Association for Information Systems
AIS Electronic Library (AISeL)

ICIS 1993 Proceedings

International Conference on Information Systems (ICIS)

1993

AN EXPLORATION OF THE ROLE OF DIVERSE CULTURES ON THE INFORMATION REQUIREMENTS DETERMINATION PROCESS

Robert L. Leitheiser
University of Wisconsin-Whitewater

Nadya A. Fouad
University of Wisconsin-Milwaukee

Follow this and additional works at: http://aisel.aisnet.org/icis1993

AN EXPLORATION OF THE ROLE OF DIVERSE CULTURES ON THE INFORMATION REQUIREMENTS DETERMINATION PROCESS

Robert L. Leitheiser
Department of Management
University of Wisconsin-Whitewater

Nadya A. Fouad
Department of Educational Psychology
University of Wisconsin-Milwaukee

ABSTRACT

Successfully defining the information requirements for an information system has proven to be a difficult task. It is even more challenging when there are significant differences in the way analysts and users perceive the world, the application, and each other. Major changes in the cultural makeup of the work force have been projected for the next two decades. This paper explores the influences of cultural differences on the requirements determination process. A model is proposed to explain these influences and to identify research opportunities.

1. INTRODUCTION

Perhaps the biggest challenge to successfully building information systems is getting the information requirements right. To do this, users and analysts must develop a complete and accurate set of inputs, outputs, stored data, and processes for the application (Davis 1982). When the requirements are not right, the system has an excellent chance of failing (Bostrom 1989). Unfortunately, getting the requirements right is difficult for the following reasons (Davis 1982):

1. humans have innate limitations on their ability to process information and solve problems,

2. the requirements to be stated are numerous and complex, and

3. users and analysts face complex patterns of interaction.

Methods and tools have been developed (Taggart and Tharp 1977; Bostrom and Heinen 1977; Munro and Davis 1977; Rockart 1979; Naumann and Jenkins 1982; Montazemi and Conrath 1986; Coad and Yourdon 1990) to help overcome human information processing limits and to manage complex requirements. Unfortunately, a serious problem still exists in improving user/analyst interactions. If these interactions break down there is little likelihood of producing a complete and accurate set of information specifications.

One challenge to successful interactions is a lack of understanding of the views held by each of the participants. While this issue has been discussed before (Bostrom and Heinen 1977; Bostrom 1984), we feel it deserves new emphasis and expansion because of changes in the makeup of user and analyst work groups. In particular, the increasing globalization of organizations and fundamental changes in national work forces make culture an important factor to consider when striving to improve the IRD process. For example, shifting demographics in the U.S. work force (Johnston and Packer 1987) will insure that the cultural makeup of system users and developers will be more varied than it has been in the past. This diversity will express itself in a wider range of "worldviews" (Ibrahim 1991) which has the potential for making user/analyst communication more difficult than it is already. On the other hand, the expanded perspective brought to the IRD process by culturally diverse users and analysts may improve information specifications. The argument is similar to that made for having different personalities represented in the systems development process (Taggart 1980; Kaiser

and Bostrom 1982) and in organizations (Mitroff and Kilmann 1976a, 1976b). A basic requirement for this "cultural synergy" is effective communication among participants (Harris and Moran 1991). Since effective communication is also critical to successful IRD, the influence of cultural diversity on user/analyst communication is the focus of this paper.

While the issues raised in this paper apply to many nations and cultures, we have chosen to focus on one nation (U.S.) with one historically dominant business culture (male Anglo). By doing so we do not diminish the importance of cultural issues for other nations but only recognize that (1) the body of IRD research on which we drew is almost exclusively based on U.S. businesses and (2) that there are serious hazards when theories, models, and measures developed in one culture are extrapolated to another (Adler and Graham 1989). We call upon other researchers to consider this study in light of other nations and dominant cultures, and to help us expand and modify our understanding of the influences of culture on information requirements determination.

This paper begins with a review of the IRD process and of the special role of communication in that process. An overview of culture is given and then the proposed IRD model is introduced and discussed. The paper finishes by proposing questions to be addressed by future research.

2. BACKGROUND

2.1 Information Requirements Determination

The Information Requirements Determination (IRD) process is described by a model, proposed by Davis (1982; see Figure 1). In his model users specify information requirements based on their understanding of their business needs and the proposed application. Analysts elicit requirements from users and evaluate them for completeness and accuracy. The abilities of users and analysts to effectively fulfill their roles are affected by (1) characteristics of the "utilizing system," (2) characteristics of the proposed application, (3) relevant experience of users and analysts, and (4) innate constraints of humans as specifiers of information requirements. Davis argues that by examining how these four types of characteristics apply to the current systems development project, an assessment may be made about how certain we can be that accurate and complete requirements will be generated. For example, a low degree of utilizing system stability, a complicated application, and inexperienced users and analysts will lead to a high degree of uncertainty about whether stated requirements are correct. Naumann, Davis, and McKeen (1980) made a similar argument concerning the process of assuring the quality of information requirements.
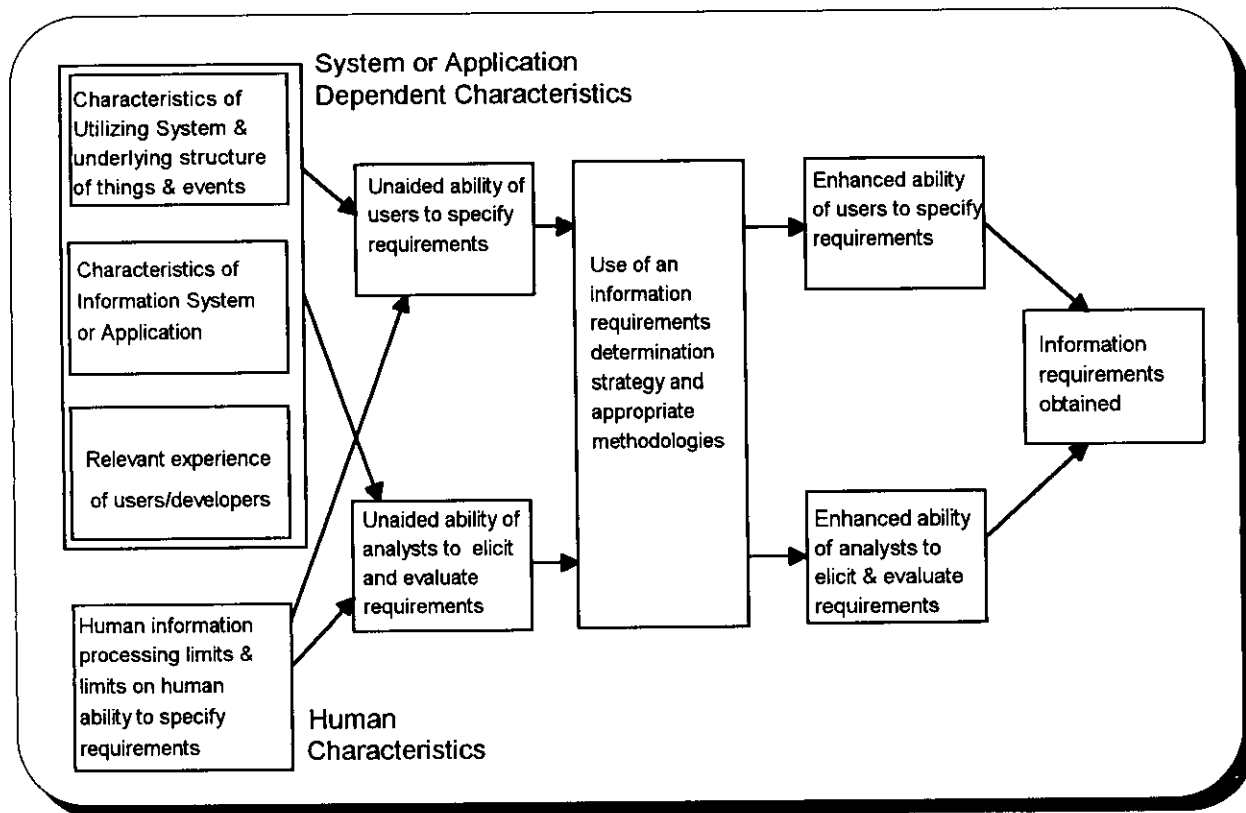

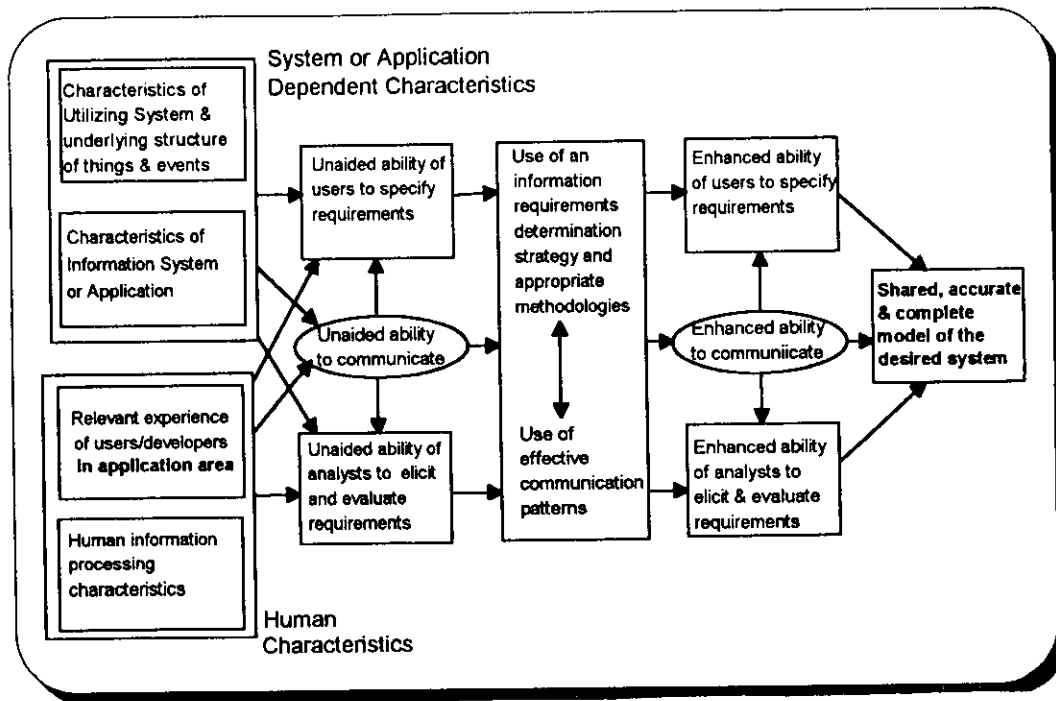Figure 1. Davis IRD Model (Davis 1982)

System or Application
Dependent Characteristics

Characteristics of
Utilizing System &
underlying structure
of things & events

Characteristics of
Information System
or Application

Relevant experience
of users/developers
in application area

Human information
processing
characteristics

Unaided ability of
users to specify
requirements

Unaided ability
to communicate

Unaided ability of
analysts to elicit
and evaluate
requirements

Use of an
information
requirements
determination
strategy and
appropriate
methodologies

Use of
effective
communication
patterns

Enhanced ability
of users to specify
requirements

Enhanced ability
to communicate

Enhanced ability
of analysts to
elicit & evaluate
requirements

Shared, accurate
& complete
model of the
desired system

Human
Characteristics

Figure 2. Bostrom IRD Model (Bostrom 1984)

To mitigate these uncertainties, Davis suggests matching the level of uncertainty to a specific IRD strategy. Four possible strategies are discussed: directly asking, deriving from existing systems, modeling and synthesizing from utilizing system, and experimenting. These strategies, Davis claims, handle increasing levels of uncertainty.

2.2 Role of Communication

While Davis (Figure 1) focuses on the difficulties associated with human information processing limits and the complexity of necessary requirements, he gives little attention to the difficulties stemming from complex user/analyst interactions. Bostrom (1984) has addressed this by extending Davis' model to include the ability of users and analysts to communicate among themselves (see Figure 2). Difficulties in communication limit the ability of users to specify requirements and of analysts to elicit and evaluate requirements. This can, in part, be overcome by using effective communication patterns.

There is widespread agreement on the importance of communication skills for systems developers (Barrett and Davis 1986; Licker 1988; Blank and Barratt 1988; Levasseur 1991). When analysts or IS managers have been asked to rate the importance of various skills, they have typically rated communication skills highly (Henry, Dickson and LaSalle 1974; Arvey and Hoyle 1974; Benbasat, Dexter and Mantha 1980; Green 1989; Watson et al. 1990). A recent survey by Leitheiser (1992), for example, found that when IS managers evaluated 54 technical, business, analytical, and communication skills, they rated "listening" (#1), "ability to work with others" (#2), "writing" (#3), "documentation" (#4), "persuading" (#6), "presenting" (#8), and "responding to another's emotions" (#10) as essential skills for systems developers.

White and Leifer (1986) asked systems analysts and IS managers to list attributes or skills of people that they thought led to success for a particular phase of a systems development project. They found that "good communication skills" was ranked second overall (after technical knowledge) and first in the initial requirements determination phase (i.e., "strategic planning"). Cronan and Means (1984) surveyed users and IS personnel and found that both groups felt that communication was important to the success of their development projects.

Guinan and Bostrom (1986) elaborate on the user/analyst communication process by describing a communication framework. The framework includes (1) effective communication outcomes consisting of shared meaning, goal achievement, and rapport, (2) environment including organizational cultures and subcultures, (3) communication behavior and internal processing, and (4) effective communication patterns. The authors argue that the use of effective communication models (e.g., the Precision Model) will lead to enhanced elicitation, specification, and evaluation of information requirements.

Jenkins and Johnson (1977) have provided a specific and detailed model describing one aspect of interpersonal communication: i.e., body language. Body language includes facial expressions, eye contact, speech characteristics, hand movements, posture, body rhythms, and proxemics. The authors mention that culture, geography, and occupations will influence body language and its interpretation. Beyond giving a couple of examples, these influences are not elaborated.

Little empirical research has been done directly linking communication to effective systems development. Edstrom (1977) found that ineffective communication was indirectly related to perceived system success. Bostrom (1989) demonstrated that improved communication patterns can improve the systems development process in an actual application. He found that, by introducing the Precision Model to the project, the quality of the information requirements was improved and the IRD process was more efficient.

Guinan (1986) used content analysis to evaluate the communications behavior of systems analysts. She found that analysts who were rated as higher performers by their supervisors exhibited good communication skills when compared to lower rated analysts. High rated analysts were better able to establish a common understanding with users, to develop and maintain rapport, and to produce a satisfactory interaction. Guinan makes a convincing argument that communication skills should be considered when trying to understand the information requirements determination process.

2.3 Cultural Diversity

Jenkins and Johnson and Guinan and Bostrom suggest that culture plays a role in IRD communication. Culture "is the collective programming of the mind which distinguishes the members of one group or category of people from another" (Hofstede 1991, p. 5). This programming includes the learning of accepted or standardized "ideas, habits, attitudes, customs, and traditions" (Harris and Moran 1991). Individuals belong to more than one group or category. These "layers of culture" include (1) national, (2) regional, ethnic, religious, and/or linguistic, (3) gender, (4) generational, (5) social class, and (6) organizational or corporate levels (Hofstede 1991). Cultural diversity within the IRD process means that participating analysts and/or users belong to more than one group within a cultural layer. For example, diversity at the second cultural layer is achieved by a project involving users who belong to Anglo, Asian-American, and African-American ethnic groups. For the purposes of this paper, a single dominant national culture is assumed (i.e., U.S.) and emphasis is given to ethnic and gender diversity. The dominant culture will be referred to as the majority culture while other cultures will be labeled as minority. We focus on ethnic and gender diversity because work force projections emphasize changes in these sectors and the literature has tended to focus on diversity in these areas. This emphasis is itself likely to be a national cultural bias. In other countries, religion or social class differences may be more important to understanding user/analyst communication. We also do not consider corporate culture which has its own literature and is outside the scope of this paper.

Interest in cultural diversity within the United States was stimulated by projected changes in the U.S. work force. When Johnston and Packer (1987) examined birth rates, median ages, immigration rates, and labor force participation by women, they found that ethnic minorities and women should comprise nearly three/fourths of new entrants into the work force by the end of the century. While the largest segment in the work force will still be Anglo, this group will grow by only 17%, and will have a median age of 39.3 in 2000 (Saveri 1991). By contrast, the median ages for African-Americans, Hispanic-Americans, and Asian-Americans will be 25, 26, and 28, respectively. In addition, the labor force growth rates are expected to be much higher for African-Americans (32%), Hispanic-Americans (75%) and Asian-Americans (75%) (*Occupational Outlook Quarterly* 1991; Ponterotto and Casas 1991). As the Anglo male work force ages and retires, U.S. businesses will need to fill entry level positions with women and members of minority ethnic groups.

The increase in work force diversity means that analysts (and users?) must be conversant with how culture impacts the communication process. Both analysts and users are products of their cultural backgrounds. They approach the information requirements determination task with their own set of cultural filters, world views, and value orientations that affect their ability to understand each other.

Given the importance of cultural changes in the U.S. work force, it makes sense to specifically include cultural influences in our understanding of information requirements determination. If culture is excluded, we risk the possibility of experiencing reductions in the effectiveness of our IRD strategies in the future. This would result in an increase in failed systems and unsatisfied users. By taking culture into consideration, we have an opportunity to accommodate cultural changes as they occur and to maintain or improve the effectiveness of our IRD efforts.
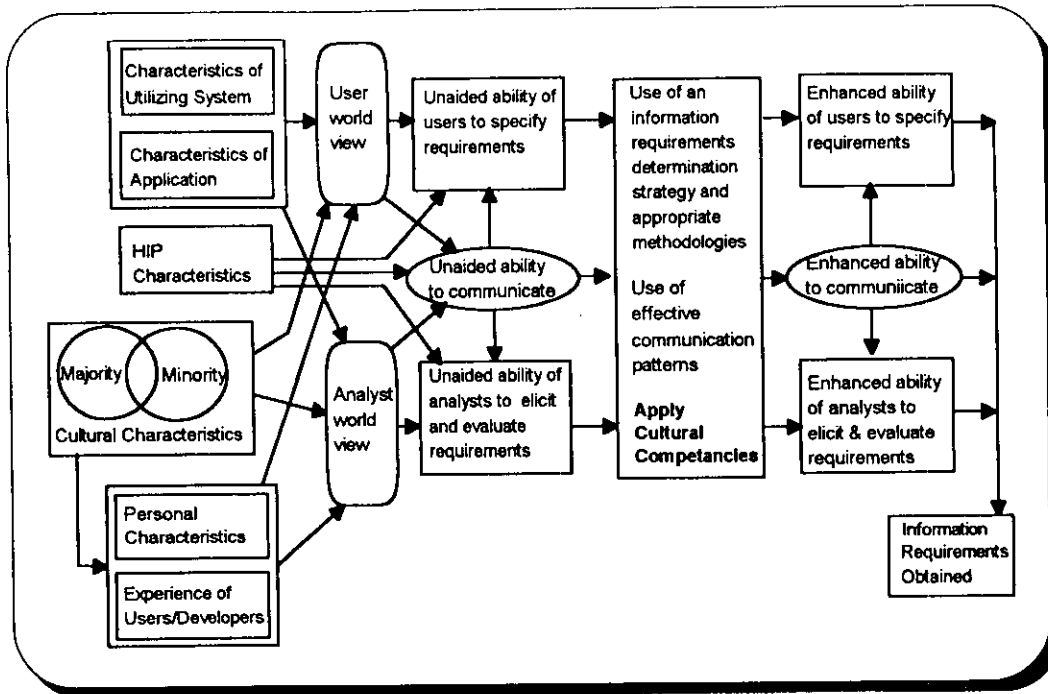
Figure 3. Proposed IRD Model with Cultural Influences

3. PROPOSED IRD MODEL

3.1 Overview

Using the Davis/Bostrom models as a starting point, we have incorporated cultural factors in a revised IRD model (see Figure 3). We argue that to understand the influence of culture on user specification and analyst elicitation/evaluation behaviors, one must understand their "worldviews." A worldview consists of "culturally based variables that influence the relationship [between two individuals, that] directly affects and mediates our belief systems, assumptions, modes of problem solving, decision making, and conflict resolution" (Ibrahim 1991, p.14).

An analyst or user's worldview affects how they perceive characteristics of the utilizing system and the application. The way decisions are made, for example, may differ for users with different worldviews. The Anglo culture stresses individuality while the Hispanic places emphasis on family or other social grouping. This may lead the Anglo user to focus on personal information needs while the Hispanic user will emphasize the overall needs of the work group. Worldviews also affect how personal characteristics and relevant experiences impact on specification, elicitation, and evaluation. An analyst uses his/her worldview to interpret experiences that he/she has had developing similar applications in the past. This may lead to different conclusions about how best to support the making of decisions in a specific application situation.

Different worldviews play a major role in communication among users and analysts. These views provide the reference point from which participants interpret the messages they are being given. Users, for example, must interpret the elicitations and evaluations of the analyst. What is the analyst asking for? Why is he/she asking it? When users and analysts have widely different worldviews, there is ample opportunity for misunderstandings and miscommunication.

In some ways, a worldview is similar to the concept of frames that has been used by some researchers. Bostrom and Heinen (1977) state that frames of reference "serve as filters through which one perceives the world and provides guides for actions" (p. 19). Bostrom (1984) defines frames as "a person's internal contextual definition that creates meaning" (p. 19). To implement a desired communication pattern, Bostrom suggests that these frames must be manipulated. This broad conceptualization of frame encompasses the notion of worldview. We have chosen to use worldview in the proposed model to emphasize and focus on the role and impact of culture. The term also allows us to link the IRD process to the literature of cross-cultural diversity. As noted by Limaye and Victor (1991), most cross-cultural business communication literature is drawn from psychology, anthropology and sociology. In this paper, we have drawn from the cross-cultural counseling literature because the initial skills that counselors learn are the same skills needed for effective interpersonal competence among all professionals. These skills may serve as a model for all interpersonal communication.

Individual Characteristics are included as an explicit component of the IRD model. Individual Characteristics include race, gender, values, attitudes, cognitive style, personality, acculturation, self-esteem, and racial identity, among others. This component was included in part as recognition of research that has been done on these characteristics. The effects of cognitive styles and personalities (Kaiser and Bostrom 1982; Kaiser 1985; White and Leifer 1986) and attitudes (Kaiser and Srinivasan 1982) on systems development have been investigated. The other reason for including Individual Characteristics is that culture interacts with personal characteristics to form a worldview.

The majority and minority cultures to which an individual belongs, and the interaction among them, create his/her worldview. Understanding these views requires some understanding of the characteristics of the underlying cultures. Membership in a culture also influences an individual's personal characteristics and experiences including education, social economic status, work history, and history of discrimination and oppression. These cultural characteristics are discussed in more detail in a later section of this paper.

The final addition to the IRD model is the inclusion of an intervention to improve the quality of obtained requirements. Davis posited that selecting the right IRD strategy would improve information requirements. Bostrom (1984) added that, by changing communication patterns, the process can be further improved and better requirements would result. We suggest that increasing the cultural competencies of analysts would mitigate difficulties introduced by having users and analysts from diverse cultural backgrounds and would allow for enhanced specification, communication, elicitation, and evaluation or information requirements.

The following subsections detail some of the variables involved in Individual Characteristics, Cultural Characteristics, and Worldviews. Discussion will be limited to emphasizing those variables deemed important to understanding the influence of culture on IRD process. We will also focus on variables not covered in the MIS literature. Following this discussion, recommendations for cultural interventions are made.

3.2 Individual Characteristics

Analysts and users come to the IRD process as members of a particular race and gender. Beyond these physical characteristics is a set of socio-psychological variables that affect the individual. Individual variables particularly affected by culture include self-esteem (Parham and Helms

1985), racial/ethnic identity development (Helms 1990), cognitive style (Triandis 1985), and acculturation (Sue and Sue 1990). Minority groups in the U.S. are characterized by large within-group variation. It is important that minority group members not be treated as part of a large homogeneous group. Two factors that have been found to influence within-group variation are racial/ethnic identity development and acculturation.

Racial/ethnic identity development, or minority identity development model (MID; Atkinson, Morten and Sue 1993), is an approach that views racial/ethnic group behavior as a development of a distinct identity. The MID model posits that minority group members go through five stages from depreciating their own culture and solely appreciating the majority culture through rejection of the majority culture and finally to an integration and appreciation of all cultures. Each development stage is associated with characteristic views of self, others of the same minority, others of another minority, and members of the majority culture. An individual's developmental stage will greatly affect his/her behavior, particularly toward individuals of the majority culture. The race and racial identities of the analyst and user could complicate the IRD process. Even members of the same race may have different worldviews depending on their developmental stage. Stereotyping by the analyst may create an insurmountable communication barrier.

Acculturation is another variable that will influence the way that minority group members behave. Acculturation is considered to be the "process of change that occurs when two or more cultures come in contact with each other" (Atkinson Morten and Sue 1993, p. 22). It may also be seen in this context as the degree to which individuals change their values to match those of the majority culture (Marin and Marin 1991). It is important to note that acculturation, per se, is not a goal for all immigrants or minority group members. Nonetheless, the extent to which an individual has changed — or has not changed — as a result of participation in the majority culture will affect his/her worldview. Acculturation will vary by socioeconomic status, family background, and generational status in the United States. Analysts should be sensitive to the fact that acculturation will cause differences in worldviews among individuals within the same minority group. Some members of racial/ethnic groups have adopted the values of the majority culture and others have not.

3.3 Cultural Characteristics

Cultures differ in their predominant value orientations and in the general way individuals approach others, interact with others, and how they solve problems. Kluckhohn and

Strodtbeck (1961) proposed that cultures differ on five universal dimensions: view of human nature (as evil, good, or mixed), relationship with nature (subjugation to nature, mastery over nature, or harmony with nature), time sense (present, future, past), activity (being, being-in-becoming, or doing), and social relations (lineal, collateral, individualism). Kluckhohn and Strodtbeck (1961) and Szapocznik, Scopetta, Arranndale, and Kurtines (1978) found that the white middle-class U.S. culture is characterized by a mixed view of human nature, belief in mastery over nature, future time orientation, emphasis on doing, and emphasis on the individual.

Carter (1991) reviewed the empirical investigations of Kluckhohn and Strodtbeck's model and concluded that there is evidence for substantive differences between cultures on these value orientations. He found that most immigrant groups and racial/ethnic minority group members are "characterized by Subjugation to Nature, Present Time, Being Human Activity, and Collateral Social Relations" (p. 170.) Thus, members of minority groups have an orientation toward harmony with nature, an emphasis on the Here-and-Now, a focus on being spontaneous and self expressive, and a value on social relationships and subordination of individual goals to group goals. This contrasts markedly with the values of the majority culture, and Carter points out that differences, or mismatches, in values lead to communication gaps, or even to non-communication. This breakdown in communication in the IRD process would inhibit the elicitation and specification of information requirements.

3.4 Interaction of Cultures

It is important to understand that minority group members have had unique experiences as a result of being a minority in a dominant culture. These environmental events impact variously on their psychological makeup and consequently on their behavior. For example, minority group members are more likely to be in vocational "tracks" than academic preparation in high school and are more likely to receive diagnostic labels, such as emotionally disturbed, than are majority group members (Sue and Sue 1990; Baruth and Manning 1991). Minority group members are also more likely to experience discrimination in the work place, both in being hired and in on-the-job environments. Axelson (1985) delineates twelve areas in which institutional racism is likely to occur, including exclusion from organizations, differential incomes, housing discrimination, tokenism, and inferior municipal services. These environmental barriers clearly affect the worldview of minority group members. Analysts must be aware of the impact of racism on users and be aware that those barriers may filter users' perceptions of information requirements and their willingness to trust majority culture members.

3.5 Worldviews of Users and Analysts

An individual's worldview is a product of the interaction between the majority culture, minority culture(s), and individual characteristics. The worldview affects how users and analysts think about the utilizing system and the proposed application. Beamer (1991) synthesizes worldview, value orientation and pattern variables to arrive at five areas of value orientation that specifically affect business communication: thinking/knowing, doing and achieving, the self, organization of society, and the universe.

1. Thinking/Knowing refers to how members of the culture obtain, process and disseminate information. Some cultures assume all knowledge is attainable, while others view some aspects of nature an essential mystery. Knowledge may also be gained through experience or through abstract concepts. Some cultures emphasize cause and effect and breaking problems down into small units to solve them. Other cultures place less emphasis on linear thinking, more on interconnectedness among relationships. There is a strong prejudice in MIS training and practice toward attainable knowledge, abstract concepts, cause and effect, decomposition of problems, and linear thinking. Users may not be comfortable with this approach and may find it hard to relate to the analytical methods of the analyst. While a powerful tool for the analyst, the systems approach may not be useful for communicating with some users.

2. Doing and Achieving refers to differences in focus on activity and achievement. Some cultures emphasize getting results while others are more concerned with social relationships. In meetings between analysts and users, the perception of the value of time spent on socializing and on task oriented behavior may differ. This could lead to frustration and anger between analysts and users. Doing and achieving also includes differences in sequential versus simultaneous approaches to task (how many things can an individual do at one time?) and attribution of outcomes to luck.

3. The Self dimension encompasses individualism, a reverence for age and experience, and gender equality. The U.S. majority culture tends to value individualism and gender equality while having less respect for age and experience. A female analyst may face additional challenges when working with Hispanic, Asian, or Middle Eastern cultural group members.

4. Organization of Society includes Hofstede's dimension of power distance; which is how cultures treat inequality among individuals, and uncertainty (i.e., risk)

avoidance. It also includes approach to authority via direct contact or mediated link. An Asian analyst interviewing an executive may tend to work through the management hierarchy rather than approaching the user directly.

5. The Universe includes concepts of time as linear versus cyclical, characterization of change as good or evil, concept of death as final or on a continuum of being. This dimension affects an individual's view of the value of change. An analyst's bias in favor of "new and improved" may not be shared by members of some minority cultures. This attitude will clearly impact on issues associated with the implementation of new application systems.

Associated with this latter dimension is the way time is perceived by members of different cultures. Often, differences in time perception are the lightning rod for cultural clashes. This may be evident, for example, in a situation in which an analyst is more concerned with strict time management than the user. What the analyst considers a waste of time, the user may think of as building a working relationship.

3.6 Developing Cultural Competencies

To be successful, intercultural communication must take cultural factors into account. Beamer expresses concern about communication models that view culture as being an outside influence on behavior instead of a fundamental shaper of perceptions within the communicator's consciousness. She questions the ability of the model to "show what happens to communication when one party has no knowledge of the other's context" (p.287).

The proposed IRD model (Figure 3) brings culture into the center of the IRD process in the form of User and Analyst Worldviews. An important implication of the model is that analysts can improve their ability to communicate with users even when cultural differences exist. Furthermore, this communication opens up the possibility of obtaining better information requirements through the application of cultural synergy.

The recommended intervention is specific training to make analysts culturally competent communicators. Sue (1991) identified three barriers, to diversity in organizations as a whole: differences in communication styles and values; interpersonal discrimination and prejudice; and institutional or systemic barriers. To overcome these barriers he proposed a model of cultural diversity training that includes three phases.

1. The first phase involves making analysts more aware of their own culture and heritage. Majority culture members often do not view themselves as members of a cultural group. This ethnocentric view leads to an assumption that their own standards, norms and values hold true for all individuals. These views become standards against which others are evaluated. The desired training should increase sensitivity to the analyst's own cultural heritage and develop a value for diversity.

2. In the second phase, analysts acquire knowledge about other racial/ethnic groups and cultures. They become aware of their own reactions (positive and negative) to members of other cultural groups, and work to eliminate stereotyping notions. Knowledge includes information about history, cultural experiences, history of oppression, and sociopolitical influences.

3. In the final phase, analysts develop a repertoire of skills, both verbal and nonverbal, to use in the communication process. This includes an awareness of their own nonverbal communication and cultural differences in others' nonverbal communication. Analysts should develop an awareness of how eye contact, personal space, touching, kinesics, and paralanguage are interpreted differently by different cultures. Some of the difficulties in communicating in a culturally diverse setting will be alleviated by using effective communication patterns (Guinan and Bostrom 1986; Bostrom 1989). These include attending, probing, clarification, summarizing, and reflection of content and feeling (Ivey, Ivey, and Simek-Morgan 1993).

4. CONCLUSIONS AND IMPLICATIONS

Information requirements determination is a process that depends on effective communication between users, who specify information needs, and analysts, who elicit information and evaluate stated requirements. A model has been proposed that incorporates the influence of cultural diversity in the IRD process. Specifically, the model describes how cultural characteristics impact on individual variables and helps define worldviews for users and analysts. These worldviews partially determine the ability of users to specify requirements and the ability of analysts to support the specification with effective elicitations and evaluations. An intervention is proposed that would create cultural competencies for analysts. These competencies enhance the ability of IRD participants to create a complete and accurate set of information requirements.

4.1 Research Questions

There is great opportunity for research in this area. One of the assumptions of the model is that cultural influences that exist in other interpersonal communication will also exist in requirements determination interaction. This assumption can be empirically tested.

> **Research Hypothesis 1: Differences in worldviews of users and analysts that are not addressed by cultural competencies result in reduced ability to specify, elicit, and evaluate information requirements.**

We expect that in contexts where there are substantial differences in worldviews, users and analysts will have trouble communicating effectively. There will be misunderstandings and misstatements due to these differing views. Ibrahim has developed an instrument to measure worldviews which could be used to explore this hypothesis.

The model also assumes that an intervention can improve the chances of producing a complete and accurate set of requirements. This intervention could be modeled after a counseling training model proposed by Sue and discussed earlier in this paper. This aspect of the model leads to a second research hypothesis.

> **Research Hypothesis 2: A training intervention that increases the cultural competencies of systems analysts results in more accurate and complete information requirements.**

This hypothesis could be tested using an action research approach similar to the one Bostrom (1989) used to find evidence for the effectiveness of improved communication patterns.

For purposes of this paper, the term minority group member has been used to describe all non-majority group members. However, just as there are great within-group differences for each minority group, there are great differences among culture groups. It is possible that analysts will need to develop different strategies to work effectively with different cultural groups.

> **Research Hypothesis 3: Culture specific elicitation strategies will result in more accurate and complete information requirements when compared to non-specific interventions.**

Finally, there is the hope that the differences among cultures can be used as an advantage in the IRD process. When communication problems have been solved, there is the potential for getting more complete and accurate requirements from a diverse group than from a homogeneous group. The possibility of this cultural synergy calls for a final research question.

> **Research Hypothesis 4: Differences in worldviews of users and analysts that are addressed by cultural competencies result in increased ability to specify, elicit, and evaluate information requirements.**

Changes in the cultural makeup of national and international work forces will have far reaching impacts on business and government. This paper attempts to address these changes by considering how they will impact on the systems development process.

5. REFERENCES

Adler, N. J., and Graham, J. L. "Cross-Cultural Interaction: The International Comparison Fallacy?" *Journal of International Business Studies*, Fall 1989, pp. 515-537.

Arvey, R. D., and Hoyle, J. C. "A Guttman Approach to the Development of Behaviorally Based Rating Scales for Systems Analysts and Programmer/Analysts." *Journal of Applied Psychology*, Volume 59, Number 1, 1974, pp. 61-68.

Atkinson D. R.; Morten, G.; and Sue, D. W. *Counseling American Minorities: A Cross-cultural Perspective*, Fourth Edition. Dubuque, Iowa: Brown and Benchmark, 1993.

Axelson, J. A. *Counseling and Development in a Multicultural Society*. Monterey, California: Brooks/Cole, 1985.

Barrett, R. A., and Davis, B. C. "Successful Systems Analysts Hone Their Communication Skills." *Data Management*, April 1986, pp. 18-21.

Baruth, L. G., and Manning, M. L. *Multicultural Counseling and Psychotherapy: A Lifespan Perspective*. New York: Merrill, 1991.

Beamer, L. "Learning Intercultural Communication Competence." *Journal of Business Communication*, Volume 29, 1991, pp. 285-303.

Benbasat, I.; Dexter, A. S.; and Mantha, R. W. "Impact of Organizational Maturity on Information System Skill Needs." *MIS Quarterly*, Volume 4, Number 1, 1980, pp. 21-34.

Blank, M. M., and Barratt, D. "Finding and Selecting Systems Analysts and Designers." *Journal of Systems Management*, March 1988, pp. 8-11.

Bostrom, R. P. "Development of Computer-Based Information Systems: A Communication Perspective." *Computer Personnel*, Volume 9, Number 4, August 1984, pp. 17-25.

Bostrom, R. P. "Successful Application of Communication Techniques to Improve the Systems Development Process." *Information and Management*, Volume 16, 1989, pp. 279-295.

Bostrom, R. P., and Heinen, J. S. "MIS Problems and Failures: A Socio-Technical Perspective; Part I: The Causes." *MIS Quarterly*, Volume 1, Number 3, September 1977, pp. 17-32.

Carter, R. T. "Cultural Values: A Review of Empirical Research and Implications for Counseling." *Journal of Counseling and Development*, Volume 70, 1991, pp. 164-173.

Coad, P., and Yourdon, E. *Object-Oriented Analysis*. Englewood Cliffs, New Jersey: Prentice-Hall, 1990.

DeMarco, T. *Structured Analysis and System Specification*. New York: Yourdon, 1978.

Cronan, T. P., and Means, T. L. "System Development: An Empirical Study of User Communication." *Data Base*, Volume 15, Number 3, Spring 1984, pp. 25-33.

Davis, G. B. "Strategies for Information Systems Requirements Determination." *IBM Systems Journal*, Volume 21, Number 1, 1982, pp. 4-30.

Edstrom, A. "User Influence and the Success of MIS Projects: A Contingency Approach." *Human Relations*, Volume 30, Number 7, 1977, pp. 589-607.

Green, G. I. "Perceived Importance of Systems Analysts' Job Skills, Roles, and Non-salary Incentives." *MIS Quarterly*, Volume 13, Number 2, 1989, pp. 113-133.

Guinan, P. J. *Specialist-Generalist Communication Competence: An Investigation of the Communications Behavior of Information Systems Developers*. Unpublished Doctoral Dissertation, Indiana University, 1986.

Guinan, P. J., and Bostrom, R. P. "Development of Computer-Based Information Systems: A Communication Framework." *Database*, Volume 17, Number 3, 1986, pp. 3-16.

Harris, P. R., and Moran, R. T. *Managing Cultural Differences*, Third Edition. Houston: Gulf, 1991.

Helms, J. E. *Black and White Racial Identity: Theory, Research, and Practice*. New York: Greenwood, 1990.

Henry, R. M.; Dickson, G. W.; and LaSalle, J. "Human Resources for MIS: A Report on Research." MISRC Working Paper Number WP-74-01, MIS Research Center, University of Minnesota, May 1974.

Hofstede, G. *Cultures and Organizations: Software of the Mind*. New York: McGraw Hill, 1991.

Ibrahim, F. A. "Contribution of Cultural Worldview to Generic Counseling and Development." *Journal of Counseling and Development*, Volume 70, Number 1, 1991, pp. 13-19.

Ivey, A. E.; Ivey, M. B.; and Simek-Morgan, L. *Counseling and Psychotherapy: A Multicultural Perspective*, Third Edition. Needham Heights, Massachusetts: Allyn and Bacon, 1993.

Jenkins, A. M., and Johnson, R. D. "What the Information Analyst Should Know About Body Language." *MIS Quarterly*, Volume 1, Number 3, September 1977, pp. 33-47.

Johnston, W. B., and Packer, A. H. *Workforce 2000: Work and Workers for the 21st Century*. Indianapolis: Hudson Institute, 1987.

Kaiser, K. "The Relationship of Cognitive Style to the Derivation of Information Requirements." *Computer Personnel*, Volume 10, Number 2, 1985, pp. 2-12.

Kaiser, K. M., and Bostrom, R. P. "Personality Characteristics of MIS Project Teams: An Empirical Study and Action-Research Design." *MIS Quarterly*, Volume 6, Number 4, 1982, pp. 43-60.

Kaiser, K., and Srinivasan, A. "User-Analyst Differences: An Empirical Investigation of Attitudes Related to Systems Development." *Academy of Management Journal*, Volume 25, Number 3, 1982, pp. 630-646.

Katz, J. "The Sociopolitical Nature of Counseling." *The Counseling Psychologist*, Volume 13, 1985, pp. 615-624.

Kluckhohn, F. R., and Strodtbeck, F. L. *Variations in Value Orientations*. Evanston, Illinois: Roe Paterson, 1961.

Leitheiser, R. L. "MIS Skills for the 1990s: A Survey of MIS Managers' Perceptions." *Journal of MIS*, Volume 9, Number 1, Summer 1992, pp. 69-91.

Levasseur, R. E. "People Skills: Self-Awareness — A Critical Skill for MS/OR Professionals." *Interfaces*, Volume 12, Number 1, January-February 1991, pp.130-133.

Licker, P. S. "What Do Software Development Managers REALLY Do?" *Journal of Systems Management*, July 1988, pp. 6-11.

Limaye, M. R., and Victor, D. A. "Cross-Cultural Business Research: State of the Art and Hypotheses for the 1990s." *Journal of Business Communication*, Volume 28, 1991, pp. 277-299.

Marin, G., and Marin, B. V. *Research with Hispanic Populations*. Newbury Park, California: Sage, 1991.

Mitroff, I. I., and Kilmann, R. H. "On Organization Stories: An Approach to the Design and Analysis of Organizations Through Myths and Stories." In R. H. Kilmann, L. R. Pondy and D. P. Slevin (Eds.), *The Management of Organizational Design*. New York: Elsevier, North-Holland, 1976a, pp. 189-207.

Mitroff, I. I., and Kilmann, R. H. "Qualitative versus Quantitative Analysis for Management Science." *Interfaces*, Volume 6, Number 2, 1976b, pp. 17-27.

Montazemi, A. R., and Conrath, D. W. "The Use of Cognitive Mapping for Information Requirements Analysis." *MIS Quarterly*, Volume 10, Number 1, March 1986, pp. 45-56.

Munro, M. C., and Davis, G. B. "Determining Management Information Needs: A Comparison of Methods." *MIS Quarterly*, Volume 1, Number 2, June 1977, pp. 55-67.

Naumann, J. D.; Davis, G. B.; and McKeen, J. D. "Determining Information Requirements: A Contingency Method for Selection of a Requirements Assurance Strategy." *The Journal of Systems and Software*, Volume 1, 1980, pp. 273-281.

Naumann, J. D.; and Jenkins, A. M. "Prototyping: The New Paradigm for Systems Development." *MIS Quarterly*, Volume 6, Number 3, 1982, pp. 29-44.

Occupational Outlook Quarterly. Washington, DC: Department of Labor, 1991.

Parham, T. A., and Helms, J. E. "Relation of Racial Identity Attitudes of Black Students." *Journal of College Student Development*, Volume 26, 1985, pp. 143-147.

Ponterotto, J. G., and Casas, J. M. *Handbook of Racial/Ethnic Minority Counseling Research*. Springfield, Illinois: Charles C. Thomas, 1991.

Rockart, J. F. "Chief Executives Define Their Own Data Needs." *Harvard Business Review*, Volume 57, Number 2, March/April 1979, pp. 81-91.

Saveri, A. "Realignment of Workers and Work in the 1990s." In J. Kummerow (Ed.), *New Directions in Career Planning and the Workplace*. Palo Alto: Consulting Psychologists Press, 1991.

Sue, D. W. "A Model for Cultural Diversity Training." *Journal of Counseling and Development*, Volume 70, 1991, pp. 99-105.

Sue, D. W., and Sue, D. *Counseling the Culturally Different*, Second Edition. New York: John Wiley, 1990.

Szapocznik, J.; Scopetta, M. A.; Arranndale, M. A.; and Kurtines, W. "Cuban Value Structure: Treatment Implications." *Journal of Consulting and Clinical Psychology*, Volume 46, 1978, pp. 961-970.

Taggart, W. M. "Human Information Processing Styles and the Information Systems Architect in the PSC Systemeering Model." *Proceedings of the Seventeenth Annual Computer Personnel Research Conference*, Association for Computing Machinery, New York, 1980, pp. 63-78.

Taggart, W. M., and Tharp, M. O. "A Survey of Information Requirements Analysis Techniques." *Computing Surveys*, Volume 9, Number 4, December 1977, pp. 273-290.

Triandis, H. "Some Major Dimensions of Cultural Variation in Client Populations." In P. Pedersen (Ed.), *Handbook of Cross-Cultural Counseling and Psychotherapy*. Westport, Connecticut: Greenwood, 1985.

Watson, H. J.; Young, D.; Miranda, S.; Robichaux, F.; and Seerley, R. "Requisite Skills for New MIS Hires." *Data Base*, Volume 21, Number 2, 1990, pp. 20-29.

White, K. B., and Leifer, R. "Information Systems Development Success: Perspectives from Project Team Participants." *MIS Quarterly*, Volume 10, Number 3, 1986, pp. 215-223.