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Cultural Influences on International Software

Teams

An Interactive Qualifying Project Report


submitted to the Faculty

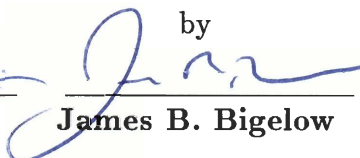
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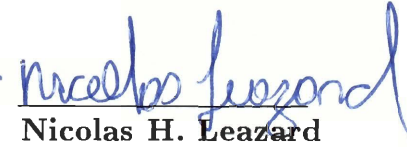
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Abstract

Scarcity of programmers and the resulting high labor costs is bringing people of different race, ethnicity and culture together. This project was concerned with multi-cultural software development teams and the benefits of cultural awareness training. We hypothesized that cultural awareness training of the software team's various cultures would increase production. We performed experiments which supported our hypothesis. We have concluded with a 97.5 percent confidence level that such training does increase production within multi-cultural teams.

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Chapter 1

Introduction

We chose this topic due to the great increase of international software development teams influenced by the expense and scarcity of software development experts. This scarcity has propelled the software development industry to globalize and diversify. It is with this in mind that we start our study.

In a global software development team there are a lot of issues that arise. Some of these issues are directly related to inherent cross cultural differences. It is in this area that our paper will focus on. We theorize that having awareness training of the various teammates culture of a software development team will improve the productivity of that team. In the following chapters we will discuss some of these problems and explore solutions to them. We

will analyze barriers caused by cultural misconceptions and generalizations in order to teach cultural awareness.

In chapter 2 we describe some cultural characteristics, and some major cultural differences. In chapter 3 we describe thoroughly how our experiment is to be carried out. We discuss all of the experiments, and how we will go about carrying them out. In this chapter we also describe in detail how we will go about getting our subjects for these experiments and why we need a certain kind of subject. Chapter 4 consists of all our results to the experiments. It is in this chapter that we perform all our statistical analysis, and our observations to all the experiments that we carried out. Finally in chapter 5 we conclude our study.

Chapter 2

Literature Review

The purpose of this section is to introduce background information to support our proposed project, in which we will study the cultural differences and their business implications, in particular, on software development teams. We researched various sources to discover such influences due to cultural differences, including instructional videos, guides, articles, research text and case studies.

In the beginning of this literature review we will be discussing what culture is and differences among various cultures. We will focus on countries predominant in software development including Israel, United States, Japan, China, Saudi Arabia and Mexico. Further into the review we will present the

effects that those cultural differences have on the development of a product, such as software. The last part of this review, we will present solutions to the problems that are posed when cultural differences exist.

2.1 Culture Defined

We need to first understand what culture is. Culture refers to the way people, as a grouped whole, lead their lives. This includes their particular underlying patterns of thinking, feeling, and acting towards members of their own culture and towards others of different cultures (O'Hara-Devereaux, Johansen; 1994). There are 3 forms of cultures - (1) primary social culture (2) professional culture and (3) corporate culture (O'Hara-Devereaux, Johansen; 1994).

2.1.1 Primary Social Culture

Let's first discuss primary social culture. People learn these cultural attitudes through childhood and are transmitted from generation to generation. These things are taught primarily through conditioned learning. They learn what is expected of themselves and what can be expected of others through displeasure, such as scoldings, and pleasures, such as recognition of a loved one. Culture gives people a sense of who they are, a sense of 'belonging', a sense of what is expected of them behavioral and a sense of what they should be doing with their lives (Harris, Moran; 1987).

2.1.2 Professional Culture

Another type of culture is the professional culture. This refers to a sub-culture within a specific profession. People tend to gravitate toward professional cultures that more specifically define their personal makeup. These cultures are learned through high-level training during formal education and training programs (O'Hara-Devereaux, Johansen; 1994). This is the fine tuning of one's personal culture. This tendency works in favor of the international teams. Examples would be to value creativity and abstract thinking, as among software teams. However, all work cultures, to some extent, are reflections of the social cultures in which they exist (O'Hara-Devereaux, Johansen; 1994).

2.1.3 Corporate Culture

Each company can have its own culture molded to fit its own ideal. An example is a company which feels that having a relaxed environment to work in is appropriate; thus an informal attire is allowed. Software companies wish to attract creative people, so they are less apt to hold rigid policies toward dress. This allows people to express themselves as creative people often do. Accountants are people dealing with order and precision, so perhaps an

accounting firm would wish to have a punctual starting time in the morning.

2.1.4 General Cultural Information

Cultures evolve over time. Take for instance the Americans view toward sexual harassment. This term was rarely heard of just 20 years ago, but is presently a topic of daily conversation. An act considered to be nuisance a dozen years ago is now grounds for a law suit. As women in American society have made progress in their recognition as a major contribution to the business environment, so has American culture evolved to respect them in all areas. Great problems arise though when this progress is assumed to exist in other cultures of the international software teams (O'Hara-Devereaux, Johansen; 1994). American women abroad may not be treated 'acceptably' and may even offend an advancing counterpart by 'putting him in his place'. Occurrences such as these may threaten the social values held by those abroad and result in tension within the team. At a minimum it will cause discomfort due to questioning one's own beliefs and not knowing where the acceptable boundaries are.

All cultures are based on some form of logic (O'Hara-Devereaux, Johansen; 1994). Often times it originates from someone's trials and errors.

The logic is that parents will teach their children of the mistakes they have made in hopes of their children not needing to repeat them. That is an example of how social culture is formed.

Professional culture often formalizes general cultural practices through ethics committees formed from within the separate professions. Peer pressure and market forces will then encourage compliance. Some of the ethics can even be mandated by law, thus increasing the difficulty of change. An example is for a real estate agent to put the concerns of the client above his/her own. If the agent purposefully misrepresents information to close a sale and the buyer or seller later incurs a loss, the agent can be thrown out of the Multiple Listing Service thus hindering his/her ability to make a living. This expulsion is above and beyond the legal ramifications the buyer, or even the state, can pursue. The logic is that the profession as a whole will be more highly regarded and trusted.

Corporate culture is usually set by the upper management with some form of logic, often based on personnel attraction or public image. An example is a company allowing its employees to make their own work schedules or the ability to work from home. This attracts employees with personal social cultures that place emphasis on family orientation, so that parents can be

home with their children more often.

The various levels of culture have different levels of adaptability and evolution. Corporate culture can be readjusted rather easily to accommodate changes in personnel. Professional cultures can adapt but much slower than corporate cultures. Social cultures evolve very slowly, usually over several generations (O'Hara-Devereaux, Johansen; 1994). These differences in the ability to change are due largely to the number of people involved and the influence of key people.

Corporate culture can be changed by the authority of just a few people and non-conforming subjects can be quickly eliminated either by coercion or by force. Professional cultures are more resistant to change, but can be influenced by the industry leaders and by market forces applied by the populous. Social cultures are very slow to change due to the vast number of people needing to agree on such a change. It is difficult to change a person's way of thinking after years of discipline and belief in such customs. Just imagine how difficult it would be to convince Americans not to celebrate Christmas this year.

2.2 Cultural Characteristics

Recognition of one belonging or not belonging to one's own primary social culture is possible through several means. Physical attributes such as our gender, skin color, shape and characteristics of our bodies are visible aspects of our make-ups and thus are common sources of cultural influences (O'Hara-Devereaux, Johansen; 1994). Communication is another key indicator of one's culture.

2.2.1 Gender Differences

A cultural difference that might not be considered cultural at first is the issue of gender. In each culture, the gender issue is treated differently somehow. There are some cultures which view a female's role as mainly within the home, while others recognize the significant contribution to production and management. The way each culture deals with the issue of gender affects the economy of that culture. Not only that, it also affects the societal norms, expectations, and beliefs of others within the nation.

2.2.2 Skin Color Differences

People's skin color is an obvious source of cultural identification. The predominant colored group most often sets the cultural standards for the minority group (O'Hara-Devereaux, Johansen; 1994). The minority group often retains its cultural preferences within its home and local community, but is forced to live by the general standards of the predominant group.

2.2.3 Body Differences

Characteristics of a person's body can influence a person's ability to excel in various areas of life. For example, some cultures prefer petite, thin women, while others prefer larger women. Such individual traits influence the image of a company as a whole, especially from the traits of a company representative (O'Hara-Devereaux, Johansen; 1994). People have a tendency to desire being seen and associated with 'physically desirable' people. Since the definition of 'beauty' is defined by each separate culture, a person could be aided with his/her physical attributes in one culture while experiencing resistance in another. Some cultures may look at overweight people as not caring about themselves, while others view it as a sign of success and prestige due to evidence of lack of manual work (O'Hara-Devereaux, Johansen; 1994). Cultural

'guidelines' have a large impact not only on how we are viewed and treated by others, but on how we view and treat others.

2.2.4 Age Differences

Age is another physically noticeable trait that influences people in various ways amongst different cultures. In most Asian and Latin cultures, elders are revered as having superior knowledge and wisdom, while in America they are looked at as 'out of touch' and from the 'old school' (O'Hara-Devereaux, Johansen; 1994). This may influence international teams in a negative way due to the lack of the respect that one or the other expects. What is not as obvious as the age trait is the underlying cultural traits associated with age. It would be quite obvious to a young American abroad in an Asian country that the manager is elderly, but the American would be surprised that in referencing him as an 'old geezer' would not only be offensive to the manager, but to his co-workers as well. The young American would not only be insulting their revered elder manager, but their underlying cultural values and beliefs.

2.2.5 Communication Differences

Communication is more than just words in a lot of cultures. It entails the entire package of greeting styles, gestures, posture, etc. A firm handshake expected in America could infer a challenge to one's standing in another country. It has been estimated only 20% of communication is verbal and the remaining 80% is associated with what one does rather than with what one says (O'Hara-Devereaux, Johansen; 1994). Such things as table manners communicate inferences of proper upbringing.

Language is often another key indicator of one's culture. Even the same language can indicate different cultures depending on accents. Take for instance the English language. It is easily discernible between an Englishman and an American and even between 'southerners' and 'northerners' of the United States.

Language is the deepest and richest expression of a primary social culture. It reflects and interprets the culture, providing vital insights into how it works. Language and thought are intricately interrelated and thus offer a vital avenue into understanding a culture.

A problem arises in multilingual teams because some team members must use a foreign language. This dampens one's creativity because one must

focus to some extent on expressing one's idea properly in the unaccustomed language. Thus the essence may be lost, distorted, or at a minimum, delayed.

Even a strong accent can be troublesome. Delays caused from repetition of verbal words can be so annoying that the repetitions themselves are eliminated and can potentially result in even greater misunderstandings. Constant requests for clarification can become offensive to the less accustomed speaker causing friction among team members. This can be so great that the team can be 'split' along language fronts and an atmosphere of 'us' and 'them' can be formed. This is a potential crisis to team unity.

2.2.6 Context Differences

Source: Copeland and Griggs (1985 p.107)



Figure 2.1: Hi/Low Context by Culture

As illustrated by the above chart, various cultures can be classified by their attitude toward context. This refers to the entire environment in which a communication occurs. This includes the person's gestures, past

and present relationships, and the words themselves. High-context cultures place a high dependence on things such as interpersonal relationships and tones of voices, while low-context cultures place great significance on the words themselves rather than from the source itself (O'Hara-Devereaux, Johansen; 1994). Thus low-context cultures have an easier time communicating through instruments such as e-mail for they are more dependent on the words of the communication.

2.2.7 Cultural Tendencies

The Japanese are a more team-oriented culture, therefore they tend to do everything in a group oriented manner. If a person is working for a company, and that person stands out, s/he is not made a manager, because that would be thought to break team harmony (Copeland, Saraf, Block, Miller; 1983). In the American culture if anyone in a team stands out, they are acknowledged in the form of a promotion. In Japan identities are strongly linked to one's work.

The Japanese culture is so focused on teamwork that even the way in which their offices are laid out is reflected by this fact. In the United States, the way in which many offices are laid out is that the employees are divided

up into their own cubicles. The higher a person climbs up the ladder of success, the more likely they are given their own bigger office. The American culture values personal space. In contrast, the way in which the Japanese offices are laid out is that anyone sitting on their desk can see and hear everyone sitting on their respective desk, it is more communal (Copeland, Saraf, Block, Miller; 1996).

The Latin American culture tends to be more laid back than the American Culture. The way that business works in Latin America is more personal oriented. Personal matters come first, then come business.

In Latin America meetings rarely start on time, and people are rarely on time to anything; this is perfectly fine in their cultures. There are many underlying reasons for that. Some of which are that in Latin America there are major traffic jams, and public transportation is barely existent. Also if a person in Latin America were to see a person that s/he has not seen in a long time, they would stop and chat with them, and for that time, s/he belongs to that person. And that's how the Latin American culture is, if a person is doing a job, s/he does that job, until s/he is done with it. Unlike in American Society where life is sometimes driven by appointments, in Latin America life is driven by task at hand. Meaning if a person is doing

something, s/he doesn't move to the next task until that first one is finished. This is one of the main underlying reasons that in Latin America, people are hardly on time and business is more laid back. It is a fundamental part of their culture (Copeland, Saraf, Block, Miller; 1983). It is important to remember values placed on courtesy to succeed in cross cultural personal relations (Nancy Fisher; 1996).

High-context cultures, for example, China, Chile, and Iraq, place more emphasis on to many of the stimuli surrounding an explicit message, such as past relations, the age of the person, the status of the person and even the religion of the person. Low-context cultures, for example, America, Germany, and Scandinavia, assign more meaning to the message itself, whether it be spoken or gestured.

An often overlooked form of communication deals with space. Different cultures have different concepts of what is appropriate distance for various relationships. A standing face-to-face business conversation among friends is allowed to be physically closer than among strictly business associates. Arab countries stand closer than Americans do in face-to-face conversations. This can lead to great discomfort and distraction to the American. The American will be thinking more about his discomfort or why the other is

standing 'in his face' instead of hearing the message trying to be conveyed. "The amount of stress that can result when these norms are violated should never be underestimated."

One of the most hazardous management functions in a mixed-context environment is that of personnel evaluation. High-context cultures take all feedback as personal: there is no such thing as an objective evaluation. Openly discussing poor performance with a Thai or Chinese worker, for example, is considered very aggressive.

2.3 Effects of Cultural Differences

2.3.1 Gender Differences

Besides factors such as personal interest and capabilities, a person is influenced in their work by society's norms on those who are qualified to work. Other factors that are influential to an individual's decision about their work are the expectations of capabilities by others, choices of the marketplace, and decisions of employment application approval by an organization (Powell; 1993).

Gender differences in decisions that involve an individual's start in his/her career are attributed to differences in aspirations and expectations of the job. The factors that influenced those were the social pressures created by the mass media, schools, and parents (Powell; 1993). For the most part, that is what drives a person to have the interests that they have. It will always be influenced by somebody or something. It isn't always what they figure out by themselves, out of thin air. Their interests and goals are always set off by what is around them, or lack thereof. Depending on the person's personality and the environment in which they live, those two aspects are what really motivate the person to head in the direction that they are going.

There is likelihood that choices made by individuals would be influenced by the ratio of male to female workers and fraternizing experiences (Powell; 1993). Some people may feel comfortable working in an environment that is dominated by one gender, some do not. That is why the sex ratio in a workplace may greatly effect the work dynamic of that particular company or group.

Gender Treatment in Different Cultures

The treatment that we may bestow unto each other is based upon the facts and assumptions that people may have about on one another. With these facts and assumptions comes the breakdown where gender plays a major role in the way we treat each other. Treatment based upon gender has the same weight as treatment based upon the way someone walks, talks, stares, and smells. Since the appearance of that person, especially the gender of that person will greatly effect the way others would initially think of that person, occupations start to become either gender specific or fitted to which ever gender dominates that particular occupation.

Most occupations in Finland are either strongly dominated by men, or strongly dominated by women (United Nations; 1995). The equal balance of

men and women within an occupation is still non-existent in today's society. Even though there is an increase of female workers in today's workforce, there still is an imbalance in the sex ratio of most occupations.

In Europe, the computer industry has less than one-third of mathematicians, computer technicians, and professionals who are female. Domination of higher status occupations usually go to men, while the occupations that are losing status are usually those occupied by women. In Germany, Sweden, and the United States, women are under-represented in advantaged professions and technical jobs while over-represented in less advantaged occupations (United Nations; 1995).

The arrival of the communist party in China increased the availability of higher education. That gave women more opportunities to educate themselves in the health care profession. In doing so, as the highest ranks of the health profession began to be occupied by females, the communist government devalued the positions, thus having women in that profession, work with decreasing conditions, status, and pay, while men moved to better jobs with higher prestige (United Nations; 1995).

Sweden exhibits a good commitment to the ideology of equality within genders, whereas Japan is the total opposite. Male dominance never ceased

to be the norm in Japan (O’Kelly and Carney; 1986). That maybe due to the extreme beliefs of Japan’s culture. In general the Asian culture has a strong link to their past. The culture is based upon ideas that were set when male dominance was an excepted concept among all. Those ideas are still strongly revered in the modern Asian world, thus creating conflict with the modern world outside of its realm.

In India, an educated woman who lives in an urban setting has more career opportunities than one who lives in a rural part of India. The job market that is offered to them is mostly gender segregated, low income, and low prestige, such as teaching and clerical work (O’Kelly and Carney; 1986).

In Iran, ”woman are considered intellectually inferior”. In their view, the problems of the West were all created by giving woman rights to have a say in the country’s political matters (O’Kelly and Carney; 1986).

It has been found in studies that women tend to talk less, are interrupted more, and are often challenged and disagreed with more than men (Powell; 1993 which referenced Radecki and Jennings).

In other trials, it was found that in mixed groups, a male member tended to be the one chosen for leadership of that team. Before any work was done and any information given, no matter how skewed the ratio was of female to

male, a male member tended to be the leader chosen by his group members (Powell; 1993).

The barriers that are set with stereotypes will progressively start to break-down as individuals begin to gather more and more information on one another. Therefore in the end, the group would feel comfortable with one another and have enough information gathered or observed for them to make a better judgment of the other person's character (Powell; 1993).

2.3.2 Expectations

Among a group of people, or even when alone, there will always be expectations for each other or for ourselves. These expectations are created by the impressions that we have about ourselves or of other people. These expectations will lead to assumptions that we will instill upon ourselves in assessing another person.

Stereotypes

Stereotypical beliefs are the basis of most evaluations of what a person is like. The gender aspect of that person plays an important role in the stereotypical belief of the evaluator upon the individual (Evetts; 1996).

People will assume things about another person. These expectations will be based about the impressions that they get from one another. These impressions could be observed either first hand or instilled on others who may or may not have experienced those assumptions. What makes the impression or assumption a stereotype is when people start to apply those impressions generally. Stereotypes can sometimes be grossly exaggerated, while at other times they could be a true description of an individual who belongs to a group that is being generally defined by a stereotype. We can break it down further with gender stereotyping. Besides stereotyping through race and age, you have gender to consider as a separate common stereotyping of a person.

Some people may have a stereotype that women lack confidence, drive, competitiveness, and ambition in comparison to men. However research has discredited this stereotype/misconception due to evidence that shows that there are few differences in cognitive abilities and skills of men and women (Evetts; 1996).

Another stereotype women are facing is the theory that they are not voluntarily getting education, training, and experiences to succeed in positions with promotional opportunities (Evetts; 1996). That stereotype is false in the sense that in some communities or even cultures, it is forbidden for fe-

males to obtain education or knowledge of a skill that might conflict with the role they are expected to follow.

Family structure and the division of domestic tasks plays an important role in a woman's life when considering a career that would require her to spend time away from home and loved ones, especially children, if any. However that could go the same way with male individuals. The misconception that people have of female workers is that they would have less motivation and less commitment to further her career because they are more devoted to their home life than their work life, contrary to the perception of their male counterparts (Evetts; 1996).

Stereotypes are based on factors such as race, ethnic group, and geographical region of origin, class, religion, and age. When a person has to make a decision about another individual and with limited information, they most likely rely more on their assumptions and prejudices that they place on that individual with the information at hand than those who have more information on which to decide (Powell; 1993).

Cultural Misconceptions

Within organizations, people may create their comprehension of the gender structure in the workplace and of opportunities available by sets of cultural representations and their meanings (Evetts; 1996 which referenced Wajcman). Working relationships among female and male workers are hindered by gender stereotypes (Powell; 1993).

2.3.3 Management**Characteristics**

Senior managerial positions in organizations that deal with the field of engineering and other sciences are usually obtained by those who have experienced first hand what it is like to work out in the field (Evetts; 1996). The concept of a good manager is someone who has years and years of experience within their skilled abilities and knows first hand how parts of a project would function correctly. What not many organizations understand, even though the person being offered a position as a manager has had many years of experience in their respective field, doesn't mean they know how to manage people.

A successful career is defined as experiencing work overload and energy deficiency (Evetts; 1996 which referenced Gray). In most cases this characteristic is true for the majority of the workforce. For some people, in order to obtain high quality work, they would need to spend time which expels energy and that quality work is what qualifies a career to be successful.

A “Qualifications lever” can be utilized to benefit female workers in securing a promotional position. The lever isn’t a physical property, instead it is a name that is used to describe a process in which a person can obtain a managerial position in an organization. It is implemented by simply complying and possibly exceeding the requirements of a managerial position. Since the person meets the criteria, they cannot be denied the promotion on other grounds, for they met the standards (Evetts; 1996).

The characteristics of management have been unofficially noted as being uni-dimensional and the position itself is usually occupied by a person who is without family obligations and other responsibilities that might hinder their work performance (Evetts; 1996). A statistical approach to this portrayal of characteristics of management, a survey was completed in Britain of senior managers. Of those who were female in the study, one-third were unmarried, twelve percent were separated or divorced from their spouse, and a little

over half never experienced responsibility that would require them to care for another being. In comparison, of those who were male, only eight percent were unmarried, five percent were separated or divorced, and twelve percent never had a caring responsibility (Evetts; 1996 in reference to Institute of Management, 1992).

Qualification is a balance of different aptitudes, which might have connections to the person's basic character (May, Strikwerda, Hopkins, Grim; 1996). With the knowledge of that person's basic character, whomever is hiring that person for a position, they could more likely better assess that person's ability to handle cases that might arise in the position that they are applying for.

Leadership style is very important in the way a manager performs his or her job; it has been observed that some managers use their own personal influence, belief, and qualities of leadership to accomplish their jobs effectively. Others might emphasize more company policies, procedures and more traditional aspects of the managerial position, for instance, hierarchical delegation and committee structures. While another type of style has the power of the position be the style that that particular manager might assume, by control of the team using rewards and punishments (Evetts; 1996).

The kinds of ideal styles of leadership are political-authoritarian, political-adversarial, managerial, and interpersonal (Evetts; 1996). The political-authoritarian is the kind of leadership that takes only into consideration the welfare of the organization and the policies that are instilled within the organization. The leader will not bend from any aspect of those policies that are being instilled. The political-adversarial, is the kind of leadership that still has the welfare of the organization and its policies and will use those to further their intentions ahead. The managerial leadership style pertains to more of a lower level of management, where it follows the policies of the organization, but not so involved with the preservation of the organization's welfare. The interpersonal type of leadership deals with the welfare of the employee above the organization's. This type tends to be held by people who care for the individual and the success of the group by paying attention to each of the individuals of that group.

Gender Diversity and Treatment

Gaining high level managerial positions are a career hurdle for women in today's society. A study done by The National Management Salary Survey showed that women managers are being paid considerably less than their

male counterparts/co-workers. The results in another survey done by The Institute of Management Survey found a variation in women's management positions by function, with a concentration in personnel and marketing and hardly in research and development, manufacturing and production (Evetts; 1996).

It is stated theoretically that managerial positions aren't gained due to the difference of gender, but of the relations that the gender has with the top official that does the decisions for the organization (Evetts; 1996). If this theory is true, to some degree, it helps explain the occurrence of male workers being offered managerial positions more often woman workers. If there are male managers currently in position they are more likely to develop stronger friendship or acknowledgment with male subordinates than with female subordinates. A male manager might have more similarities with the male subordinate than the female one, which would lead to more or less interaction with that subordinate, which would intern give the manager a more or less understanding of who that subordinate is.

A "Glass ceiling" is name given to a imaginary barrier so subtle that it is transparent yet so strong that it prevents women and minorities from moving up the management hierarchy (Evetts; 1996 which referenced Morrison and

Von Glinow). It is exhibited in most corporate companies that span the world. It is also what hinders the progression of equality within the workforce of the world. Gender differences in positions that are of the managerial type could be explained by two concepts: individual characteristics of each sex and organizational practices and process (Evetts; 1996).

Some say that characteristics of a female, such as the ability to manage multitasking, more consideration towards others, informal tendencies, and less confrontational, are an advantage to have in managerial processes (Evetts; 1996). This is just one of the many characteristics that is desired and needed in a managerial position.

2.3.4 Stages of Cultural Interaction

Managerial stereotypes that resulted in studies done within the United States of the high success rate of males in management, matched findings found in other countries such as, Great Britain, Japan, China, Germany, and Ireland. However when there is interaction between two different countries, studies have shown that the gender issue would not grossly affect procedures and hearings in the case of international trade. In Asia, they would view an American female manager more so as an American manager than as a female

manager (Powell; 1993).

2.4 Building Global Software Teams

2.4.1 Six Centripetal Forces

The following six centripetal forces are forces that bring teams closer together. All teams need these gathering forces but global teams especially need them to overcome the distance and cultural difference factors. The distance and cultural differences cause an inherently loose binding among team members not found in traditional teams. It is much more difficult to feel part of something that is thousands of miles away unless certain counter-measures are taken. People have a tendency to bond with others within their own culture so forming true team unity is more difficult with team members of varying cultural backgrounds (Carmel; 1999).

Telecommunications Infrastructure

A foundation of high speed, reliable communication lines should first be obtained (leased). Many problems can arise from dependence on inferior communication lines. Global software teams often have to transmit large

files and serious frustration can result if files arrive altered or incomplete. These resulting frustrations can quickly deteriorate any previously formed team bonds (Carmel; 1999).

Collaborative Technology

Collaborative technology refers to electronic communication between group sights. This technology can refer to e-mail, audio-conferencing, video-conferencing and group ware platforms. Other helpful items are discussion lists and group calendars/ schedulers.

The objectives of using this technology is threefold. First, it serves as a team memory and knowledge center. This includes written goals, discussion conclusions, achieved milestones and the like. Second, it provides the various members with a total view of what is happening within the team - abroad and locally. It gives a sense of transparency that somewhat counters the distance factor. Third, it creates a sense of community. You 'belong' because you have access to this information.

This technology comes with some degree of complication since they are culturally biased. For example, a person from a culture that uses hand movements and body gestures as a large portion of his communication style

is somewhat limited expressing himself using e-mail. E-mail has its positive side too. People can read it at their own speed so looking up definitions is possible for people who do not speak the language fluently. The problem of accents is also eliminated (Carmel; 1999).

Other problems resulting from the use of these technologies have to be addressed and resolved. With video- conferencing, for example, rules must be established to determine when it is appropriate to start talking. This can be a problem due to the time delay involved. Cues can be given to show when one is finished talking so that the embarrassment and rudeness of being interrupted can be avoided (Carmel; 1999).

Development Methodology

The Development Methodology binds a software team together. It is the common thread that makes the team adhere to a certain way of doing things throughout the software development stage. By conforming to a methodology it makes the team more discipline, hence more productive (Carmel; 1999).

Architecture and Task Allocation

Architecture is used to determine how to build a global team, in order to allocate task in a way in which team members can work most harmoniously. There are three main task allocation strategies, module based allocation, phase based allocation, and integrated allocation (Carmel; 1999)

The Module based allocation strategy is based on the concept of modularity, often used in software development. Modularity in this sense means that a part of a project (a module), can be worked on and it has little interdependency with other modules. This strategy lends itself well to parallel production of a product. Since all modules have little interdependency, each of the modules can be built at the same time by a different group, and they can then be assembled together (Carmel; 1999).

In phased based allocation one team would develop a part of the project, for example the design, while another group takes care of the implementation. In this strategy, teams do not need to work as closely as with modular based allocation. In the last strategy, integrated allocation, a dispersed team works closely together across modules, and across the designing cycle (Carmel; 1999).

There are some shortcomings to architecture and task allocation. First

allocation needs to be managed, and in the case of module based allocation a product needs to be broken up into multiple smaller independent components (Carmel; 1999).

Building the Dispersed Team Through Trust, Communication, And Personal Bridges

Trust, personal bridges, and communication are the main essentials to building an effective team. Technology alone cannot create an effective team. For it is in the face to face meetings that common bonds are made, and trust can be achieved between members of the team.

To be effective team members must build trust with one another. There are a lot of ways of achieving this, one technique is categorized as “swift trust”. Swift trust is when a dispersed team is thrown together to do a finite task. The team members know that the all of them have been screened and perform at a similar level so they can begin to trust that their teammates will do their part and not let them down.

Communication also is a major key element in effective team building. The communication and coordination between team members in a dispersed team can suffer from lack of face to face interaction. It is important for team members to be on the same page, know what everyone above, below, and all around them are doing. This way they wont feel isolated, and feel more comfortable as part of the whole. This is called “360 degrees view” (Carmel; 1999). By this method since everyone knows what everyone around them is

doing, they get sense of how they are performing according to everyone else in the team.

Personal bridges is another issue that needs to be address in disperse team building. It is very simple to for a conventional team to build personal bridges, they are always going to meetings, seeing each other. Sometimes they even go out together to do something that they both enjoy. For a dispersed global software team this is a little harder. For this reason traveling, becomes very important. One of the must successful personal bridge building technique is having kickoff and other milestone meetings. This way the team member can meet each other, interact, build trust, and personal bridges.

Specialized Management Techniques

The last but not least of the six centripetal forces of dispersed team building is Specialized Management Techniques. The manager is one of the most important members in a group. First of all it is the manager who assembles the teams. The manager needs to regulate a set of standards to be used throughout the duration of the project. When there is team conflict the manager needs to resolve those conflicts that arise. The manager needs to be able to measure the tasks at hand. He also needs to be able to compensate/reward

the team for a job well done. A successful manager of a dispersed multicultural team needs to do all the previously mentioned things, and also be fully culturally aware (Carmel; 1999).

2.5 Guides For Cross Cultural Team Work

2.5.1 Guides to working with The Japanese

The Japanese culture is a remarkable and unique one. They value saving face, personal relations, cohesive and strong family ties, among other things. For an American to work in a group with a Japanese he must learn how to interact with their culture. The Japanese language lends itself wonderfully to being vague, so an American might get frustrated by the vagueness that he will experience while working with a Japanese coworker. The Japanese don't like conflicts, so they are vague and often don't finish their sentences, to let the listener finish it as they please. (Harris, Moran; 1987).

Saving face is a major part of their culture. While working on a group project a Japanese coworker will never admit to carrying the group even though she may have done so. By the same token, if a Japanese coworker doesn't do her part on a project, she will expect you to cover for her. In

their culture the team is the most important thing, and not the individual. This is why covering for the team, even to the degree of sacrificing themselves in the process, is common in the Japanese culture. The Japanese are very disciplined, and focused on their task. In the American culture the managers motivate their workers by threatening to fire them, while in the Japanese culture the manager takes the blame if a workers aren't producing. To be successful in cross-cultural group work with the Japanese, one must be culturally aware, and willing to learn even more. (Harris, Moran; 1987)

2.5.2 Guides to working with the Arabs

One of the first things to keep in mind when working in teams with the Arabs is "patience". When working with an Arab one must exercise patience, and be polite. Cursing or screaming during meetings is considered taboo. Avoiding discussions of religion, politics, and Israel is highly recommended. The Arabic people are very religious and bring that to the table.

When it comes time for decision making, all parties of the team must be present, email, letters, phone calls just don't cut it. When it comes time for a group meeting, one must be prepared to socialize first, for a long time, and then get down to doing business. This goes back to having patience. Arabs

are a well-rounded people. They are very amorous and friendly. They value the friendships that they make while working in teams. When communicating with an Arab, one should be courteous, and friendly as they would do the same. When they speak they use a lot of language to express themselves. Most Arabs feel that Americans are self-centered and like to take credit for a joint team effort. Arabs also feel Americans don't respect the Arabian culture when first working with an Arab. This may be the reason why an Arab may feel a little weary around an American coworker.

2.6 Solutions

For a business to be successful in the global market it needs to become culturally aware (Copeland, Saraf, Block, Miller; 1983). In a sense it needs to become more sensitive to the culture in which it is trying to start or maintain a business relation. There are some major problems in the way American business goes about doing business in other countries, because of some major misconceptions made by Americans about the United States and other countries.

Companies embarking on international teams are discovering the cultural competencies they seek cannot be found in textbooks (O'Hara-Devereaux, Johansen; 1994). Productive cross-cultural relationships require each individual to embark on a personal learning journey that initially can be even more frustrating than it is rewarding. A major challenge faced within the team is to accept the logic of the other member's culture. Members have the tendency to judge their counterpart's cultural standards and practices according to the very different logic of their own culture (O'Hara-Devereaux, Johansen; 1994).

It is harder today than it was in the early 80s and late 70s for companies to maintain a dominance overseas. Culture and cultural ways of doing things

are very sacred to a society, and there is always an underlying reason for people in a society to do business as they do. There are some key reasons why some American companies are having trouble doing business overseas. Take for example India, in the Indian culture it is customary for a manager to manage. What I mean by that is that a manager makes decisions, s/he doesn't consult the team as it is sometimes done in America. He is paid to manage, and that means making decisions. If a manager is to involve his department in all or some of the decisions made he is thought of as not being a good manager. In contrast, in the United States, if a manager were to involve his department in a decision, he is a good manager.

Cloning the "United States way" of doing business does not always spell success in other countries. (Copeland, Saraf, Block, Miller; 1983) Let's take for example a simple meeting. In the U.S. it is customary for a meeting to start on time. The first order of business is about business, once business is taken care of, people can be social. For all of us that live in the United States, this is normal, it goes hand in hand with our society, "always on the run". But this is not the way that it is done in all parts of the world. Take for example our own close neighbor Mexico, in the Mexican culture, it is done a little different. In Mexico, meetings hardly ever start on time,

and the first things taken care of are the social needs of the employees in the meeting, then they do business. But wait this is totally wrong, this is not the way that it is done in the United States. That is the first mistake, made time and time again by American companies trying to start up a business in Mexico. What they don't understand is that there is a historical / cultural reason for doing business this way in Mexico (we can also go so far as to say in all of Latin America).

Understanding why countries do things the way they do, and emulating the practices in those countries means success for business. It is our stubbornness that keeps us from being more successful overseas, and our misconceptions about other cultures that influence our everyday interactions in those culture. For an American businessman to go do business in Saudi Arabia and be successful, he needs to understand Saudi Arabian culture. He cannot walk into a meeting and expect to things to work the way they do here. Understanding that is the first step in becoming a successful multicultural businessman.

Inherently cultural differences are one of the factors that keep companies from booming in a global economy. Being sensitive to cultural differences is a key in becoming successful in any country. For a company to thrive

in overseas business both the company and the people that work for the company must commit to the creation of a climate of cultural diversity. This will create a manager with the knowledge to make his or her staff work at its highest productivity level (Nancy Fischer; 1996).

2.6.1 Team Managers

The selection of the team leader to work abroad should not be accomplished using the traditional criteria of past performance and technical expertise. It has been shown through analysis of study results that a manager deemed successful in one country is not necessarily the best manager for an overseas operation (O'Hara-Devereaux, Johansen; 1994).

The main cause of this is due to the change of cultural work ethics and habits. A managing style which works very effectively in one country may have just the opposite effect in the country the manager is transferred to. In the United States, for example, it is acceptable and somewhat expected for a manager's subordinates to give their opinion on a matter and the manager listens to and weighs the subordinates' opinions and then makes a final decision. However, if this same manager uses this style by requesting subordinate's input in a country like India, he would find the subordinates would

not give their input and would feel quite uncomfortable with such a request. The manager would find the style used very effectively in the U.S. would need to be discontinued and a very different totalitarian style would need to be implemented. The switch to such a totalitarian style may very well be impossible for the transferred manager.

It has been determined that effective managers for global software teams need comparatively little technical expertise and more knowledge of managerial skills such as supervision, control and facilitation and global orientation skills such as understanding national cultures along with their markets and customers. Effective managers were asked to self-rate their skills as concerning 3 relevant dimensions (for a total of 10 points) - technical knowledge, managerial skills and global orientation. The average ratings were 2.4 for technical knowledge, 3.9 for managerial skills and 3.7 for global orientation. (Carmel; 1999) These numbers were compared to less effective managers having an average of 6.0 for technical knowledge, 2.7 for managerial skills and only 1.3 for global orientation. Successful managers rated themselves as having nearly 3 times the competence in global orientations (for example - understanding the national culture). This indicates prior cultural awareness training of the transferring manager should be beneficial to the team

performance as a whole.

The following information gives the various characteristics of a successful a global team leader (O'Hara-Devereaux, Johansen; 1994).

- Personal characteristics:
 - patient / persistent;
 - emotionally stable;
 - able to live with failure;
 - open-minded;
 - sense of humor;
 - humble (as opposed to modest); strong imagination

- Work-related characteristics;
 - capable of systems thinking;
 - can make decisions in ambiguous situations;
 - capable of pushing cultural limits;
 - able to model behavior valued in each cultural environment;
 - able to read cross-cultural business cues;

- able to adapt management style;
- technically competent;
- Intellectual / Social characteristics:
 - curious (intellectually and socially);
 - able to build personal relationships and build rapport;
 - knowledgeable about historical and current social developments;
 - sensitive to the value of every person;
 - motivated to work cross-culturally;

2.6.2 Guides

Guides have also been utilized. A guide is someone with knowledge of the host country's culture. The guide's job is one of consulting to be used by the manager. The guide explains the customs of the host country and explains any misunderstood actions either to the employee or the manager. The guide acts as a mediator in disputes to lessen the communication misinterpretations (literal or implied). The managers should be selected according to one of the two following criteria. First, a person of the culture who has gone to at least two years of school or work in the parent company's country. Or second, a

person from the parent company's country that has worked abroad in that culture for at least one year. Either criterion would give the manager a greatly needed advantage over the cultural adjustments needed (Funakawa; 1997).

2.6.3 The Third Way

Another approach is for the team to develop its own culture. This is referred to as 'the third way' where the team does not adopt either culture, but a combined, agreed on culture. The most important part of this adaptation is the mutual agreement by all parties involved. This takes considerable time to develop but on the long run it solves more problems than it creates (O'Hara-Devereaux, Johansen; 1994).

2.6.4 Global Team Advocate

A global team advocate is someone remaining in the parent country who looks out for the interests of the global team. The advocate constantly reminds the parent leaders of the needs and importance of the global team. Often times, the parent company will tend to forget the needs of those not present. The cliché - 'Out of sight, out of mind' - takes on significant meaning as

concerning global teams. The advocate is the 'squeaky wheel' for the team when budgets are created or adjusted. The selection of a dedicated advocate is of great importance (O'Hara-Devereaux, Johansen; 1994).

2.6.5 Regularly Scheduled, Face-to-Face Communication

One of the most important elements of a successful global team is regularly scheduled communication between the team representative and the home company representative. E-mail seems to be the most convenient due to time zone differences, but e-mail is not as personal as teleconferencing or telephone conversations. The problem with the latter two is possible conflicts arising due to some side needing to be available at an inconvenient time. This would defeat the benefit of the conversation.

There should be arranged, at a minimum of once per quarter, regularly scheduled face-to-face meetings with the home company representatives. These meetings should include as many team members as possible. It reinforces their sense of value, importance and need to the whole. It may be very costly in both time and money but, the benefits far outweigh the costs (O'Hara-Devereaux, Johansen; 1994).

Chapter 3

Methodology

The more knowledge we have of another person, the more informed we are to judge their character. Our hypothesis is that knowledge of other cultures would lead to higher productivity within a multicultural team. With that knowledge, we would become more open-minded to different ideas, opinions, and ways of thinking other than our own, all of which are very necessary in an industry that thrives on diversity in the creation or continuation of technology.

3.1 The Experiment

In today's workplace, project teams are becoming increasingly diverse. One reason for the diversity in project teams is that people who are from a different culture than the culture that is creating the project are meeting special skill requirements. Another reason for the diversity would be the cost efficiency of that project. It could be cheaper to have a programmer from China to program specific software than to get a programmer of that same caliber here in America. Whatever the reason may be, in order to have a functioning team that would work at an optimal level, we believe that the more knowledge and background that teammates understand about each other, the easier and more efficient the workplace and/or setting might be. We have comprised an experiment that would test our hypothesis.

3.1.1 The Subjects

To obtain the necessary subjects for our experiment, we advertised for their help in our study thru a general email to the student body of WPI (undergraduates and graduates) with the allure of a stipend of ten dollars if they replied back and were chosen to participate in our study. We gained permission from the Managing Senior UNIX Systems Administrator, Allen

Johannesen, to do so. The actual email that was sent out to the general population of WPI is provided in Appendix A.

We focused on acquiring volunteers from WPI's graduate program. First year graduate students of WPI were our prime candidates for completing this study. The reason for wanting participants from this pool of potential participants is because they are mostly comprised of international students who have just arrived from their native country. With international volunteers, we were able to set up an environment that would contain members of different cultures who were not yet assimilated to the "American way". The less exposure they had to the American culture, the more cultural innocence that has been preserved.

For our results to be somewhat quantifiable we had four groups of three participants. For statistical significance this experiment should have required a larger amount of participants than previously stated, but due to constraints of time, money, and availability of volunteers, we had to limit it to just four groups. More detail on the statistical significance of our results will be given at a later section of this study.

Email Procedure

We wanted to make sure that we had an adequate pool of people from which to choose the candidates for our IQP research. We chose to send an email to the whole institution in search of students that have not been influenced by the American culture for a long period of time.

The reasoning behind this technique was to ensure that we minimized the cultural intergration of our subjects. Another reason was to have a large enough pool of candidates to minimize the chances of the candiates we chose knowing each other prior to our experiment.

We received two hundred and sixty three responses from a student body of slightly greater than four thousand students. Out of those two hundred and sixty three responses, we kept all foreigners and about thirty students of American heritage. In order to form four groups consisting of three candidates with different nationalities, we created a program that sorted the candidates by the amount of time spent in this country and what their nationality is. We then checked this list and came up with our four teams, with each team consisting of one American, one Chinese and one Indian. We chose these cultures based on available subjects and the great extent these participate in the software developement industry.

Two groups were designated as the experiment groups and the remaining two groups were designated as the control groups. In each of the four groups, we had one member from each of the cultures represented - Indian, American, and Asian. We created these groups with the random method of picking their names, sorted by nationality, out of a hat and assigning them to a room with teammates of the other two cultures.

We reserved four cubicles within the WPI Gordon Library to use for our experiment. We had each group complete their experiments within those rooms. We also video recorded both experimental groups during completion of their activities as well as the conference discussion. We used a video recording so we would be able to freely observe all the groups. We were then able to review these tapes as a group later on so to insure we did not recall events incorrectly or missed events of an unattended group.

Our experiment had three phases that tested and recorded the reaction and productivity of each group. Figure 3.1 shows in detail the path in which each group followed in completing our experiment.

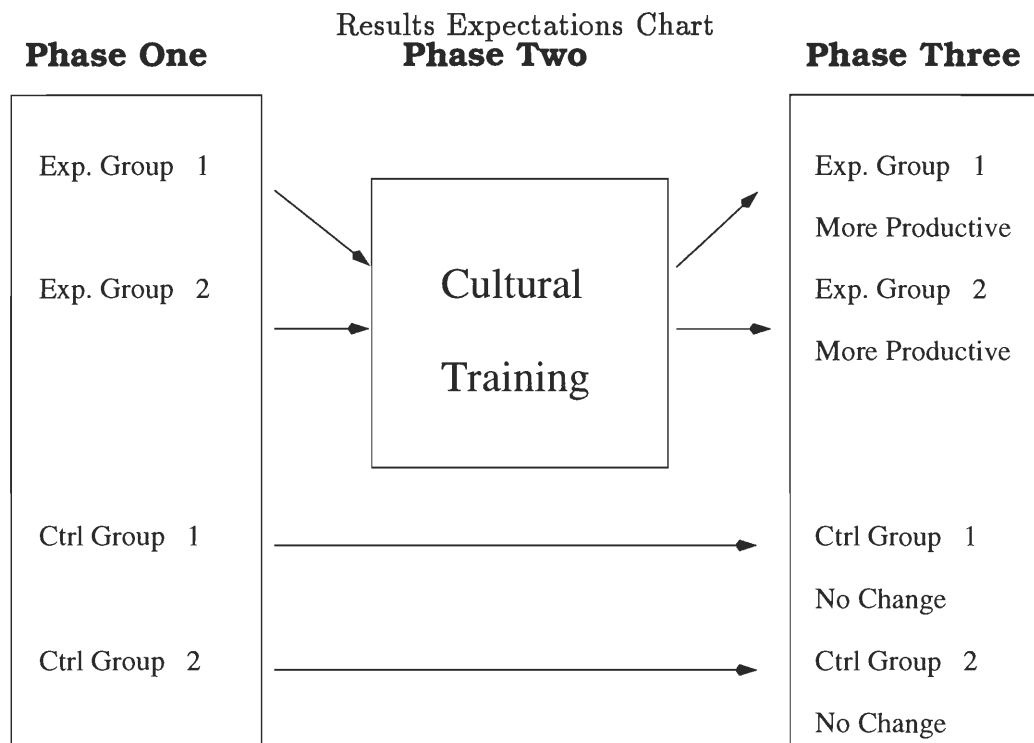


Figure 3.1: Productivity Expectations

3.1.2 Phase One: Test Without Culture Knowledge

For the first phase of the experiment, each group completed a problem-solving activity that would require them to work in a group. One of the activities that were used involved the participants to create a structure out of a deck of cards. The other activity required the groups to create a structure out of random materials. The objective of the two activities mentioned above is to have a group “work together to accomplish a difficult task” (p.70, Jones;

1999).

Experimental group one and control group one completed the “Tower of Cards” activity in the first phase of the experiment, where as experimental group two and control group two completed the “Tall Tower” activity in the first phase.

Description of The Tower of Cards Activity

In the “Tower of Cards” activity, each group was given a deck of cards in which they were instructed to use those cards and build a tower at least two tiers high. The participants were instructed to use only one hand, with the other placed behind their backs. This restraint forced interaction and dependence between the members. At first we imposed a time limit of twenty minutes for the groups to create two tiers out of cards. We modified the original time limit because none of the first groups were able to construct a card tower of two tiers within the expected time limit. See Appendix B.1 to view the actual instructional handout given to the participants explaining the rules of the “Tower of Cards” activity.

Description of The Tall Towers Activity

For the “Tall Towers” activity, each group was given instructions to construct a structure out of one pound of thin spaghetti, a one pound loaf of white bread and one 8 ounce bag of gum drops. The structure created from these materials needed to support two slices of bread layed flat on top of the structure.

We set two restrictions for this task. The group members could only use one hand in building this tower as before and the height of the tower to must be a minumum of eighteen inches. We also timed teh length of time used by each the team to construct the 18” structure. See Appendix B.2 for this experiment’s instructions.

Observations

We observed their techniques and their interaction between one another as the participants worked to complete the activities. We specifically observed their communication skills with one another, in particular, who assumed leadership positions and the evolvment of the roles each member assumed as time went on. We were also watching how they socially interacted with each other and the ideas each contributed to the solution of the activity.

Another characteristic we observed was the group's ability to become comfortable with each other. Friction among the group would be harmful to the success of the experiment. Observing and noting the procedure each group followed to solve the problem helped us identify types of common group dynamic problems that arouse within the multicultural groups.

The observations and time results we collected were useful for quantifying each groups' productivity level. The observations of the participants benefited us by seeing first hand how each individual of the group interacted with the others. We got an objective view of how the dynamics of each group pulled together to complete the activity, thus giving us insight to difficulties occurring within multi-cultural groups.

3.1.3 Phase Two: Cultural Awareness

For the second phase of the experiment, the two groups that were designated as the experimental groups were guided into a conference room where we posed situational questions and had them respond to them openly. See Appendix C.1 for the listing of the discussion topics presented to each of the subjects.

The other two groups that were designated as the control groups did not

go through this group interaction. Instead, each individual of the control groups were given the discussion topics individually to read and respond by writing their answers on a piece of provided paper. We wanted the control group members isolated from each other so they would be unable to socialize as a group. The importance of not allowing the participants of the control group to interact with each other during that period of time is to control the amount of exposure these individuals have with the other group members and their cultures. We were also interested in their views of these situational questions.

3.1.4 Phase Three: Test With Cultural Awareness

This was the last test phase of our experiment. In this phase, we instructed all groups to once again solve a problem as a group. Experimental group one and control group one received the “Tall Towers” activity to accomplish at this phase, while experimental group two and control group two were instructed to complete “Tower of Cards” activity during this phase.

3.1.5 Exit Questionnaire

After the experiment was completed, we asked the subjects to all fill out a questionnaire. Each participant gave us a chance to gather more background information and experience they encountered with other cultures. Through this exit questionnaire, we obtained each subjects' perspective on the multiculturalism of the team and how it affected their work abilities. See Appendix C.2 for the actual exit questionnaire.

3.2 Expected Results

We hoped that by the end of our experiment we would have a set of data that we could use to compare the productivity of each of the groups. From that comparison we could then confirm or disconfirm our initial hypothesis that cultural awareness training does in fact impact the productivity level in a culturally diverse team. We expected the results of the first phase of the two groups performing the same activity should be relatively the same.

After the second phase, we hoped all the experimental groups' members would have a better understanding of their teammate's cultural background. This would help each team member better understand their teammates abilities and expectations. This should significantly increase their cooperativeness and productivity.

By the end of the third phase, the final results should tell us that the experimental groups had a greater increase of productivity level than the control groups. We expected a slight increase in the productivity level of the control groups due to experience in working together but an even greater increase of productivity level of the experimental groups due to the additional cultural awareness training.

3.3 Potential Problems

Our experimental results could be adversely influenced by many factors. Some of these factors can be minimized by careful planning and others are beyond the scope of this project. The following contains many of the problems we feel will possibly be encountered which will limit the validity of our conclusions. Most of these factors are due to limited resources of one kind or another.

3.3.1 Beyond Our Capabilities

First, let us discuss the factors that are beyond the scope of this project. The most influential factor concerns the scale of the study to be performed. The scale of the study is critically important because the number of trials of the experiment is directly correlated statistically to the accuracy of the conclusions. In order to reach statistically valid conclusions we would need to record experimental results from a far greater number of groups than we will be able to study within one IQP.

3.3.2 Within The Scope of Our Study

Availability of Subjects

There are two major factors limiting the scope of our study. Perhaps the most influential limiting factor is the availability of study subjects. The lack of resources allocated to this study greatly limits the possibility of finding suitable study participants. We must find participants from other cultures which have not yet been influenced by the American culture. We could not afford to study participants within their own cultural environment or 'import' them to our facilities nor can we go to them. This left people living in Worcester county but not living here long enough to be influenced by our native culture. Considering the great skill of adaptability of most humans, this leaves us a very small window of opportunity. Thus our pool of possible subjects was very small. We asked the aid of foreign graduate students of WPI who have arrived in this country and started school this past September. This meant they have only been here for 2 months and have had limited interaction with our culture. Unfortunately, this pool of possible subjects was very small.

Subject's Knowledge

The subjects' knowledge of the other participants would be another factor that would also hinder the aspect of each person being culturally ignorant of their teammates. Knowledge of each other would greatly affect the ability to work together as strangers. We would like to preserve the notion that all subjects are to start at the same point. The only way we figured to try and solve these potential errors from happening is by screening our participants before the experiment is to take place.

Experimentors' Knowledge

Just because we are collecting data from the subject, doesn't mean that the experiment will solely reflect upon the participants' actions. The experimentors' actions during the study might greatly influence the subject's thoughts, ideas, and actions as well. We must keep in mind that the subject will always wonder about what is going on with the project, so they might look to us for some answers. The way we view the experiment and the way we carry ourselves will lead to an insight for the participants to use in order to figure out the real point of the project and possibly the expected outcome of the experiment given.

3.3.3 Time

The second major limiting factor effecting the scope of our study is the amount of time allocated to the study. We have only 7 weeks to develop the study, find participants and complete the study. The time factor effects the study in several notable ways.

We expect the time restraints and busy schedules of the students we are intending on using as trial group members will cause difficulties in the coordinating of their schedules. Most graduate students have jobs during the day and classes in the evening so the possible times of getting the groups together is probably limited and may even eliminate some volunteers from being able to participate.

The time we are allotting the experiment to be completed within an hour, maybe at most an hour and a half. Then to take that time allowance and divide them into four sections for the completion of each of the three phases plus the exiting interview. The time restraint greatly limits the scale of the study we are able to perform. This may very well be a study that needs to be continued by following IQPs.

Chapter 4

Results Of The Experiment

The following section reveals what actually happened when we conducted our experiment. This section explains in full detail all of the noted observations and data collected that afternoon.

4.1 Setting Up

The library proved to be the only area where we could conduct our experiments. The library is a centralized building within our campus that is well known and accessible enough for all of our subjects be able to attend and participate. There are study cubicles that are able to fit three people around a wooden table on the library's third floor. These cubicles were essential for

Nationality	On Average
Indian	2 Minutes
Chinese	-8 Minutes
American	3 Minutes

Table 4.1: Arrival Times

our experiment for we needed to keep all groups separated from each other's influence, yet close enough together so we were able to observe all the groups' actions simultaneously.

4.2 Arrivals

We arrived earlier than the subjects to setup the video equipment so we could record their actions throughout the experiment. We had two camcorders and chose to focus these devices on the experimental groups. We asked the subjects to arrive at 2:45 PM. We noted the time difference of their actual arrival time and the scheduled arrival time. This additional side experiment was conducted to observe patterns that may pertain to some of the ethnic groups. The results of the arrival times are listed in table 4.1.

Overall the Chinese subjects arrived earlier than requested. The American and Indian subjects were all punctual. The average arrival times coincided with the cultural tendencies toward time as described in the literature.

Out of the twelve subjects that we selected and corresponded with, only nine subjects appeared and participated for that afternoon. A week later, we conducted this experiment again with only one group in attendance to make up for the group that did not show up the first time.

In the first afternoon, we designated two of the three groups as the experimental groups and the remaining group as the control group. The process of selecting group members was performed in the following manner to ensure statistical competency. we picked names out of a hat and organized it so that each group would have different ethnic subjects. After creating the groups, we then ushered the three groups into their rooms that was randomly assigned to them just as they were being randomly assigned as a group.

4.3 Administering Phase One: Observations

The first experimental group and control group were situated in rooms one and two respectively. We gave them the “Tower of Cards” activity to perform first. In room three, the second experimental group was given the “Tall Towers” activity as their first activity to perform. As the participants went on their way to solve the activity’s challenge, we as the experimenters observed

that right away the American subjects took charge and started to delegate instructions to complete the activity. After a few minutes of listening and actually constructing the structure, the Indian subjects began to give input into the plan of solving the activity and start to develop co-leadership with the American subjects. The Chinese subjects always kept to themselves and did whatever they were assigned or asked to do. They were active in the activity to the extent of lending a hand.

For the second experimental group and the second control group (which met with us a week later) they received the "Tall Towers" activity during this first phase of our experiment. The second experimental group worked very well with each other. They established a democratic like team right away, where all three of the subjects within that group were able to communicate with each other and be heard by the other members. All three of the subjects interacted with each other in a calm and organized fashion which created a pleasant environment for them to work in.

The second control group had some problems in constructing the tower, however it was due to structural design and not their interaction with each other. This group had a good rapport with each other, for they all were able to talk to each other and be able to understand concepts contributed by each

of the members.

4.4 Administering Phase Two: Observations

After phase one was completed, we led both experimental groups into a conference room where they proceeded to openly answer questions that were posed on the discussion topics sheet openly. Please refer to Appendix C to view the actual questions given.

4.4.1 Experimental Group Discussion Session

The discussion of the questions posed (refer to Appendix C) were held among the two experimental group members jointly in one room. The questions were posed one at a time and responses were solicited by going around the table in alternating directions. The subjects seated themselves in an arbitrary order. The subjects were not close associates of each other, to the best of our knowledge. This method of listening to responses minimized dominance of any specific group or person and effectively facilitated the extraction of opinions from all the subjects in a uniform manner while minimizing the effects of previously heard opinions on the same few subjects.

The responses to the first question, which basically concerns a situation where a co-worker is being asked to finish another co-worker's work prior to the test subject's work, were fairly uniform among all the subjects. All but one Indian subject's response was to do their own work first and then help the co-worker. The one dissenting Indian subject replied with an answer of helping the co-worker prior to finishing his own work. The Americans responded without hesitation as to declining to help while the Indians and Chinese questioned as to the relationship they would be involved in with the co-worker. They were concerned if the co-worker was a superior or a friend of theirs. They decided not to help after finding the co-worker was on the same level of corporate hierarchy and not more than a mere working acquaintance. The obvious concern with relational context coincides with the information given in our literature review, concerning the care of the Indians and Chinese and irrelevance to the Americans.

The responses to the second question, which was about whether or not a subject would feel comfortable in voicing a design idea to their colleagues and management, were uniform with only one dissension from the majority. The dissenting party was the other Indian subject. The majority stated they would bring the idea up at the meeting among their colleagues and

managers. The dissenting Indian subject stated he would later discuss it with his superior after the meeting showing more concern for the reputation of the manager than for the welfare of the project or group as a whole. This also coincides with our findings in the literature review.

The last question asks the subject for their own opinion on punctuality for attendance at a work-related meeting. Once again, their responses ran parallel to our literature review. The Indians answers indicated less importance on punctuality for they are more concerned with relationships more so than time. The Americans expressed a deep concern with punctuality stemming mainly with an underlining concern the interference of a late co-worker would effect the remaining schedule of their day. The Chinese also thought timeliness was important but more so because of respect for their superiors.

As a general side note, the Americans were more apt to voice their opinions in an un orderly fashion. The Indians gave responses when asked without much explanation. The Chinese were needed near prodding to extract responses. This observation once again demonstrates the level of importance given to context as revealed in our literature review.

4.4.2 Control Groups Discussion Answers

For the two control groups, we gave them a copy of the discussion topics and asked them to write down their answers on a piece of paper. You may refer to Appendix D for the transcription of their answers.

For the first question, of whether or not to help a co-worker with his/her own work, two of the six subjects would not help unless their own work has been completed. The other four subjects would rate the need for help against their own work load and the priority that is set upon both projects.

For the second question, all subjects would be comfortable in contributing their ideas to the project in front of their colleagues and management. One subject mentioned that he would be comfortable in contributing an idea as long as he feels that he has enough knowledge with the topic.

For the third question, they were asked about punctuality to a meeting. They all believed that being punctual is a necessity, but admittedly for some of the subjects, they wouldn't mind other people being late, as long as they are apologetic and reasonable.

4.5 Administering Phase Three: Observations

Experimental group 1 and control group 1 were given the "Tall Tower" activity to complete during the third phase while experimental group 2 and control group 2 were given the "Tower of Cards" activity. It was observed that it was easier for each team to communicate with one another since they had previously completed an activity together and can understand a few quirks to their personality. One concept that stayed throughout all activities and phases were the Chinese subjects. They all generally kept to themselves and hardly spoke up. When they were asked to do something, they did it, with no questions asked. There were no conflicts in them following suggestions, however they hardly or even at all made a suggestion themselves.

4.6 Experimental Data: Statistical Analysis

4.6.1 Explanation of Null Hypothesis Technique

The following pages contain a summary interpretation of the statistical data. In order to prove our theorem of cultural awareness training increases the productivity of a multi-national team, we exercised the common statistical technique referred to as assuming a “null hypothesis”. The null hypothesis assumes the opposite and if the null hypothesis is mis-proven within a stated probability, then the original hypothesis must be true within the remaining probability (1 - stated probability). In our case, we will try to prove a null hypothesis, which is training will not effect productivity, with a 97.5 percent probability. The results of the experiment would need to fall within a range of less than 2.45 (t value at 6 degrees of freedom and 97.5 percent confidence level) to prove the null hypothesis.

4.6.2 Adjust Time to Negate Order Difference

The data collected had to be adjusted to negate the influence the difference of the ordering may have on the results. The teammates had gained familiarity and knowledge of each other’s skills by the start of the second activity.

Leadership roles were also established by this point. These influences would tend to aid the second activity to be completed at a improved level of performance so the time of completion of the second activity needed to be adjusted to reflect this. This adjustment was accomplished by subtracting the mean of all four performed activities from the individual times of each team. The ordering of the activities is negated by adjusting the performance times in this manner. The following pages gives summarized tables of the interpreted data.

Groups	Tower of Cards	Tall Towers
Control 1	25	28
Control 2	30	44
Experiment 1	23	29
Experiment 2	5	26

Table 4.2: Activity Completion Times

Recorded Times (*in Minutes*)

Table 4.2 summarizes the time it took (in minutes) each group to complete each activity.

Groups	Activity 1	Activity 2
Control 1	Tower of Cards	Tall Towers
Control 2	Tall Towers	Tower of Cards
Experiment 1	Tower of Cards	Tall Towers
Experiment 2	Tall Towers	Tower of Cards

Table 4.3: Order of Activities

Order of Activities Performed

Table 4.3 shows the order of the activities performed by the corresponding groups.

$$\text{Mean factor Tall Towers} = \frac{25+44+23+26}{4} = 29.5 \text{ Minutes}$$

$$\text{Mean factor Tower of Cards} = \frac{28+30+29+5}{4} = 23 \text{ Minutes}$$

Table 4.4: Mean factor computations

Calculation of Activity Mean Times

Table 4.4 shows the calculations used for determining the mean (average) of the two activities.

Time	-	Mean Ordered Tasks	=	Adjusted Time
25	-	29.5	=	-4.5
44	-	29.5	=	14.5
28	-	23	=	5
30	-	23	=	7
Mean	=	$\frac{22}{4}$	=	5.5 minutes

Table 4.5: Mean Ordered Task of Control Groups

Control Groups' Collective Mean CompletionTime

Table 4.5 shows the computations performed to reach a mean time of all activities performed by the control groups. First, adjustments are made on the performance times to eliminate the influence of the order in which the tasks were completed. This is necessary because a newly formed group will increase productivity as members become more acquainted and comfortable with each other. This is accomplished by subtracting the total mean of all groups for each task from the time taken to complete the task by the control group. Those times are then averaged to obtain an adjusted mean length of time of all tasks performed by the control groups.

Time	-	Mean Ordered Tasks	=	Adjusted Time
23	-	29.5	=	-6.5
26	-	29.5	=	-3.5
29	-	23	=	6
5	-	23	=	-18
Mean	=	$\frac{-22}{4}$	=	-5.5 minutes

Table 4.6: Mean ordered Task of Experimental Groups

Experimental Groups' Collective Mean Completion Time

Table 4.6 shows the computations performed to reach a mean time of all activities performed by the experiment groups. First, adjustments are made on the performance times to eliminate the influence of the order in which the tasks were completed. This is necessary because a newly formed group will increase productivity as members become more acquainted and comfortable with each other. This is accomplished by subtracting the total mean of all groups for each task from the time taken to complete the task by the experiment group. Those times are then averaged to obtain an adjusted mean length of time of all tasks performed by the experiment groups.

4.6.3 Explanation of Student's t Approximation

Our experiment had a sample population of four groups. The interpretation of data obtained with such a limited source of data is best achieved by means of Student's t process. This process adjusts the normal distribution curves to apply toward sample populations containing less than 30 groups.

The procedure is based on a given confidence level. We chose a confidence level of 97.5 percent. This reflects the following statement : We can assume with a 97.5 percent surity that means of two different samples are from the same population (there is no difference between them) if their calculated t value is within the range of the tabular t value. Our Null Hypothesis assumes the two different populations, control groups and experimental groups in our case, are no different if the calculated t value is within the range of the tabular t value. If the calculated value is within the tabular range then there would be only a small 2.5 percent chance we made an incorrect assumption from the data. If a calculated value does not fall within the tabular value range we can conclude there is indeed a difference between the two populations. In other words, the cultural awareness training DID make a difference. In this case, we would say there is only a 2.5 percent chance we reached a conclusion that training does make a difference incorrectly. In other words, there is only

a 1 in 40 chance we reached an inaccurate conclusion.

The following pages state the appropriate standard formulae and calculations with our data as input.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left(\frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1+n_2-2}\right) \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \quad (4.1)$$

$$(4.2)$$

Table 4.7: Calculation of t

Student's t Equation for Difference of Two Means

Table 4.7 gives the standard formula for calculating the t value of experimental data obtained from two groups. This utilizes the difference between two means. The equation includes n_1 and n_2 which refers to the number of activities performed by the control groups (n_1) and experimental groups (n_2). The mean completion times of the two groups are represented by \bar{x}_1 for the control groups and \bar{x}_2 for the experimental groups. Likewise, the variances of the groups overall mean completion times are represented by S_1^2 and S_2^2 .

$$\begin{aligned}\text{Degrees of Freedom} &= n_1 + n_2 - 2 \rightarrow 4 + 4 - 2 \rightarrow 6 \\ t_{6,.975} &= 2.45\end{aligned}$$

Table 4.8: Calculation of Degrees of Freedom

Degrees of Freedom

Table 4.8 gives the formula for calculating the Degrees of Freedom used in obtaining the tabular value of t . In our case, n_1 and n_2 are both four due to each type of group having two groups and performing two activities each ($2 \times 2 = 4$). The tabular value of t is then looked up with references to the calculated degrees of freedom and the confidence level desired. In our case the degree of freedom is six and the confidence level chosen is 97.5 percent. The value of $t_{6,.975}$ is then given as found in Student's t table.

4.6.4 Calculation of Experiment's t Value

Several values must first be calculated for input into the equation previously described for computing the t value for the difference of two means. The mean completion times of both types of groups have been previously calculated and are located in Tables 4.5 and 4.6. Equations and calculations of the variances are located on the following page. Following that page is the actual computations for the t value of our experiment.

$$\text{Variance} = S^2 = \frac{1}{n-1} \sum_{i=1}^n (y_i - y)^2$$

Table 4.9: Standard Variance Equation

25	-	29.5	=	-4.5	(4.5) ²	=	20.25
44	-	29.5	=	14.5	(14.5) ²	=	210.25
28	-	23	=	5	(5) ²	=	25
30	-	23	=	7	(7) ²	=	49
					Σ		304.5

Table 4.10: Summation of Squared Difference of Means for Control Groups

Calculation of Standard Deviation for Control Groups

Table 4.9 states the standard equations used to compute the variances of test data (S^2).

Table 4.10 illustrates the calculation and summation of the squared difference of means needed for the calculation of the variance for the control groups.

Below are the results of inputting our data into the equation for variance.

$$S_1^2 = \frac{1}{4-1} (304.5) = 101.5$$

$$\text{Variance} = S^2 = \frac{1}{n-1} \sum_{i=1}^n (y_i - y)^2$$

Table 4.11: Standard Variance Equation

23	-	29.5	=	-6.5	(6.5) ²	=	42.25
26	-	29.5	=	-3.5	(-3.5) ²	=	12.25
29	-	23	=	6	(6) ²	=	36
5	-	23	=	18	(-18) ²	=	324
					Σ		414.50

Table 4.12: Summation of Squared Difference of Means for Experimental Groups

Calculation of Standard Deviation for Experimental Groups

Table 4.11 states the standard equations used to compute the variances of test data (S^2).

Table 4.12 illustrates the calculation and summation of the squared difference of means needed for the calculation of the variance of the experimental groups.

Below are the results of inputting our data into the equation for variance.

$$S_2^2 = \frac{1}{4-1} (414.5) = 138.5$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left(\frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1+n_2-2}\right) \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \quad (4.3)$$

$$(4.4)$$

Table 4.13: Calculation of t Value

$$t = \frac{5.5 - (-5.5)}{\sqrt{\left(\frac{(4-1)101.5 + (4-1)138.5}{4+4-2}\right) \left(\frac{1}{4} + \frac{1}{4}\right)}} \quad (4.5)$$

$$t = 2.84 \quad (4.6)$$

Table 4.14: Calculation of Actual t Value

Calculation of t Value

Table 4.13 reiterates the equations used for calculating the t value for the difference of two means (as previously seen in Table 4.7).

Table 4.14 shows the t value equation with values calculated from our experimental results.

4.6.5 Interpretative Conclusion

Since our calculated t value of 2.84 is outside the tabular value range of 2.45 to -2.45, we could not prove the null hypothesis which states there is NO difference between the two groups (in other words, the culture awareness training had NO effect). Since we COULD NOT conclude there is NO difference, we can therefore conclude THERE IS A DIFFERENCE between the two groups. Thus we can say, with a 97.5 percent confidence level, our original hypothesis of cultural training increases production is true. In other words, there is only a 2.5 percent chance we've reached this conclusion incorrectly.

In summary, our results provide very substantial evidence that cultural awareness training increases productivity among multicultural teams.

4.7 Exit Questionnaire Analysis

We had each subject fill out a questionnaire that asked general questions about their background after all of the activities were completed. Refer to Appendix C.2 for the questions asked. The answers to the questions were similar among individuals of the same culture. To view the transcribed

answers of all the subjects, please refer to Appendix E.

All of the Indian subjects had diverse communities that exposed to different types of cultures and beliefs. They had knowledge of other cultures through traveling friends and relatives as well as from the media. Three out of the four Indian subjects would feel better working in a group.

American subjects lived in diverse communities, however not all. Two of the four has lived and grew up in a culturally diverse community, while the other two grew up in fairly isolated areas of the nation. One subject had even traveled and lived abroad. Their education of other cultures varied depending upon the area in which they resided. Three of the four subjects would be comfortable in working by themselves. One of those three subjects preferred working in a group if she had the chance to get to know the group. The one subject who strongly believed in team work and cooperation is also the same subject who has traveled abroad.

The Chinese subjects lived in the least diverse communities than the other two ethnic groups. They had little or no formal education of other cultures. Three of the four subjects preferred to work in a group.

We also observed the groups during the activities to record the participants cooperation and any leadership tendencies of the three cultures. Over-

all, throughout the entire experiment, American and Indian subjects were the most vocal. The Americans were the most vocal and appeared to take initial lead of their groups. The Indian subjects assumed a shared leadership position approximately fifteen minutes into the activity. The Chinese subjects were cooperative but did not assume any initiative position. The groups began to cooperate and work together with greater efficiency as they interacted more with each other.

4.8 Summary of Discussion Topics and Exit Questionnaire Analysis

Chinese	Indian	American	
2/2	2/2	0/2	1. Asked about relationship of co-worker
2/2	1/2	2/2	2. Voice dissenting at meetings
2/2	0/2	2/2	3. Concerned with punctuality
2/2	2/2	0/2	4. Spoke only in turn or when questioned
0/4	4/4	2/4	5. Diversity exposure
3/4	3/4	2/4	6. Preferred group work

Table 4.15: Breakdown of Discussion Topic and Exit Questionnaire Analysis

In table 4.15 is displayed a summary of the analysis of discussion topics and exit questionnaire results. The first four rows in the table reveal the discussion topic answers of the experimental groups. The last two rows in the table show the exit questionnaire results we obtained and analyzed from all of our subjects. All answers are organized by the nationalities of the subjects.

Row one refers to the number of subjects requesting information about the relationship of the co-workers referred to in question one of the discussion topics (see Appendix C). Both of the Chinese and Indian subjects were concerned about the relationships of the co-workers before deciding whether to interrupt one's task and help the coworker, while the relationships did not

matter to either of the American subjects.

Row two reveals that one Indian subject's answer to the second discussion topic dissented from the majority response. The majority response to the second discussion topic was the subjects would be comfortable in pointing out an idea they might have on a design of a project in the meeting while the dissenting Indian said he would only talk to the manager after the meeting. This would avoid possible embarrassment to the manager.

Row three shows that both the Chinese and American subjects are concerned with punctuality, while none of the Indian subjects in the experimental groups were as concerned with punctuality.

Row four shows that both the Chinese and Indian subjects spoke only in turn or when questioned during the discussion topic conference. Both American subjects felt comfortable in being vocal in the discussion and spoke out of turn.

Row five reveals that none of the Chinese and half of the American subjects have had any exposure to other cultures during their childhood.

Row six shows that a greater majority percentage of Chinese and Indians prefer to work in teams than do Americans.

All of these observations coincide with the information gathered in our

literature review.

Chapter 5

Conclusion

The increasing amount of interest and need in the computer technology field is bringing more and more people of different race, ethnicity, culture and background together. Software development projects involve skills and teamwork. Talented programmers are found all over the world. Companies today are interested and willing to fund project teams full of talented, international people to create software packages. This is driven by scarcity of talented programmers and high labor costs, especially in the United States.

This project was concerned with multi-cultural software development teams and the benefits of cultural awareness training. In chapter two, we reviewed literary sources on different cultures and interactions between those

different cultures. This background research led us to hypothesize that cultural awareness training of the software team's various cultures increases the productivity of the team.

The more comfortable a person is, the more relaxed and productive that person would be. The surroundings to which the person is being subjected is what gives a person a sense of ease and comfortableness. A project group involves teammates interacting with each other. They are surrounded by each other for however long it takes to create a successful outcome of the project. The interaction between each teammate must be in good favor in order for the team to function at its highest potential productivity. If there are any hostility or uneasiness between any member of the group, that tension could cause a indefinite amount of stress on the parties involved or even the whole group which would in turn ultimately affect the progress of the project. This tension can be caused unintentionally due to ignorance of another's culture.

In order for a team to function at their highest potential, there must be an understanding of each others values and cultural habits between all of the team members. In chapter three we designed and conducted a study to test our hypothesis. It consisted of obtaining paid subjects participating in activities (which can be referenced in Appendix B) that enabled us to use

the outcome to numerically analyze the productivity level of their groups. The experimental variable in our experiment was the “cultural awareness training” in which we led our experimental groups in an open discussion in answering specific discussion topics (referenced in Appendix C). We also had the control groups answer those discussion topics. However, instead of answering them in an open environment where their teammates would hear their answers, we had the control groups write down their opinions on paper. Those discussion topic answers as well as answers to an exit questionnaire we gave all participants to fill out can be referenced in Appendix D.

In chapter four, we discussed the results of the experiments that were conducted in this study. The overall results show that with increased cultural awareness of the other group member’s background the group’s ability to accomplish a project would be increased. Our study found, with a 97.5 percent confidence level, that cultural awareness training does indeed increase productivity of a team. This means there is only a 2.5 percent chance our conclusion is incorrect.

Another example indicating the hypothesis to be correct is the experiences of this group’s journey to completing this IQP. Our group is comprised of three different ethnicities: American, Dominican, and Chinese American.

Each of us demonstrated some of the cultural attributes of our respective cultures. Even though we spoke the same language, there were still barriers holding our group from achieving our goal in a more productive manner. Our personalities that were shaped by our heritage and environment caused friction at first. As time progressed, as a group, we began to open ourselves up and discuss our backgrounds with one another. With the knowledge of who the other person is and how they functioned made a significant difference in the attitude we had towards one another.

We witnessed the correctness of our own hypothesis with the journey and completion of this project. The increased knowledge we had of each other's cultures gave all of us better insight and perspective of who we are and how we function as individuals and as group members. This in turn led us to have a higher productivity rate due to the comfortability we had with one another. The key to the progression and evolution of this world and the societies that live in it is the knowledge we all gain from each other and our surroundings. With such knowledge, the goals we reach for can be accomplished with greater efficiency and harmony. The world's workplaces, as they become more and more culturally integrated, will offer more pleasant environments and increased personal and monetary rewards with culture

awareness training in the workplace.

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Appendix A

Solicitations

A.1 Email Request

Subject: Need Volunteers for IQP Experiment, WILL PAY \$10

Our IQP researchs the effects of culture on multicultural software teams.
Get \$10 for about an hour of your time doing a FUN activity.

To see if you qualify, answer the following questionnaire:

How long have you lived in this country?

What is your nationality ?

Respond to jimb6387@wpi.edu.

Accepted people will be contacted by Tuesday so respond NOW.

Thank you for your time.

A.2 Email Response

Congratulations !!

You have been selected for the participation in our IQP !!

Please indicate which of the following times is most convenient for you:

Wed. January 26 at 6:00 pm

OR

Sat. January 29 at 4:00 pm

The actual time will be determined by majority.

Please respond ASAP.

Thank you for your interest in our IQP study.

Appendix B

Activities

B.1 Activity One: Tower of Cards

Instructions:

You will be given a deck of cards which as a group will then need to use them to build a tower as tall as you can with a minimum of two tiers (approximately 10 inches tall).

Rules:

1.

You may only use one hand, but **MUST** stick with using the chosen hand throughout the whole entire activity.

2.

We will be timing you on your ability to complete the minimum of two tiers, however you will have 20 minutes maximum to use to build the tower as tall as you can.

3.

There will be no manipulations of the cards, such as bending them to the degree where a crease develops and/or ripping it.

B.2 Activity Two: Tall Tower

Instructions:

You will be given spaghetti and gumdrops and using them please construct a tower with a minimum of 18 inches and hold the weight of two slices of bread.

Rules:

1.

We have the restrictions of only use one hand in building this tower.

2.

We will be timing you on this and there would be a maximum of 20 minutes with this project

Appendix C

Discussion Topics

C.1 Discussion Topics

1.

If a co-worker asked you to complete an assignment for them, would you drop what you are currently doing and start on that assignment or would you continue on working with whatever work you are currently working on and after finishing that, start to work on your co-worker's request?

2.

If you had an idea on a design of a project, would you be comfortable in pointing out the idea that you have in front of all your colleagues as well as managerial counterparts? If not in front of those people, would you still contribute that idea even if it might not be taken into consideration?

3.

If you were to attend a group meeting of all group members to discuss various parts of the project you are currently working on, what would the time priority be? For instance, would you feel OK if you arrived late to the set time? Would you feel OK if one of the other members of the project group arrived late?

C.2 Exit Questionnaire

1.

Describe your community.

2.

How much education did you receive of other cultures besides your own?

3.

Do you work better by yourself or in a group?

Appendix D

Discussion Topic Answers

These answers pertain to the questions asked in the discussion topics that were given to all of our participants as our second phase of the experiment. Only the control groups were able to write down their answers while the experimental groups were to answer theirs in a conference group outloud. The following answers were transcribed verbatim from the sheets of papers their answers were written on.

D.1 Control Group No. 1

D.1.1 Indian Subject No. 2

1.

No. I would No. drop what I was doing currently. I would try to find the reason why my co-worker wants to drop and if it is a valid reason I would understand his/her problems and the get on

with the job.

2.

I would be comfortable in pointing out the idea in front of my colleagues. I would definitely go by the group decision and probably in between I would give some input which I would consider being helpful for the project.

3.

I would give a timing and would definitely like to arrive on time and I would expect the same from other members of the project group.

D.1.2 American Subject No. 2

1.

I would totally finish my own project first. If you're working on an assignment that has to be completed at a certain time, and you delay it to work on someone else's project and miss your own deadline, what are you going to tell your boss? On the other hand, if I were to finish my project early and I had time, I would help them out then. So long as you are clear in the beginning of the conversation, and just tell them either sorry I don't have time, or yeah I can help you in a few...

2.

Yeah I would contribute my idea. Even if it was a silly idea that would never be considered, if I think it's good then I'm all about telling everyone.

3.

I try to be on time to things like that, but punctuality is not a strong point of mine. I don't like people being late as long as they are all apologetic and sorry for delaying us, but when a member of a group strolls in 20 minutes late like it's no big deal, that's just annoying.

D.1.3 Chinese Subject No. 2

1.

It depends on the importance of the job. I'll do the most urgent and important one first.

2.

Yes. I will and be comfortable with it.

3.

I'll be very sorry for my own late. For others it depends on the course of the late, basically I want everybody on time. I think it's absolute necessary to be on time.

D.2 Control Group No. 2

D.2.1 Indian Subject No. 4

1.

It depends on how involved I am in what I was doing at that moment. If I was debugging my program, for example, and examining the flow of the program, leaving it in the middle would be impossible. If I was simply bored of what I was doing on the other hand, I would start to work on my co-worker's assignment.

2.

I would feel comfortable with pointing out the idea as long as I think I understood the project sufficiently well. If the project is vague to me, I would rather keep shut.

3.

I would definately be concerned if I showed up later than the rest. However if others showed up later than me I would feel more comfortable as long as they showed up!

D.2.2 American Subject No. 4

1.

It would depend on the urgency of the assignment; If mine was more important, I would complete it first; if the co-workers was more urgent, I would complete theirs.

2.

Yes, would contribute the idea in front of colleagues and management.

3.

I'd be upset if I was late, as well as any others who were late. I prefer meetings to be on time, and No. have to wait for others.

D.2.3 Chinese Subject No. 4

1.

Depend on how long I will finish my work. If I can finish my work very soon. I would continue my work first and then start to work on my co-worker's request, but I will tell my co-worker that I will get back to him/her very soon. If it will take long time to finish my work. I will start to work on my co-worker's request.

2.

Yes.

3.

I would like arrive on time. I also prefer other members arrive on time.

Appendix E

Exit Questionnaire Answers

These are each of our subject's answers to the exit questionnaire. They have been transcribed verbatim. Please refer to Appendix D for the exit questions.

E.1 Experiment Group No.1

E.1.1 Indian Subject No. 1

1.

Orthodox, diverse.

2.

A lot.

3.

In a group

E.1.2 American No. 1

1.

Grew up in a very diverse community (So. CA)

2.

4 Years HS (high school) Spanish

3.

Yourself

E.1.3 Chinese Subject No. 1

1.

I lived in China about 30 years.

2.

I recieved a little about America history and French history.

3.

I work better in a group than by myself.

E.2 Control Group No. 1

E.2.1 Indian Subject No. 2

1.

My community is one which is laid on strong ethics and morals. It gives a lot of priority to beliefs and family values. It is one place where you get the richest and as well as poorest.

2.

I was aware of American culture through satellite television, though I am No. aware that would be sufficient.

3.

I feel I am better working in a group, coz there will be a lot of input from other people.

E.2.2 American Subject No. 2

1.

Grew up in Lancaster County, PA, in a pretty suburban environment ... There was a church that some of my friends went to right down the block, are we all went to the same school ... Knew the neighbours pretty well (I'm No. quite sure what you want here ...)

2.

No. much really ... my uncle goes to Sweden pretty often and tells us stories. And I took a class intro to Asia last year, learned some things about Asian culture.

3.

I'm usually fine working by myself, given a choice. But if I have a chance to get to kNo. a group, then it's obviously easier to work with them.

E.2.3 Chinese Subject No. 2

1.

I lived in China for 27 years. China is a traditional country, No. China is developing pretty fast; and she changed a lot. She goes through ecoNo.y reform.

2.

I've learned most of my own culture and I also learned other cultures from media and history class.

3.

It depends on what kind of work, usually for my own work, I prefer work by myself.

E.3 Experiment Group No. 2

E.3.1 Indian Subject No. 3

1.

My community where I grew up is on the South Eastly coast of India. The people are friendly, warm, and affectionate. People my age move along freely. Older people are respected and their advice is taken frequently.

2.

I learned quite a bit about Middle-Eastern, European (UK, Turkey), and American through friends and relatives who stayed there. And also through television.

3.

If it's a group work, I really nice to work with others. If it can be done by myself. I don't like others and would work better by myself. It depends on a lot of things. The team your with, the job you are trying to do.

E.3.2 American Subject No. 3

1.

Born Boston upper-middle class. Lived in Cambridge, Louisiana, and Switzerland from age 3 - 15 yrs. Private schools both places.

Large converted 2 family house in Cambridge small 15 story apartment building apartment in Louisiana. Knew the neighbors in the US. Knew the neighborhood kids in CH.

2.

Lived in CH. 8 years. Visited South Africa every 2 years for one month at a time. Including ghetto's and crossroads. Traveled extensively throughout Western Europe. Spent 3 weeks in the USSR.

3.

I rely heavily on coordinating the specialties of others into a web of great work.

E.3.3 Chinese Subject No. 3

1.

1. Age: 0 - 18. I lived in a nation-possessed factory. The community was quiet. People love and help each other. 2. Age: 18 - 23. I lived in South China University of Tech. It's a big school, Noisy but funny, and I felt warm there. 3. Age: 23 - No.. I live at Fruit Street of Worcester. This community is quiet, and people are friendly.

2.

I don't know much about America, but heard and saw much, especially movies and news. It's a mixed and open culture, and that's why I chose to come here.

3.

I work better if with group partners, for example, today.

E.4 Control Group No. 2

E.4.1 Indian Subject No. 4

1.

The country I came from consists of 25 states and more than 25 languages spoken. Thankfully most people speak either English or Hindi. The culture is confusing for most children growing up there, but somehow contradictions do make sense as you grow up.

2.

Coming from Bombay, the culture was a mixture of both Western and Eastern qualities. It wasn't consciously taught in that way. It's something which is considered "Normal". Cultures from the rest of the world were touched upon in junior and middle school geography.

3.

I work better alone because I don't always document my assumptions and it's tougher putting concrete words to thoughts or mental structures.

E.4.2 American Subject No. 4

1.

Rural; very rural. No. many people close together. Largely residential, No. very commercially developed.

2.

Extreamly little. In fact, I barely knew they existed.

3.

Definately by myself

E.4.3 Chinese Subject No. 4

1.

I lived in a traditional chinese family before. After I came to USA most of my friends are chinese too. So basically I am still in a chinese culture.

2.

I began to learn English from middle school, but I think I recieved more education about English culture in recent two years.

3.

In a group.