

## **Leveraging Diversity in Information Systems and Technology Education in the Global Workplace**

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## **Leveraging Diversity in Information Systems and Technology Education in the Global Workplace**

### **ABSTRACT**

In this chapter, we consider the educational needs of the globally diverse IT sector and a curriculum that has been developed in order to respond to them. We begin by discussing two human resource gaps that are affecting the preparation of tomorrow's IT workforce. The first gap is a participation gap which is related, in part, to the under representation in recruitment and retention of students with particular demographic profiles in information systems and technology education. The second gap is a knowledge gap, which is related to the globalization of the IT field and the challenges of developing compatible curriculum and pedagogical practices that will prepare students for careers in such a field. We argue that diversity is a lens that can be used to both understand these human resource gaps and to develop curricular responses to them. We do this by considering, as a case study, a course developed and taught in the College of Information Sciences and Technology at The Pennsylvania State University that is intended to address these gaps. This course -- "Human Diversity in the Global Information Economy" -- is offered to exemplify a way of addressing the diversity dimension of the IT skill set.

### **INTRODUCTION**

The gap between the supply of information system professionals produced by the educational system and the demands of industry has long been the focus of attention for concerned stakeholders: employers, policy makers and educators. This issue has been exacerbated on a global scale, in recent years, for three reasons. First, the role of the information economy as a function of the overall economy of a country has grown in both size and importance. This includes activities associated with the development of the primary IT sector (i.e. those involved in the creation of hardware, software and systems) and facilitating the diffusion of IT into other sectors<sup>1</sup>. As a result, an increasing number of countries has taken on the challenge of developing a pool of talented IT workers, which can enable it to enter the global IT market and to engage in globally collaborative IT work. Second, networking technologies have made both asynchronous and real-time communications between different regions and countries feasible, and have created new forms of work and collaboration. For example, global IT outsourcing work can be seen as the practice of seeking diverse knowledge resources globally. Third, in contrast to the cultural diversity evident in the makeup of the global IT workforce, national statistics show that the domestic workforces of many countries (in terms of race, gender, age, social class, etc.) are not as diverse. Thus, the purpose of this chapter is to consider the ramifications of including in the IT skill set, preparation for work in the globally diverse IT sector. We do this by discussing a curriculum that has been developed in order to respond to these needs.

In this book chapter we begin by discussing two human resource gaps related to diversity that are affecting the preparation of tomorrow's IT workforce. The first gap is a participation gap, which is related, in part, to the under representation in recruitment and retention in information systems and technology education of students with particular demographic profiles. The second gap is a knowledge gap, which is related to the globalization of the IT field and the challenges of developing compatible curriculum and pedagogical practices that will prepare students for careers in such a field. We then consider as a case study a course developed and taught in the

College of Information Sciences and Technology at The Pennsylvania State University that is intended to address these gaps. This course -- “Human Diversity in the Global Information Economy” -- is offered to exemplify a way of addressing the diversity dimension of the IT workforce shortage.

## **BACKGROUND**

The gap between the supply of information system (IS) professionals produced by the educational system and the demands of industry has long been the focus of attention for concerned stakeholders (Trauth et al, 1993; Lee et al, 1995; Miller & Donna, 2002; Swanson et al, 2003). Such a gap can be attributed to the interdisciplinary nature of the information systems field (Checkland & Holwell, 1998; Lyytinen & King, 2004) and the fast changing environment of the information technology industry. While the interdisciplinary nature of the information systems field requires the boundaries of IS educational curriculum to be inclusive and flexible, the fast changing IT industrial environment demands that educators actively change the IS curriculum design to address the emerging challenges.

### **Globalization**

One of the major changes in today’s IT market is globalization, which has been facilitated by advancements in various information and communication technologies. Globalization, in turn, is having a significant influence on the IT industry (Walsham, 2000). The globalization of the IT industry is manifested in the prevalence and diversification of global IT work such as IT offshore outsourcing (Carmel & Agarwal, 2002), global software development (Sahay et al, 2003), and global information systems management (Niederman et al, 2002). Such diverse forms of global IT work and global IT collaborative relationships demand a set of new knowledge and skills from the future IS workforce. This would consist of: understanding different contexts of IT development, management, and service; understanding policy, infrastructure, regulation, and cultures of different regions; understanding the diverse needs and work behaviors of various global IT partners and clients; and communication and team work skills in either face-to-face or virtual work environments.

In the current global IT market, U.S., western European and Asian countries including UK, Germany, Japan and Korea are actively pursuing outsourcing and global IT collaborative opportunities (Sahay et al, 2003). In addition to current dominant service providers such as India, Ireland, and Israel, China and Russia are beginning to enter the global outsourcing market (Gopal et al, 2002). At the same time, global outsourcing participants are no longer limited to large corporations as more and more small suppliers are entering the market by focusing on their own specialties (Lacity and Willcocks, 2001). Other evidence of diversification is activity diversification, which refers to the wide variety of outsourcing interests including application packages, systems operation and management, systems integration, and business processing (Lee et al, 2003; Sahay et al, 2003).

These new demands together with conventional challenges of IS curriculum call for proactive approaches and creative ways of reforming the undergraduate programs of information systems disciplines. Several IS undergraduate programs have begun to specifically target the global IT environment by either adding a global business perspective to existing curricula or by developing

new specialized courses focusing on global information management in particular (Beise et al, 2005). Some examples are reported by Carmel and Mann (2003), Beise et al (2005), and Van Genuchten et al (2005).

The development of a new global IS undergraduate program is facing two major issues. First, how do we conceptualize the intellectual space of the program to address both the current and future needs of the global IT workforce? Second, how do we implement the program to challenge the existing mindsets of the student participants and at the same time give them a realistic sense of what it will be like to engage in global IT work in the future?

### **Domestic Diversity**

As opportunities for global expansion and outsourcing increase, so does the trend to more diversity in the workplace. Domestic diversity generally refers to diversity of a workforce within the context of a given country. Yet, Adya and Kaiser (2005) argue that the decline of the dot.com era coupled with an increase in global outsourcing of IT jobs has negatively affected the appeal of IT careers and filtered out inflated demand. As a result, universities report lower enrollment in post-secondary IT-related degree programs, particularly from women and minorities. These programs of study<sup>ii</sup> are important gateways for students interested in pursuing careers in the IT workforce. Yet, unfortunately, researchers have found that women and minorities are alarmingly under enrolled in these technical programs (e.g. Camp, 1997; Freeman and Aspray, 1999; Margolis and Fisher, 2002; Teague, 2002; von Hellens et al., 1997). Data from the U.S., from the National Center for Education Statistics (NCES) (2003), reports that from 2001 to 2002 women accounted for 28% of degrees in computer science and information science. The Association for Library and Information Science Education (ALISE) (2003) adds that in 2002 women accounted for 30.5% of degrees in library and information science (Saye and Wisser, 2003). The NCES (2003) also highlight the under representation of racial minorities in computer science and information science degrees during the same time period. African Americans accounted for only 11% of total degrees awarded, Hispanics for 5%, and Native Americans for .5%.

The under representation of women and minorities in post-secondary IT-related degree programs also contributes to their under representation in the IT workforce. An Information Technology Association of America (ITAA) Blue Ribbon Diversity Panel study (2005; 2003) found that American representation in the IT workforce fell from 41% in 1996 to 32.4% in 2004. This number is significantly low considering that in 2004 the percentage of women in all occupations in the U.S. was 59% (U.S. Bureau of Labor Statistics, 2005). Also alarming, is that women in the U.S. hold only 10% of the top IT positions and are rising the leadership ladder much slower than in the past (Adya and Kaiser, 2005; D'Agostino, 2003; Gibson, 1997) The number of women in the Canadian workforce is also declining from 28% in 2001 to 25% in 2003 (Downie, Dryburgh, McMullin, and Ranson, 2004). In addition, the European IT workforce is heavily male dominated. For instance, in the United Kingdom and Germany, men outnumber women five to one in computing professions, whereas the rate is seven to one in the Netherlands (WANE, 2004). Furthermore, in 2001, women comprised only 22% of the Australia IT workforce.

Racial minorities are also under represented in the IT workforce. For example, in the United States the percentage of African Americans in the IT workforce fell from 9.1% to 8.2% between 1996 and 2002. This statistic is lower than their 2002 participation rate of 10.9% in the general U.S. workforce. In 2002, Hispanic Americans and Native Americans represented 6.3% and .6% respectively in the American IT workforce. These statistics are also lower than their 2002 participation rates of 12.2% and .9% respectively in the general U.S. workforce (ITAA, 2003; Morgan, Marshall, & Moloney, 2004).

Another minority in the IT workforce is the older employee. In 2002, only 29.4% of the U.S. IT workforce was comprised of workers over the age of 45 (as compared to 37.6% of the overall U.S. workforce) (Morgan et al., 2004). The case is the same in Canada, older workers in the IT workforce represent only 15% of employees between the ages of 45 and 54 and only 3% of employees between the ages of 54 and 64 (Downie et al., 2004). In Europe, the overwhelming majority of IT workers are under the age of 45. In 2002, 77.5% the German IT workforce was comprised of employees under the age of 44. This percent jumps to 79.5% in the Netherlands and 82.2% in the United Kingdom. Furthermore, in 2001, the Australian IT workforce was comprised of approximately 6% of employees over the age of 55 (WANE, 2004).

The under representation of women and minorities in the IT workforce holds a number of implications for the management and development of information systems and technologies. Recently, there has been a rise in discourse that points to the importance of diversity in the global IT economy. First, increasing the involvement of under served groups would make a clear effort at resolving the IT worker shortage. If the IT workforce was open to a larger group of employees then fewer shortages would exist (Roberts, 2000; Schenk and Davis, 1998; Wilson, 2004). Second, it has been argued that a diverse workforce contributes to increased levels of innovation (Florida, 2005; 2002), economic development (Gravelly, 2003) and the creation of more diverse products and services (Joshi and Kuhn, 2001; Wardle, 2003). Finally, a more diverse IT workforce would support the move toward increases in social inclusion and social access (ITAA, 1998; Kvasny and Payton, 2004; Office of Technology Policy, 1999; Trauth et al., 2006).

## **SKILL GAPS IN THE IT FIELD**

Understanding the IT educational skills gap is a moving target. Quite clearly, this gap is related to the fast growing nature of the IT field and the challenges of developing compatible curricula and pedagogical practices for such a fast changing field. The IT workforce is a dynamic area which requires its members to engage in constant re-skilling in order to stay current (Gjestland et al., 2001). It is also an area that must take into account the individuals who will be designing and using this technology. Thus, there is an ongoing need to re-evaluate the IT curricula to meet the ever changing need of such an integral field. We suggest that the current re-evaluation should take into account the need to develop IT professionals who possess a set of skills that relate to the people who will develop and use the technology, and the context for doing so.

## **Participation Gap**

Many agencies, organizations and researchers in the U.S. are attempting to document the dimensions size and shortage of individuals in the IT industry. A variety of studies have revealed the magnitude at which the IT workforce is suffering from a shortage (Freeman & Aspray, 1999;

ITAA, 2002; Office of Technology Policy, 1999; 1998; Roberts, 2000; Schenk & Davis, 1998). IT related occupations are the highest growing positions globally and are among the largest professional specialties, rivaling that of nursing, elementary and secondary teaching and engineering. For example, the U.S. Department of Commerce (2000) expects new jobs for IT workers to increase 78.7 percent between 1998 and 2008. In addition, the U.S. will need to replace 306,000 workers who are leaving these occupations due to retirement, change of profession and various other reasons. Therefore, the U.S. will require two million new IT workers in the ten year period (1998 to 2008), which is an average of approximately 201,800 workers each year. An additional analysis of data reports that “IT jobs will grow slightly more than 7 percent per year over the decade, far more quickly than the 1.4-percent average across all jobs” (Hilton, 2001). Also, in 2004, ITAA reported that what appeared to be a 2% increase in IT employment from 2003 to 2004, has a now “shrinking forecast” for growth in the future. Even so, the forecast is for continued IT employee shortages, despite the under representation of women, racial minorities and older workers the IT workforce. Addressing this under representation of diverse workers would make a clear effort at resolving the worker shortage. If the IT labor force were open to more diverse workers then fewer shortages would exist. Thus, IT workforce diversity is of vast importance because it directly impacts the IT skills shortage.

Thus, one dimension of a skills gap is the participation gap. This gap is related, in part, to the under representation in recruitment and retention of students with particular demographic profiles in information systems and technology education (Varma, 2006; Minton et al., 2004). Much of the nation’s enrolled student body in information technology programs consist of a homogenous group of individuals (Burge and Suarez, 2005). Thus, the exposure to different perspectives may be affected as well as perceived openness of the field to other minority groups. Basically, there is an important role to be played by the University in addressing the recruitment and retention of diverse students into technical concentrations at each level of the educational system. Not only is it important to manage the diversity of students, but additionally maintaining a diverse faculty may assist in providing role models and resources for these minority groups.

Woszczyński et al. (2003) discuss the influence of a variety of demographic groups on technology. They argue that without the participation of women in the development of technical artifacts, for example, the process may be more geared towards speed than innovation. Also, with the input of disabled individuals, more emphasis may be placed on accessibility and usability of different attributes of technology. Diversity of age in IT teams provides rich knowledge that facilitates an understanding rooted in history and experience in the field. Lastly, culturally diverse teams are necessary to meet the demands of globalization in the IT workforce.

Baird and Meshoulam (1988) explain that business objectives are more easily achieved when strategic human resources (HR) programs are in place, that is, when HR practices, procedures and systems are developed and implemented based on organizational need. A primary function of these HR programs is to ensure that organizations have the right mix of skilled professionals to effectively perform its value creation activities. At the same time, HR functions must also ensure that professionals are adequately recruited, trained, motivated, and compensated to perform their value creation tasks (Hill & Jones, 1998). Hence, a common theme of modern management philosophy explains “that *people* are the only sustainable asset in modern business” (Schwarzkopf et al., 2004, p. 28). Therefore, it is critical that researchers and practitioners take

an active role in creating HR solutions that meet the demands of today's professionals. In order to accomplish this task it is important to understand diversity in terms of increasingly globalized enterprises.

Thus, many types of arguments can be made for the importance of diversity, however for the IT field; the most prominent may be a way in which to address the present skills gap. If the demand for IT workers exceeds the available supply, then investing in the recruitment, retention, and education of under represented minorities may help to lessen the skills gap, and increase the number of qualified IT professionals.

### **Knowledge Gap**

IT has become a valuable and important area of focus due to the integration of technology into nearly all facets of society. Governments, industries, and organizations invest endless amounts of capital into the development of technical infrastructures, processes, and systems. Business strategy and processes are often tailored around technical capabilities and applications. Technically skilled personnel are critical to the productive accomplishment of goals and the execution of tasks. As a result, the opportunities for individuals trained in technical subject matter have become critical to both progress and innovation. In addition, prior research has established the need for human skills - business and interpersonal skills – in addition to technical skills (Lee et al., 1995; Trauth et al., 1993). Further, insofar as IT professionals need to understand their clients in all their diversity, and given the global diversity of the IT workplace, an argument can be made that part of the 'human skills' that IT professionals need to develop is an understanding of human diversity and its implications for the IT profession.

An understanding of diversity can be seen to contribute to IT effectiveness in several ways. Diversity assists in the process of creative problem solving efforts through the integration of different perspectives (Foldy, 2004; Reichenberg, 2001). From a business perspective, then, diversity can be viewed as a positive asset in strengthening the organization. According to research conducted with senior management teams, entities that are comprised of diverse age, gender and ethnic groups performed better than teams with lower levels of diversity. Thus, it is an understandable notion that diversity improves organizational productivity and creativity (Salomon et al., 2003).

An important current argument in support of recognizing diversity in the IT sector is the existence of a global information technology (IT) workforce (Trauth et al., 2006). This global IT workforce is largely the result of the global IT outsourcing phenomenon. Based on increased economic development in connection to this information economy, global diversity within the IT labor force to can be expected to grow. However, the management of a diverse workforce does present challenges (Bazile-Jones, 1996). Within the organization, there is potential for great accomplishments and great variance. The presence of diverse opinions may affect an organization's efficiency by requiring investigation into the varied interests that a diverse workforce may possess.

The approach we take is to conceptualize the phenomenon of global IT work and global IT outsourcing as part of diversity. Being argued in the previous section, diversity is not only an important concept for social inclusion and social welfare, and a great asset for productivity and

creativity of organizations and businesses, but also an integrated component and an increasing trend of global IT work.

## **CASE STUDY OF AN EDUCATION RESPONSE: A HUMAN DIVERSITY COURSE**

### **Course Motivation**

Students entering the professional IT arena in the twenty-first century will be required be familiar with and have exposure to more than just technology. They will have to understand cross cultural and virtual work, have an understanding of outsourcing processes, and be supportive of an organization's diversity initiatives and principles. Therefore, the task of equipping students with a myriad of skills needed to prepare them for knowledge economy work must be dedicated to providing them with a broad yet comprehensive understanding of issues important to not only the latest developments in information technology, but also outsourcing, diversity, and innovation.

Innovation and achievement are catalysts for growth in the global environment, and thus require personnel who embody a variety of attributes, perspectives, experiences, and insights. In addition, those involved with the technical efforts must have knowledge and appreciation for the diverse environment in to which they contribute (Fuller et al., 2005). Thus, the integration of principles that encourage the understanding and awareness of diversity within the IT field is key to preparing the next generation of technical professionals.

Because of the trend toward outsourcing and globalization of IT work, it is critically important to be prepared for this global workforce and client base. An integral part of this preparation includes understanding the diversity of colleagues with whom individuals will be working, both virtually and face-to-face. It also includes understanding the diversity of clients and users for whom a person will be developing systems. These diverse clients and users will be located all around the country, all around the world, and right next door. Understanding the diversity of both colleagues and users will have ramifications for the way in which work is accomplished, user requirements for systems are understood, and interaction with computer-based tools is accomplished.

### **Course Overview**

In response to this need a course was developed and pilot tested in the College of Information Sciences and Technology at The Pennsylvania State University. This course is intended to examine the effects of human diversity on the analysis, development and use of information systems and technology. It explores the meaning and implications of diversity. It takes a comprehensive view of diversity that builds upon the notion of 'diversity' as 'differences.' When applied to demographic characteristics of the IT workforce and IT user base, the term includes such meanings as: race, ethnicity, nationality, gender, sexual orientation, religion, socio-economic status, age and (dis)ability. When applied to the global workforce, the term refers to cross-cultural diversity. The concept of diversity in IT work is examined from two different viewpoints: that of the 'minority' person who is interacting with the 'majority' person; and that of the 'majority' person who wants to develop greater awareness regarding successful interaction with 'minority' individuals.



This course makes extensive use of a range of pedagogical devices including: problem-based learning; experiential learning; seminar; case studies; global, virtual team work; and guest speakers. The rationale for this range of pedagogical devices is that, taken together, they mimic the complexity of the global information workplace. The issues are not clearly identified, there are competing interests, solutions are developed through group consensus, and often there is no one, best answer to the problem. Therefore, in order to help students develop the skills necessary for coping with this situation, the learning approach taken in this course mimics this real world of the global information economy. In order to accomplish this, the course employs the problem based learning approach to education. The subject matter of the course is learned through a variety of ‘problems’ that will enable the students to learn about the ways in which human diversity affects the work of an IT professional. Through these assignments students will explore issues of human diversity and their influences on information systems design, development, use and management.

Upon completion of this course, students will have gained an understanding of the dimensions of human diversity within the field of information systems and technology in order better prepare them for the diverse working environment they will experience. Student learning is assessed using the following metrics:

- Demonstrates an understanding of the ways in which diversity affects the information technology field.
- Demonstrates an understanding of key issues related to overall topic of diversity in the IT field as well as key issues related to specific subtopics of diversity in the IT field.
- Demonstrates critical thinking about the issues and themes about diversity in the IT field.
- Demonstrates the ability to work productively in a team.

In an effort to educate future technical professionals on the concept of diversity, the course was developed with a notion that the emerging global information economy is a complicated space. The issues are not clearly identified, there are competing interests, solutions are developed through group consensus, and often there is no one, best answer to the problem. The course was developed to assist students in developing the skills and aptitude necessary to cope with this situation. In addition, the learning approach taken was one that mimicked the real world of the global information economy. The subject matter of the course was exemplified through a variety of ‘problems’ that provided the students the opportunity to learn about the ways in which human diversity affects the work of an IT professional. Through assignments, in-class lectures, guest speakers, exams, and personal reflection, students explored issues of human diversity and the influences on information systems design, development, use and management.

From the perspective of course development, there were some very direct course objectives that were identified as significant to educating students on diversity in the global IT workforce. Upon completion of this course, students were charged to have gained an understanding of the dimensions of human diversity within the field of information sciences and technology in order better prepare them for the diverse working environment they will experience. The organization of the course included an overview of diversity in the information technology field followed by

two modules that investigated diversity in two different ways: domestic diversity and cross-cultural diversity.

### **Course Structure**

The introductory overview provided students with a background as to how diversity is currently being conceptualized within the IT field. This module developed the business case for the importance of this subject matter by establishing how diversity is connected to professional processes, profit, and progress in the industry. In addition, this introduction into the course overviewed important definitions and the baseline rationale to engage students in the understanding of diversity issues. Issues of management, education, innovation, communication, and investment in diversity were all included in this portion of the course, and were used as reference points as subsequent topics were covered.

The second module, domestic diversity, introduced the notion of individual demographics. Individual demographics in this setting included the topics of individual differences with respect to: race, gender, sexual orientation, the digital divide (i.e. access to IT as related to socio-economic class), and age. The purpose of exploring these topics was to explore how each demographic characteristic is important and unique, and to draw attention to how each is both prominent and relevant to the IT field. The students were given the chance to explore their own perspectives on these topics in addition to learning ways to develop an understanding of characteristics that may or may not be connected to his/her own personal experience.

The third module was a global level module that was concerned with cross-cultural diversity. In this section ideas about outsourcing, offshoring, customer relations, globalization, global systems development and management, and economic development were covered. These areas integrated learning gained from the introductory and individual demographics modules and placed them in real-world, professional situations. Exploring these topics allowed for students to be able to see tangible evidence of how diversity issues are manifested in the workplace. In addition, this module provided an opportunity for consciousness raising in dealing with work scenarios which may realistically occur in the career of an IT Professional. Also, issues of awareness around language and professional behavior in cross cultural settings were addressed.

### **Course Implementation**

As noted earlier, the implementation of the course included a mixture of problem-based learning, in-class discussions and group assignments, guest speakers, take-home assignments, and group projects. These assignments were based around the core concepts presented in the class and provided the students with a vehicle to demonstrate critical thinking, learning and self-reflection. In addition to assigned readings and a midterm exam, this course included five written assignments which integrated the core course principles:

#### *Assignment 1 (Individual)*

The purpose of this assignment was to enable the students to reflect upon their work and life experiences, academic study of diversity topics and initial experiences in the course. The students were to develop a written baseline in which they were asked to provide information about themselves, their thoughts on the topic of diversity, and about their own personal experiences with diversity. This was done, in part, to encourage the students to use their own life

experiences to begin to understand this topic. Then, an additional requirement was to participate in an outside-of-class discussion called the “Race Relations Project.” This discussion engaged the students in a peer-facilitated dialogue about diversity. This assignment also asked the students to reflect upon their experiential knowledge in the Race Relations project and learning gained in the process.

#### *Assignment 2 (Individual)*

The purpose of this assignment was to enable the students to deepen their understanding of diversity through experiential understanding of the topic. Specifically, the students were charged to experience diversity from the point of view of one who is the minority or an ‘other’ in some way in a group. In this assignment the students were asked to interact with members of a group that has one or more identity characteristics different from theirs in order to complete a Problem Based Learning assignment which utilized a problem scenario.

#### *Assignment 3 (Group)*

In this assignment, the students were required in a group to develop in a 10 page, double spaced report in which they develop the content for a diversity policy for a company’s website. In order to prepare for this assignment students are expected to study the diversity sections of real company websites.

#### *Assignment 4 (Individual)*

In this assignment the students were asked to do three things. First, they were asked to demonstrate what they learned about how the recognition and appreciation of differing individual identities contributes to an understanding of human diversity. Second, they were asked to consider the integration of multiple identities that characterize and individual (e.g. race and gender). Third, they were asked to apply that understanding to their chosen career in Information Sciences and Technology. This five page paper served as the final reflection assignment for this course.

#### *Assignment 5 (Group)*

The final assignment of the course was a report on a semester-long cross cultural project. To help the students explore and address cultural diversity and cross-culture work issues, each of seven student teams was assigned to engage in a collaborative activity with students in a different country. The objectives of this project were three-fold. First, it provided them with first-handed cross-culture work experience. Second, it assisted them in making sense of and learning about the challenges of cultural diversity by actually experiencing it. Third, it provided them with a sound case study to explore the issues and challenges related to incorporating cultural diversity into the business of information technology development and use.

These assignments, which were completed outside of class, served as milestones throughout the class to mark the progression of students’ engagement with the topic, reflection and learning. Within the course, in-class scenarios were also utilized in an effort to help the students develop critical thinking skills within a limited time frame. The course integrated scenarios around the topics of the Digital Divide, gender and sexual orientation, and cross cultural communications. The Digital Divide scenario asked the students to consider some challenges to using Internet technology. The students were asked to evaluate the problem in terms of social and

technological access perspectives as well as outline where responsibility lies in resolving the divide issues. The gender and sexual orientation scenario asked the students to evaluate IT workplace issues that dealt with the mistreatment of individuals based on either of those characteristics. The students were required to consider their position as a colleague to the individual in the compromised position as well as an appropriate management response that facilitated team cohesiveness and professionalism. The cross cultural scenario asked the students to evaluate how to interact and effectively manage work in a non-domestic setting. The students chose a country and documented some significant cultural and work style differences of the country of choice. They then discussed how IT work could be affected and the role that technology could play in facilitating communications.

Guest speakers were another method of introducing the students to topics about diversity. One of the first speakers was an alumnus from our program, who was having a “real time” experience in dealing with issues of cross cultural management and communication. His presentation provided the class with an example of how necessary cultural awareness was to achieving goals and working effectively in the IT field. An administrator at Penn State came to the class to help the students to challenge their understandings and notions about culture and work, as well as to understand more about diversity in the domestic setting. The speaker who covered issues about sexual orientation discussed the topic from a very personal perspective: that of the mother of a lesbian. This discussion gave the students insights into how to cope and be supportive of differences in the workplace. A speaker from a high tech company spoke about the movement in the IT field toward IT services and the consequent need to better understand the diversity of clients. In the cross cultural unit the guest speaker was a Greek woman who discussed her work in an Asian environment. She discussed working in a cross cultural setting and the implications such as time, culture, and work style. Overall, the guest speakers provided some concrete examples of diversity in the IT workforce as well as providing the students some additional background on issues of diversity all facets of life.

## **CONCLUSION**

The need for information systems and technology education to include a course on human diversity in the global IT context is based upon two recognized IT workforce gaps. One is a participation gap in which women and certain racial/ethnic groups are under represented in the IT workforce. The second is a knowledge gap in which students who do not develop a cross-cultural awareness are not being adequately prepared for the global IT workplace of the twenty-first century. In response to this educational need a new course was developed and introduced into the IST curriculum at Penn State University. The goal of this course is to enable students to better understand of the ways in which diversity affects the information technology field. The approach is to employ problem-based learning techniques in which students must apply their developing understanding of diversity to concrete IT problems. At the conclusion of the course students are able to demonstrate an understanding of key issues related to the overall topic of diversity in the IT field as well as key issues related to specific subtopics of diversity in the IT field. Two more general educational goals are for the students to engage in critical thinking about the issues and themes related to diversity in the IT field and to develop their ability to work productively in a team setting with individuals who are different from them in some way.

The students in the course were provided a comprehensive overview of the concept of diversity in the IT workforce, how to celebrate it, how to manage it, and how to facilitate it. They were exposed to many different methods of experiencing diversity, and the journey that was explained by many of the students provided an additional motivation for this type of course. The course was mostly composed of White American males in their early 20's. Additionally, there were multicultural individuals, White American females, and Gay and Lesbian students. Each grouping of students took on a unique perspective to the idea of diversity and each personally enriched the discourse in the classroom. Initially students were required to document their baseline understanding of diversity and their own experiences. There were a range of responses, and very interesting outlooks on what role diversity would play in their personal and professional lives.

These baseline understandings helped the instructor to know more who the students were and where they were in their exposure to diversity. The class was meant to be a vehicle to facilitate self-reflection and learning about issues that would prepare them for the professional IT workforce. The students provided a great deal of feedback at the conclusion of the course about the applicability of diversity to their given career field, IT, and their personal journey around celebrating differences and diversity.

The student reflections provide evidence that there was a journey that occurred over time and throughout the course. Many of the students began the semester with an underdeveloped appreciation and understanding of the concept of diversity. At the conclusion, there were well versed and prepared to think and act critically around diversity, both personally and professionally. Though much of the feedback from the students indicated that the coursework was challenging, the benefit was realized when the reflection showed a marked growth in enlightenment around diversity at the end of the class.

This course is an example of a concrete educational intervention that can be instituted to address the two significant educational gaps: the participation gap and the knowledge gap. By doing so, and IST curriculum is able to better prepare students for the issues and people they will encounter in their careers. Whether the students know it or not, a highly diverse workplace – both domestically and cross-culturally – will be the norm during their careers. As such, and IST education should include educational preparation for this dimension of the IT field.

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## **ENDNOTES**

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<sup>i</sup> For an explanation of primary and secondary information sectors see Trauth (2000, Ch. 1).

<sup>ii</sup> IT-related degree programs include areas of study such as computer science (CS), management information systems (MIS) and information sciences and technology (IST).