for the AID VT chapter.

Task #3
Know about the project co-ordinated by Mr. Sivaram Tumma. Note down his contact info.

Task #4
Learn about the home schools project (SSGS) and contact the co-ordinator for the project.

Task #5
Learn about the grocery certificates. Get involved in the program.
Appendix F: Task List

Test Tasks

Please read each of the following tasks carefully before performing them. Please feel free to think aloud during the experiment.

Task #1
Become a member of AID and find out the time and location of the next community service hour of AID

Task #2
Find out the information about the current executive committee members and find out the web co-ordinator for the AID VT chapter.

Task #3
Know about the project co-ordinated by Mr.Sivaram Tumma. Note down his contact info.

Task #4
Learn about the home schools project (SSGS) and contact the co-ordinator for the project.

Task #5
Learn about the grocery certificates. Get involved in the program.
Appendix G: Structured Interview Questions

1. Did the website keep you informed about where you are and what is happening?
2. What do you think about the colors used?
3. Please tell me about the language and phrases used in the website?
4. How are the user control and freedom in exploring and navigating the site?
5. What about the error messages?
6. Did you have to remember information on each page like the link layout or you could recollect from previous pages?
7. Did you feel the need for help or a site map?
8. How easy or difficult was it to join AID from the website?
9. Did you identify that CSH on the AID website stands for community Service hour?
10. Do you think the Community service hour should have been used instead of CSH on the website?
11. What do you think of the consistency of the lay out of the links in the website?
12. How do you think that the current executive committee members page should be organized?
13. How do you think that the projects and activities pages should be organized?
14. How easy or difficult was it to learn about the grocery certificates program?
15. Do you think there are cases of lack or information or over information on the website?
16. What do you think of the aesthetic quality of the website?
17. What do you think of the acceptance of the website?
18. What do you think about the site’s appeal to the Indian students at VT?
19. What do you think of the site’s appeal to the non-Indian students at VT?
20. Over all on a scale of 1 to 5, 1 being the worst and 5 being the best, how much will you rate this site?
### Appendix H: Phase 1 Data Sheet

**Demographic Questionnaire**

| ID# | Age | Gender | First Language | US   | India | India State | Degree | 5714? | Usability Tests |
|-----|-----|--------|----------------|------|-------|-------------|--------|-------|-----------------|
| 1   | 27  | M      | TAMIL          | 20   | 300   | TN          | MS     | 0     | 0               |
| 2   | 23  | M      | HINDI          | 8    | 276   | MH          | MS     | 1     | 0               |
| 3   | 23.5| M      | MARATI         | 8    | 276   | MH          | MS     | 0     | 0               |
| 4   | 24  | M      | MARATI         | 24   | 252   | MH          | MS     | 1     | 1               |
| 5   | 26  | M      | TAMIL          | 24   | 288   | TN          | MS     | 0     | 0               |
| 6   | 25  | M      | HINDI          | 30   | 264   | MH          | MS     | 0     | 0               |
| 7   | 23  | M      | TAMIL          | 8    | 264   | TN          | MS     | 0     | 0               |
| 8   | 23  | M      | TAMIL          | 24   | 252   | TN          | MS     | 0     | 0               |
| 9   | 25  | M      | TAMIL          | 32   | 264   | TN          | MS     | 0     | 0               |
| 10  | 23  | M      | TELUGU         | 20   | 264   | AP          | MS     | 0     | 1               |
| 11  | 22  | M      | HINDI          | 24   | 240   | MP          | MS     | 0     | 0               |
| 12  | 23  | F      | MALAYALAM      | 24   | 252   | TN          | MS     | 0     | 1               |
| 13  | 25  | M      | HINDI          | 36   | 252   | UP          | MS     | 0     | 0               |
| 14  | 22  | M      | TELUGU         | 15   | 252   | TN          | MS     | 0     | 1               |
| 15  | 25  | M      | KANNADA        | 24   | 276   | KN          | MS     | 0     | 0               |
| 16  | 23  | M      | TELUGU         | 24   | 252   | AP          | MS     | 0     | 0               |
| 17  | 27  | M      | TAMIL          | 18   | 312   | TN          | MS     | 0     | 0               |
| 18  | 24  | F      | HINDI          | 20   | 276   | PHD         | MS     | 0     | 1               |
| 19  | 25  | M      | MALAYALAM      | 24   | 276   | KR          | MS     | 1     | 0               |
| 20  | 25  | M      | SOURASTRA      | 18   | 276   | KR          | MS     | 0     | 1               |
| 21  | 21  | M      | SOURASTRA      | 6    | 252   | KR          | PHD    | 0     | 0               |
| 22  | 23  | M      | SOURASTRA      | 24   | 264   | TN          | MS     | 0     | 0               |
| 23  | 23  | M      | MARATI         | 24   | 252   | MH          | MS     | 0     | 1               |
| 24  | 22  | M      | TELUGU         | 9    | 252   | AP          | MS     | 1     | 1               |
| 25  | 24  | F      | TELUGU         | 18   | 264   | MH          | MS     | 1     | 1               |

|     | 88% | 20.2 | 92% | 20% |
|-----|-----|------|-----|-----|
|     | 23.83 MALE 7 LANGUAGES | 4 265.927 STATES MS | YES | 36% YES |

Table 16: Demographic Data
| ID# | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Sum |
|-----|----|----|----|----|----|----|----|----|-----|
| 1   | 1  | 4  | 3  | 1  | 1  | 1  | 4  | 2  | 3   | 19  |
| 2   | 1  | 5  | 5  | 4  | 2  | 4  | 1  | 3  | 1   | 25  |
| 2   | 5  | 5  | 4  | 2  | 2  | 4  | 2  | 3  | 1   | 27  |
| 4   | 4  | 5  | 1  | 1  | 1  | 1  | 1  | 2  | 1   | 16  |
| 5   | 2  | 2  | 4  | 2  | 1  | 1  | 2  | 3  | 1   | 17  |
| 6   | 1  | 5  | 3  | 4  | 3  | 1  | 1  | 5  | 1   | 23  |
| 7   | 1  | 4  | 5  | 5  | 1  | 2  | 1  | 4  | 1   | 23  |
| 8   | 4  | 5  | 3  | 1  | 1  | 3  | 1  | 4  | 2   | 22  |
| 9   | 2  | 2  | 1  | 2  | 1  | 2  | 1  | 4  | 1   | 15  |
| 10  | 1  | 4  | 1  | 2  | 1  | 2  | 1  | 2  | 1   | 14  |
| 11  | 2  | 4  | 5  | 2  | 3  | 4  | 1  | 2  | 2   | 23  |
| 12  | 2  | 2  | 4  | 2  | 2  | 4  | 2  | 2  | 2   | 20  |
| 13  | 1  | 5  | 4  | 1  | 1  | 1  | 1  | 4  | 1   | 18  |
| 14  | 2  | 4  | 1  | 2  | 2  | 4  | 2  | 4  | 2   | 21  |
| 15  | 1  | 4  | 5  | 3  | 3  | 4  | 1  | 5  | 1   | 26  |
| 16  | 1  | 4  | 4  | 1  | 2  | 1  | 2  | 4  | 1   | 19  |
| 17  | 3  | 4  | 2  | 2  | 1  | 1  | 4  | 2  | 1   | 19  |
| 18  | 2  | 2  | 2  | 1  | 1  | 1  | 1  | 1  | 1   | 11  |
| 19  | 4  | 4  | 5  | 2  | 1  | 2  | 1  | 5  | 1   | 24  |
| 20  | 1  | 4  | 1  | 1  | 1  | 1  | 1  | 1  | 1   | 11  |
| 21  | 3  | 4  | 3  | 2  | 1  | 2  | 3  | 4  | 2   | 22  |
| 22  | 1  | 5  | 3  | 3  | 3  | 1  | 2  | 3  | 2   | 21  |
| 23  | 1  | 4  | 4  | 5  | 1  | 2  | 1  | 2  | 2   | 20  |
| 24  | 1  | 2  | 3  | 4  | 1  | 1  | 1  | 1  | 1   | 14  |
| 25  | 1  | 4  | 3  | 2  | 2  | 1  | 1  | 5  | 1   | 19  |

Table 17: Power Distance Data
| ID | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 | Q19 | Q20 | Q21 | Average |
|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|
| 1  | 2  | 3  | 2  | 2  | 2  | 1  | 1  | 1  | 1  | 2   | 2   | 3   | 1   | 1   | 1   | 1   | 1   | 3   | 3   | 1   | 1   | 2.1714286 |
| 2  | 3  | 4  | 2  | 2  | 1  | 1  | 2   | 3   | 3   | 1   | 1   | 1   | 2   | 2   | 4   | 4   | 1   | 1   | 2   | 2   | 2.142857 |
| 3  | 3  | 5  | 2  | 2  | 2  | 2  | 2   | 2   | 2   | 4   | 4   | 1   | 1   | 1   | 1   | 2   | 2   | 4   | 4   | 1   | 1   | 4.2571429 |
| 4  | 3  | 5  | 2  | 2  | 2  | 1  | 1   | 3   | 3   | 3   | 4   | 4   | 1   | 1   | 1   | 1   | 4   | 3   | 3   | 1   | 3   | 3.2428571 |
| 5  | 3  | 2  | 2  | 2  | 2  | 1  | 1   | 2   | 2   | 1   | 3   | 1   | 1   | 1   | 1   | 2   | 3   | 4   | 4   | 1   | 1   | 3   | 2   |
| 6  | 3  | 4  | 2  | 2  | 2  | 2  | 1   | 1   | 1   | 1   | 3   | 3   | 1   | 1   | 1   | 1   | 1   | 3   | 4   | 2   | 1   | 3.1952381 |
| 7  | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 3   | 3   | 3   | 1   | 1   | 1   | 1   | 2   | 3   | 3   | 3   | 2   | 1   | 3.2095238 |
| 8  | 3  | 4  | 2  | 2  | 2  | 1   | 1   | 2   | 3   | 2   | 4   | 1   | 1   | 1   | 1   | 2   | 2   | 4   | 3   | 3   | 2   | 1   | 3.2238095 |
| 9  | 3  | 5  | 2  | 2  | 2  | 2   | 1   | 1   | 3   | 3   | 3   | 3   | 3   | 1   | 1   | 1   | 2   | 3   | 4   | 5   | 1   | 1   | 3.2380952 |
| 10 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 1   | 1   | 4   | 4   | 1   | 1   | 1   | 1   | 1   | 4   | 4   | 3   | 3   | 1   | 1   | 2   |
| 11 | 3  | 2  | 2  | 2  | 2  | 1   | 1   | 1   | 1   | 3   | 3   | 3   | 1   | 1   | 1   | 1   | 1   | 2   | 3   | 4   | 1   | 2   | 1.904762 |
| 12 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 3   | 3   | 3   | 1   | 1   | 1   | 1   | 2   | 3   | 3   | 4   | 1   | 1   | 1   | 2.047619 |
| 13 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 2   | 3   | 3   | 3   | 1   | 1   | 1   | 1   | 2   | 3   | 3   | 1   | 1   | 1   | 2.104762 |
| 14 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 3   | 3   | 3   | 1   | 1   | 1   | 1   | 3   | 4   | 4   | 4   | 4   | 3   | 2   | 2.47619 |
| 15 | 3  | 5  | 2  | 2  | 2  | 1   | 1   | 3   | 3   | 3   | 4   | 3   | 1   | 1   | 1   | 1   | 1   | 3   | 5   | 5   | 1   | 1   | 3.2428571 |
| 16 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 3   | 2   | 4   | 1   | 1   | 1   | 1   | 2   | 2   | 4   | 3   | 4   | 1   | 1   | 2.142857 |
| 17 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 3   | 3   | 3   | 3   | 3   | 1   | 1   | 1   | 1   | 2   | 2   | 3   | 4   | 4   | 2   | 3.333333 |
| 18 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 1   | 1   | 2   | 2   | 3   | 1   | 1   | 1   | 1   | 3   | 3   | 3   | 3   | 3   | 1   | 3   | 2.047619 |
| 19 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 3   | 3   | 3   | 2   | 1   | 1   | 1   | 1   | 2   | 2   | 3   | 3   | 1   | 2   | 4.2142857 |
| 20 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 2   | 2   | 3   | 1   | 1   | 1   | 1   | 1   | 2   | 3   | 3   | 2   | 1   | 2.1904762 |
| 21 | 3  | 4  | 2  | 2  | 2  | 1   | 1   | 2   | 2   | 2   | 2   | 2   | 1   | 1   | 1   | 1   | 2   | 3   | 3   | 1   | 1   | 1.809524 |
| 22 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 2   | 3   | 3   | 1   | 1   | 1   | 1   | 2   | 3   | 2   | 4   | 1   | 2   | 3.2142857 |
| 23 | 3  | 4  | 2  | 2  | 2  | 1   | 1   | 2   | 3   | 3   | 4   | 1   | 1   | 1   | 1   | 1   | 5   | 5   | 1   | 2   | 4.2333333 |
| 24 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 2   | 1   | 3   | 1   | 1   | 1   | 1   | 2   | 1   | 3   | 3   | 1   | 1   | 2.1809524 |
| 25 | 3  | 3  | 2  | 2  | 2  | 1   | 1   | 2   | 2   | 2   | 3   | 1   | 1   | 1   | 1   | 2   | 3   | 3   | 3   | 1   | 2   | 2   |

Table 18: Acculturation Data
Indian Interviewer

Participant #1

1. Not actually.
   Because I have a little background in AID I knew.
   Information is very disorganized.
   Menu should to be to the left.
   Access is bad.

2. Colors are quite good.
   Menu is very below of the page.
   Color background on one page with black is very bad.

3. The language is very clear.
   No problem in understanding.
   They could use more descriptive language.
   No consistency in colors.
   If same colors are used users will know that they are still in the AID website

4. Quite good.
   But most of the time I did not know where I am

5. No.

6. No. I just used the browser back button.
   I did not need to remember.

7. There is a need for help.
   I could not complete Task 1.
   Search button will be good.

8. Very difficult.
   Almost impossible.
   I failed in that Task miserably.

9. No, I did not.
   I did not know that till now.

10. Yes.
11. Very poor.
   Colors are very inconsistent.
   Needs a lot of work.

12. I do not see the need for the 98-99 members at the top.
   I do not know what the user is going to do with this.
   Put 2000-2002 on the top.
   Need not give all the names of the members.
   I do not gain anything by looking at the members names.
   More information is needed on the responsibilities of the president etc.
   Very long page

13. Quite good.
   But in my opinion if they can divide these categories in to categories like infrastructure etc it will be better.
   When the user clicks on the categories more information may be presented.

14. Once I identified where it is, it was not that difficult.
   But identifying it is very difficult.

15. Lack of information but not over information.

16. Little animation or flashy images are needed.
   Kind of boring.

17. I should say that no matter how the website is designed it should be acceptable. Every Indian student has a duty towards his motherland.

18. Nothing Indian about it except the home page.
   Father of Nation’s image is good.
   They could use more Indian landmarks.

19. Not much.

20. 1
Participant #2

1. No.
   Initially when I saw the home page I could not see the menu.
   I had to scroll down.

2. Colors are bad.
   Black is very bad.
   I hate it.
   Suddenly the color changes to black.
   Indian flag colors or some thing like that are good.

3. How do I go back to the home page?
   Red color scares me.
   The overview that they are giving does not give the tasks that can be done with the website.

4. It is very bad.
   Home button must be on very page.

5. No.

6. It was Ok.
   It was not that difficult.
   Menu on the left side rather than on the bottom.

7. I guess so.

8. It was impossible. Let me try again.

9. No does it?

10. Yes, I prefer it.
    CSH does not make any sense to a non member.

11. They are consistent.
    They are all down.
    I prefer having them up and down.
    Then there should be a home button.

12. There is no menu at the top or the bottom.
    Small introduction is needed.
    I do not think all the information for 98-99 is needed.
    Links to them will do.
    Too much information.
Previous year’s executive committee members are not needed. I would like to see the responsibilities of the office bearers.

13. They can do something like amount contributed in one week etc. I would like to see the amounts in rupees. There is no organization at the present.

14. That is in Join us link. I clicked the wrong link and went there. I remembered it was there.

15. Lack of information obviously
   First page has zero information

16. Indian flag icon would make me feel at home.
   As this is AID something to remember me of my patriotism is needed.

17. Obviously I will accept it as it is or however it is as I am an Indian.
   The most important problem is join in and that must be solved.

18. I do not see any VT symbol here.
   VT color background or Go Hokies on the website and the Indian flag on the website will be appealing.
   I like Gandhiji’s image and the background color reminds me of the Indian culture.
   I like that.

19. Not that much.

20. As an Indian I would rate it 2 but not as an Indian I would rate it 1 less.
Participant # 3

1. Kind of.

2. Ok.
   Since I am an Indian I know that the saffron is a color of the flag.
   Black is not good.
   The rest of the pages with white background are fine.

3. This website is not very verbal.
   You do not have to read a lot to know about what it is.

4. When you open the home page, it takes a little time to know that you need to scroll down to the links.
   Links should be on the left side.

5. No.

6. I can see the consistency as all the links are at the bottom.
   I learnt from the previous pages I went to.

7. No.
   Search would help.
   Not exactly a site map.

8. I could not join at all.

9. No

10. Yes

11. Consistency of the links is properly maintained.

12. They need to have current at the top.
    They can move members to a new page

13. Organization wise it is ok.
    I would prefer to know when the project began and when it finished.
    Otherwise the page looks ok.

14. I had to figure out where exactly to go.
    Nothing appears in the info center also.
    Quite difficult.

15. Some pages like the projects have single line introductions.
    I would like at least a paragraph.
Proposal may not be interesting to many people.
Lack of information on the home page.

16. Colors are decent.
   - Not flashy.
   - They look good.
   - Outside, India is known by the father of the nation. So Gandhiji’s sketch is good.

17. For Indians I would say ok.
   - For non Indians more information on the home page is needed.
   - Small Indian flag or something like that.

18. ok

19. Pictures and videos must be there.

20. 3
Participant # 4

1. I would not say so.
   First of all there is a major problem with the home page. You need to all the links down there.
   Links differ on each page.

2. Colors are ok. I would not say that they are impressive.
   I am not sure if they used saffron for the Indian flag or as a VT color

3. I have not done much reading.

4. Alignment is not proper
   Back to top link is not prominent

5. Not exactly

6. Status of where I am navigating to and from is not good.
   Structure is not good.

7. I have not used site maps before.
   I do not think help is required.
   There can be a search feature.
   I would spend more time making the website more attractive.

8. I could not join at all.

9. No.

10. I think it should be presented explicitly.
    Community service is more prominent in the US.
    They should explain what it is and what they have done before.

11. I would not say.
    The size of the links is not consistent.

12. First problem is that the page is very lengthy.
    Only the present year’s executive committee members are needed.
    Members must be listed on a separate page.

13. It is nothing special but nothing bad.
    Gives all the relevant information but is not impressive.

14. I did know about it before. I have a friend involved in it.
15. Lack of information.  
    About-AID VT page does not give enough information

16. It is ok. Nothing great about it.

17. I do not think there will really be a problem.

18. It will be accepted.  
    It has to be.

19. Non Indian students will get a good overview.

20. 3
Participant #5

1. Not really.
   Besides the fact that the heading had the information, I thought I was going outside as the background changes.

2. Colors are not at all consistent.
   Home page was pleasing due to the picture.

3. I have not read much.
   I glanced at the information.
   There seems to be a lot of information about the members.

4. There are many places where I did not know where to go.
   I noticed the pages because I used the back button.

5. I did not see any error messages.

6. To become a member definitely is very tough.
   Task 1 helped me complete the rest of them.

7. I did not find it at all.
   I feel inferior.

8. I did because I caught the ‘hour’.
   It does not make any sense to use CSH.

9. Definitely, when you do not know it.

10. My complaint is that the links are at the bottom.
    Other pages have more links visible.

11. Based on the year from latest to the oldest.
    Does not seem to be organized to me.

12. I see that there are a lot of projects here.
    For a newcomer introduction and the coordinator name are enough.
    Projects need to be ordered on status.

13. It is pretty bad because the link was not at all visible.
    Now when I look for it I cannot find it.
    If it is in join-us it does not make any sense.
    Not enough information was given to me.

14. Lack of information on joining.
    Over information on the members and committee.
15. Not good.
   Look and feel is very very inconsistent.
   Some pages are fully black which does not make any sense.

16. No one can join form the website.
   Information is very low.
   I will go and directly meet the people.
   I will not go to the website again.

17. I would like a modular approach.
18. Except Hokie color there is nothing else.
19. Looking at the website I do not think they will be interested.
    I think they will get frustrated.
    They are used to good websites.

20. 1
Participant # 6
1. Except join yes.
2. Colors are very dark.
   Not matching.
3. It is OK.
4. That is fine.
   Again, I have to use the back button.
   I do not like that.
5. No.
6. I went back to the previous pages.
7. To join AID help is needed.
8. Very difficult.
   Navigation is not that easy.
   Going from one page to another is really confusing.
   I got it somehow.
   Now I am unable to find it.
9. No.
10. Yes, it is not a popular word.
11. Consistent.
12. A link to the project the member is involved in will be useful.
13. The center alignment is not good.
   Colors are not good.
14. There is no relevant information regarding this.
15. Lack of information generally.
16. Look and feel is not that great.
Colors are not attractive.
It is not pulling my attention.

17. It is acceptable.
But it is not showing exactly what aid is doing.
Nothing special about it.

18. Generally it should be more attractive to Indians.
We are Indians and we want it to be better than any site.

19. Many projects are going on. So they may get interested.
20. 3
Participant # 7

1. No.
   This was most confusing.
   On the home page only 4 links are available and other pages had 8 links.
   Join us and grocery certificates links do not take to the exact pages.

2. Irregular.
   Black, white. Impossible to read on some pages

3. Nothing in particular.

4. It is very difficult due to the inconsistency of the links.
   I never knew what links are there so I had to go back always.

5. No.

6. I had to go back

7. Not really.
   I do not think that this is a very big site.

8. I could not join.

9. No

10. Probably.

11. Very inconsistent.

12. The page is well organized.
   Alignment is not proper.

13. Probably the projects could have been sorted by name, status or choice etc.

14. I just happened to see it.
   Not visible at all.

15. Lack of information.

16. Good.

17. Good.

18. I think that its very confusing to use.
   It is easy to contact people by email.
19. May be after seeing the site they do not want to join.

20. 2
Participant # 8

1. No.

2. They are consistent.

3. Could have been better. There is too much stuff.

4. Navigation is bad. I had to use the back button. Navigation bar is at the bottom. It should have been at the top.

5. No

6. Remember where I was.

7. Site map yes.

8. I was not able to. It is very difficult.

9. Yes.

10. Yes.

11. They should be consistent.

12. They are in the wrong order. Latest should not be at the bottom. There is no need for all the members. What will they do if there are 1000 members? List all of them?

13. Projects should be grouped by the coordinators.

14. Not that difficult as I already had been to that page in the previous tasks.

15. Lack of information

16. It s not that bad.

17. It is not very acceptable.

18. Not that much.
19. Very low
20. 2

**US Interviewer**

Participant #1

1. Not really.
   It would have been better if there was a bar at the top saying what level I was in.

2. Ok.
   But orange color is not good.

3. Most tasks do not require me to read text.
   It is hard to make the call but Ok from what ever I read.

4. Ok.

5. No.

6. Remember.
   I had to retrace.
   It was not very inquisitive.

7. Not really.
   Links need to be consistent.

8. Absolutely confusing

9. No

10. Yes

11. Inconsistent

12. List of members and contact information

13. Ok. Contact info needed.

14. Lucky to find it.

15. Lack of information.

16. Good.
17. It would be.

18. Ok.

19. May be that was not an objective of this site.

20. 3
Participant # 2

1. More or less.
   Text was smaller.

2. They are nice.
   Not gaudy.

3. Seems to be good.
   Not harsh or rude to anyone.

4. Pretty good
   Links are small.

5. No.

6. Seems to be consistent.

7. Site map will be good.

8. Bit difficult.

9. No.

10. Yes.

11. Consistent.

12. Latest year should be first.

13. Brief info of the project instead of one more click.

14. Not difficult

15. Information given is useful.

16. Pretty nice.
   May be a few graphics would not hurt.

17. Acceptable.

18. Will be appealing.

19. I really cannot say but may be if it is more colorful then it may.
20. 3.0 – 4
Participant # 3

1. It did not inform me where I am.
   All links should be in page 1.
2. No problem. Fine.
3. It was to the point.
4. Difficult. No link consistency
5. No.
6. Remember some things.
7. Help needed on how to join.
8. Very difficult.
9. Yes
10. Yes.
11. Inconsistent.
   Home page link must be on all pages.
12. List only current members.
   Link to the previous members.
13. If they are sort of interrelated then they must be grouped.
14. Not that difficult
15. Lack of information in joining Aid only
16. Good enough. Not bad.
17. Good.
18. It is a good site. Well designed. Will definitely appeal to every one.
19. Good
20. 3.5
Participant # 4

1. Sort of. Sometimes it was confusing but its ok.
2. Colors are good.
   Not that bright.
3. Descriptive.
4. Ok
5. No
6. Recollect from previous pages.
   Links are at the bottom.
7. May be a site map.
8. Sign up info must be given.
   I was confused where to go.
   Not that easy to join.
9. No
10. Yes
11. Consistent
12. You should use two pages for members and committee members.
13. Contact information must be there.
14. Ok
15. Lack of contact information.
16. It is ok
17. Should be appealing
18. Ok
19. More information about India needed.
20. 3
Participant #5

1. The first page was very confusing.
   Not very clear where I am after that.
2. Very small links.
   Orange color’s purpose is not evident.
3. Guess it was fine. Not much to read.
4. Navigation from the first page is bad.
5. No
6. Many links were missing.
7. Site map should have helped.
8. Very difficult
9. Not immediately
10. Yes
11. Not Consistent
12. Alignment is bad.
   Font is not attractive
   Small pictures can be used
13. Fine
   Picture of each project is needed.
14. I was lucky as I knew about it.
15. No problem
16. Just ok.
17. I guess no one will contribute by seeing the site
18. It should not be so bad.
19. Not that much
20. 2
Participant # 6

1. No.  
   I do not like the links at the bottom.
2. Red on white I donot like.  
   Saffron and white are ok.
3. It was ok. I have not read much
4. Navigation part is bad.
5. No.
6. I could recollect.
7. I knew where I was.
8. Difficult.
   They have got to explain how to join.
9. Yes
10. Not sure. Probably the full phrase can be used.
11. Consistency is ok.
12. Latest should be at the top.  
    Members should be at the top.
13. This is ok.
14. Easy.
15. Lack of information in some places.
16. I do not see any problem.
17. Ok
18. Good
19. No appeal
20. 3
Participant # 7

1. To some extent, I guess I was.
   I did not know where I came from.
2. Ok. Except the home page
3. I did not read much.
   Language is ok even though I have not read much
4. Navigation was confusing.
5. No
6. The layout of the links was consistent.
   I remembered seeing projects at the bottom of a page.
7. Site map may be useful.
8. I do not know.
   May be joining means contacting a person.
9. I kind of guessed it.
10. Both
11. Consistent
12. Recent one on the top of the page.
13. By alphabetical order
14. I saw it on the previous page
15. Lack of information
16. Fine
17. There is room to improve.
   The web site looks incomplete.
18. They should focus more on Indian students
19. Some information about India will be useful
20. 3-4
Participant # 8

1. No. More information needed.
2. Colors are looking good.
   They should use different questions for Questions and answers.
3. I did not read through. But ok.
4. Not many links
5. No
6. I had to remember
7. Yeah. Both of them
8. I was not able to join. No link.
9. No
10. Yes
11. They are not good
12. More recent at the beginning
13. More recent projects should be kept at the beginning.
    Activities page was ok.
14. Not much information on how to use them.
15. Over information
16. Its not that good
17. Comparable to other sites.
18. Discussion boards will make it interesting
19. This site does not give information about India
20. 3
## Appendix J: Phase 2 Data Sheet

### Indian Interviewer

| Participant Id # | Total Replies | Usability Problems Found | Suggestions Made | Positive Comments | Negative Comments | Cultural Comments | Rating |
|------------------|---------------|--------------------------|------------------|-------------------|-------------------|-------------------|--------|
| 1                | 52            | 10                       | 10               | 7                 | 14                | 4                 | 1      |
| 2                | 48            | 9                        | 10               | 5                 | 14                | 7                 | 2      |
| 3                | 41            | 5                        | 9                | 7                 | 5                 | 5                 | 3      |
| 4                | 36            | 10                       | 7                | 5                 | 10                | 3                 | 3      |
| 5                | 43            | 11                       | 6                | 2                 | 14                | 3                 | 1      |
| 6                | 33            | 9                        | 5                | 4                 | 7                 | 2                 | 3      |
| 7                | 29            | 10                       | 5                | 3                 | 10                | 0                 | 2      |
| 8                | 28            | 7                        | 7                | 2                 | 7                 | 0                 | 2      |
| **Average**      | **38.75**     | **8.875**                | **7.375**        | **4.375**         | **10.125**        | **3**             | **2.125** |

### Anglo-American Interviewer

| Participant Id # | Total Replies | Usability Problems Found | Suggestions Made | Positive Comments | Negative Comments | Cultural Comments | Rating |
|------------------|---------------|--------------------------|------------------|-------------------|-------------------|-------------------|--------|
| 1                | 26            | 6                        | 5                | 6                 | 4                 | 0                 | 3      |
| 2                | 26            | 3                        | 6                | 11                | 3                 | 0                 | 3.5    |
| 3                | 27            | 4                        | 7                | 7                 | 3                 | 0                 | 3.5    |
| 4                | 25            | 4                        | 6                | 9                 | 1                 | 1                 | 3      |
| 5                | 26            | 8                        | 4                | 4                 | 8                 | 0                 | 2      |
| 6                | 26            | 5                        | 4                | 9                 | 3                 | 0                 | 3      |
| 7                | 25            | 5                        | 6                | 5                 | 3                 | 2                 | 3.5    |
| 8                | 25            | 5                        | 6                | 4                 | 6                 | 1                 | 3      |
| **Average**      | **25.75**     | **5.5**                  | **6.875**        | **3.875**         | **0.5**           | **3.0625**        |        |

Table 19: Phase 2 Data Sheet
Vita

EDUCATION

M.S in Computer Science & Applications  (May 2002)  GPA: 3.65
Virginia Polytechnic Institute & State University (Virginia Tech), Blacksburg, VA

Relevant Coursework:
Usability Engineering  Advanced Operating Systems
Information Visualization  Computer Network Architecture
Human Information Processing  Research Methods in Computer Science
End User Programming  Poetry

BS in Computer Science & Engineering  (June 2000)  GPA: 3.80
Andhra University, Visakhapatnam, India

Relevant Coursework:
Software Engineering  Computer Graphics
Object Oriented Programming  Database Management Systems
Design and Analysis of Algorithms  Data Structures
Compiler Design  Artificial Intelligence

WORK EXPERIENCE

Usability Engineer Intern  (May 2001 – Aug 2001)
IBM Corporation, Research Triangle Park, NC
Developed step-by-step test procedures for testing the accessibility of Software, Java and Web applications to ensure ADA, Section 508 compliance. Conducted usability evaluations of the ServRAID BIOS mini installation wizard. Designed cluster installation Wizard for IBM ServRAID.

Research Assistant  (Jan 2001 – till date)
Department of Computer Science, Virginia Tech, Blacksburg, VA
Research at the Dialogue Research Group to identify, verify, validate and formulate guidelines on the Cross-cultural issues in Human Computer Interaction. MS thesis applies of Hofstede’s cultural model to international usability testing.

Teaching Assistant  (Oct 2000 – Dec 2000)
Department of Computer Science, Virginia Tech, Blacksburg, VA
Assisted in designing and grading of assignments, term papers for the Computer Science junior-level course of Introduction to Human Computer Interaction

COMPUTER SKILLS

Languages:  C, C++, JAVA, PL/SQL, PASCAL,FORTRAN,Assembly (8085, 8086)
Operating Systems:  Windows XP/2000/NT/95/98, Unix (Linux, BSD), Mac OS X.1
Internet Technology:  HTML, XML, CSS 1/2, ASP, VB Script, JavaScript
DBMS:  Oracle 8i, Developer 2000, MS Access
Networking:  Unix IPC, Java RMI, Socket programming
Other Software:  MS Project, MS Office XP/2000, CorelDRAW 10, AdobePhotoshop 6.0
PROJECTS

Human-Computer Interaction/ Human Factors/ Internet Technologies:

Research towards MS thesis investigates the relationship between culture and international usability testing. An International user study is currently in progress to determine the effects of culture in structured interviews.

Developed a User Interface for an Online Clinical Pathology Tutorial for Veterinary School. The user interface was developed iteratively following the star lifecycle model. Usability attributes of learnability, retainability, first impression, performance and error recovery were measured using standard Usability Assessment Techniques. Implemented in Visual Basic.

Developed a tool for Focus + Context Visualization of Multi-dimensional functions. The tool presents an overview of a function on all dimensions simultaneously with respect to a user-controlled focal point in the function’s parameter space. Implemented using OpenGL and C.

Interaction design and interface design for the checkout process of an e-commerce site. The interaction design was grounded in the classic shopping cart metaphor. Implemented in HTML and CGI in Perl.

Conducted a study to determine cross-cultural issues in customization of end-user programming interfaces. The usability assessment techniques of surveys, questionnaires and interviews were extensively used in the study

Networking:

Developed a Java RMI based Distributed Computing system. System architecture was designed using the Jini network technology.

Designed a web based mail system that allows users to create and access email accounts on Win NT Server platform with IIS 4.0

Conducted a study to research the existing pricing schemes and QoS for ISPs. Various recommendations were made based on the research results towards pricing and QoS of ISPs.

Developed a priority and pricing based algorithm for effectively dealing with Internet congestion. Algorithm uses the header of IP v6.

ACTIVITIES

Student Member, Association for Computing Machinery (ACM)  
Student Member, Special Interest Group on Computer-Human Interaction (SIGCHI)  
Member, Judicial Panel, Graduate Honor System, Virginia Tech

PERSONAL

Achieved rank of 325 in 70,000 students in the Engineering entrance examination conducted by the State government of Andhra Pradesh, India, in 1996.

Organized the All-India industrial tour of the undergraduate class.

Won several prizes in English debate and essay writing.