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THE CHANGING ROLE OF GRANDPARENTS
(summer into fall into spring)

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ABSTRACT
The purpose of this study was to discover common challenges of grandparents rearing their grandchildren. According to current census bureau information, six percent of American children, more than 5.8 million nation-wide, live in grandparent-headed households. Although the research is limited, these challenges are seemingly manifested in factors that influence the grandparenting role, and thus influence children and grandchildren. These factors include, but are not limited to access to financial resources, medical issues and legalities as well as changes in state and federal educational mandates. Grandparents rearing children with disabilities face further difficulties. The ability to provide for the physical, social, and emotional status is coupled with the need for appropriate educational services. The Individuals with Disabilities Education Improvement Act (IDEIA P.L. 108-446) stipulates all children must receive appropriate public education. How to assist these "second generational" parents is an issue of national significance. In an attempt to identify challenges and educational hurdles, initial results from surveys, disseminated to grandparents, gave rise to a commonality of issues. The study further indicated provisions of services differ by disability, culture, and age of grandparent when the children enter the home.

Over the last decade, a group has become increasingly visible to policy makers and service providers is grandparent head of households. Many of these grandparents are actually raising their grandchildren, often without the children's parents being present in the household. There are many reasons why grandparents are raising grandchildren. The parents may be deceased, in jail, substance abusers, or may suffer from mental or physical disabilities. They may have abandoned their children or have lost custody – temporarily – because of drug use (Hayslip & Kaminski, 2005).

Less attention has been directed to the health status of grandchildren in the care of grandparents, and the results have been contradictory. As early as 1995 Solomon and Marx, in a study utilizing data from the National Children's Health Supplement to the National Health Interview Study, revealed that children raised solely by grandparents fared better in health and school adjustment than those in families with one biological parent present. Children raised by grandparents did not differ significantly in terms of health status from children in "traditional" families with two biological parents present. In contrast to these optimistic

findings, smaller, qualitative studies frequently have suggested that grandparents, particularly among those children who had been prenatally exposed to drugs or alcohol, are present as the result of experiencing parental neglect. High rates of asthma and other respiratory problems, weakened immune systems, poor eating and sleeping patterns, physical disabilities, and hyperactivity are among the problems described (Hayslip, 2005; Kirby & Kaneda, 2002) with some researchers noting that behavioral problems were particularly prevalent among male children. As noted earlier, grandparents rearing chronically ill or "special needs" children have been found to have the highest levels of distress and/or illness (Kirby & Kaneda, 2002).

Public policies and programs in many areas of the country have not kept pace with the increase in the number of these families and these families' diverse need for support. Generations United (2002), noted that the unique needs of these grandparents are many, including accessing educational enrollment, obtaining necessary immunizations to enroll the children in school, obtaining special education services, and accessing parental activities. Furthermore, many of these caregivers are raising children without a legal relationship, such as legal custody, and consequently can have greater difficulty accessing educational and social services than caregivers with a legal relationship. Relative caregivers, can raise children informally, although most hope that the parent at some point will raise the children in the future. However, caregivers frequently sense that the arrangement is permanent.

Often a grandmother acts as the primary caregiver. Many families in which the grandparents have taken over the parenting role are already coping with a difficult environment – low incomes, poor housing, and bad neighborhoods. Additionally, many grandparents are reintroduced to child rearing at the precise time in their lives when they are looking forward to more time to themselves. Eligibility requirements for traditional social service programs are complicated and often inconsistent, rendering the procurement of traditional services difficult.

Access to education,al social and legal services is a critical issue for these "second generation" parents. It was the intent of this study to discern the common challenges facing grandparents who accepted the role as primary caregivers of their children's children. The focal point of this study sought to address the particular challenges of grandparents raising children with disabilities.

Grandparents caring for grandchildren is nothing new. Generational households and extended families have long enabled grandparents to play a daily role in their grandchildren's lives. As women workforce participation increased, grandparents also played an in-

creasingly prominent role in childcare caring for their grandchildren during the day while the children's parents are at work or school. Additionally, grandparents have often stepped into parenting their grandchildren in times of illness, absence, or death of the children's parents.

Over the last 25 years, the number of children raised by someone other than a parent has increased dramatically in the United States, with the vast majority of these children being raised by their grandparents. According to the 2001 U. S. Census Bureau, 2.5 million grandparent-headed families with or without parents in the home care for over 3.9 million children. Currently, 6 percent of the American population – more than 5 million children — live in grandparent-headed households. Grandparent-headed households exist in every socioeconomic and ethnic group. The American Association for Retired Persons (AARP, 2005) indicates that 551,025 midlife and older adults in 352,945 midlife and older households are caring for their grandchildren with neither parent present and/or other non-traditional households that contain at least one grandchild of the household with no parent present. The median age of midlife and older grand parent caregivers is 57.

Currently over one in ten grandparents in the United States assume parental responsibility for a grandchild for at least a six-month period at some point

in his, or more likely her, life (Hayslip, and Kaminski (2005), Cox 2001)). Nationally, 68 percent are white, 29 percent are African American, 10 percent are Hispanic (of any race), 2 percent are Asian/Pacific Island, and 1 percent are American Indian (Cox, 2000). However, African Americans were nearly twice as likely to be grandparent caregivers as their white counterparts (9 percent compared with 5 percent), and more than 12 percent of African American children lived with grandparents, compared with 5.8 percent of Hispanic and 3.6 percent of white children (U.S. Bureau of the Census, 2001).

The rapid increase in grandparents raising grandchildren was first recognized on the East and West coasts by physicians in large public hospitals who noticed a rash of skipped or broken appointments, depression and insomnia, gastric distress, and problems with previously controlled diabetes and hypertension among midlife and older women clients. On further investigation, the recent onset of caregiving for one's grandchildren appeared to be the common denominator in most of these cases (Burnette ,2000). Closely linked to a number of health problems experienced by grandparents raising grandchildren are the problems of social isolation and alienation. Research by Kelly, Whitley, Sipe and Yorker (2000) documented decreased socialization with friends

and/or family as a consequence of caregiving responsibilities. They also noted that declines in marital satisfaction were four times more likely among the grandparent caregivers in her study than in the two comparison groups of non-custodial grandparents examined.

Intergenerational households, headed by grandparents that have formed as a result of parental AIDS or drug addiction also may experience social isolation and alienation as a direct result of the stigma attached to these conditions. African American and Hispanic grandparents have reported the frequent failure of their communities and their churches to openly acknowledge the extent of AIDS or crack use in their midst. This has contributed to a sense of isolation and alienation that has fed their preexisting feelings of shame and humiliation. Such feelings not infrequently are shared by the children in such households, who may be taunted in school and labeled by the media as, for example, a "lost generation" of "crack babies" (Kelly, Whitley, Sipe & Yorker 2000).

Finally, and more subtly, grandparent caregivers and the children in their care may suffer feelings of social isolation, alienation and "being different" as a result of the failure of societal institutions to acknowledge their reality. Grandparents reported children in their care are often embarrassed to bring them to school for "Parents Night," "Parent Teachers Association" and "Bring a daughter to work day". These organizations fail to recognize that, for growing numbers of children, "parent" is in reality grandparent, and "daughter" is granddaughter or niece.

An important resource that is accessed by large numbers (albeit still minority) of grandparent caregivers, and one that directly addresses some of the problems of social isolation and alienation noted earlier is the support group. Studies by investigators (Waldrop & Weber, 2005; McAdoo, 2002) have suggested these groups help reduce feelings of social isolation for members, while providing important sources of both tangible and intangible assistance in coping with the new role. Although support groups exist in all 50 states, the short life expectancy of many of these groups and their small numbers relative to the need underscore the importance of increasing the quality, quantity, and viability of such groups, as well as of comparable supportive groups for children in the care of grandparents.

METHODOLOGY

The first phase of the study was the establishment of questions that seek to answer issues necessary for grandparents to know regarding access to services as mandated by the Individuals with Education Improvement Act of 2004. Additionally, information sought to address social-cultural as well as educational concerns.

Grandparents from the states with a contiguous relationship to the state of Oklahoma were selected for this study. The existing liaison with organized grandparent support groups constituted a base population for garnering data. Grandparent groups in this selected geographical region were solicited for permission to complete a questionnaire. This questionnaire addressed four specific issues. Those issues were as follows: financial readiness to support the rearing of grandchildren in the home as well as medical, legal and educational needs. In addition, stress factors and physical, social, and health issues were investigated.

Subjects were solicited from grandparents who were active participants in local support groups for grandparents raising grandchildren within each state. These groups gather weekly to share common concerns, issues unique to their group and hear speakers discuss topics related to childrearing practices. The primary investigators administered the questionnaires in the base-state. In the surrounding states, the questionnaires were mailed to identify trained facilitators, who then disseminated the document. All participants were assured anonymity.

RESULTS

Data from the initial phase of the survey revealed a population who were primarily married, female, and living in metropolitan Oklahoma City, with education ranging from vocational through college education. The majority of these individuals were retired home-makers with an average of three grandchildren living in the home and one individual reporting 27 grandchildren currently residing in the home. Fifty percent of the grandchildren were below the ages of 5, 43% of the grandchildren were above the age of 6.

Data revealed the majority of grandparents were seeking guardianship and felt as if the additional weight of caring for their grandchildren was their responsibility. The grandparents were convinced their grandchild would never return to their son or daughter, which resulted in additional stress and the need for family counseling to discuss options. Additional significant issues included time management, appropriate discipline, positive home and school interactions and finances were significant issues.

Regarding to education, the majority of the grandparents were uncertain as to exactly how their grandchild was being educated, but were satisfied and thought things were going "Okay". Regarding any suspected disability, the grandparents were not totally clear if the child qualified for special educational and were unsure how to access services.

In general, indices would suggest the presence of frustration as to how they arrived at this situation in the sunset of their lives and how they had to start over. Ethically, there was confusion between what they should do, what they need to do and what they want to do.

DISCUSSION

Results from the initial data would suggest that there is a growing problem with second-generational parents. These individuals are in need of programs and services to assist them and ensure appropriate and timely delivery of services to the children. The issue of appropriate educational placement is

compounded if the grandparent suspects the grandchild to have a significant disability that would impact learning. The concern also covers issues of socialization and successful transition into the community. Parents feel the need to have continuous contact with the biological parent in an effort to remain rooted in the community and society as a whole. Future studies should explore intervention and prevention strategies.

It is necessary that grandparents raising grandchildren understand the procedures for ensuring their child has uninterrupted educational experiences . This is particularly important for grandparents whose children qualify for services via the Individuals with Disabilities Education Improvement Act. There are specific procedural safe-guards of which second generational parents must be made aware if their children are to receive a free and appropriate public education in the least restrictive environment. Specifically, grandparents must gain further knowledge on matters of guardianship, assessment, eligibility for services, implementation and remission, review and dismissal of students with unique educational needs.

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PEDAGOGICAL AGENT INSTRUCTIONAL DESIGN CHALLENGES

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Abstract
Pedagogical agents are anthropomorphic interfaces to computer-based learning systems that serve as social agents in the learning process. Instructional design challenges for pedagogical agents include determining the role of the agent, implementing the role by defining various features of the agent, determining the style of social interaction between learner and agent, and determining the type of human-computer interface to use. Previous literature is reviewed in the topic areas of agent roles: agent characteristics such as realism, appearance, gender, and ethnicity; social interaction style; and human-computer interface considerations. Recommendations made for the development of instructional design practices for pedagogical agents include increasing the research knowledge base, developing design process models, and implementing associated instructional design

Pedagogical Agent Design Challenges

Pedagogical agents are animated anthropomorphic interfaces to computer-based learning systems that are similar to avatars or chatbots commonly seen in virtual worlds and instant messaging applications (Baylor, 2007a). As a human-like representation, this interface device is distinctly social in nature; one might communicate with a pedagogical agent in the same manner as he or she would communicate with a classroom teacher or a fellow student. The Computers Are Social Actors paradigm, commonly referred to as CASA, states that "social rules guiding human-human interaction apply equally to human-computer interaction " (Nass, Moon, Fogg, Reeves, & Dryer, 1995, p. 223) and forms the theoretical basis for treating pedagogical agents like their human counterparts from the perspective of social interactions. Since teaching and learning are highly social activities (Kim & Baylor, 2006), the success of computer based learning systems depends greatly on the success of the pedagogical agent as a social actor. The social relationship between agent and learner will motivate and encourage the learner to achieve the desired learning goals (Baylor & Kim, 2004).

The social relationships involved in learning, however, are complex and subtle. At issue here are the myriad decisions that instructional designers must make to create an effective social agent for learning. Design of pedagogical agents goes beyond the already difficult traditional issues in instructional design. Instructional designers must now be more cognizant of such "soft" topics as social interactions and communications styles in addition to the standard concerns of performance improvement. Associated with this new style of computer inter-

face are new technical terms, as briefly defined in Table 1.

A variety of questions needs to be considered when designing pedagogical agents. What are the roles that need to be implemented? Given a particular role, how does one implement a pedagogical agent? What does it look like? How does it behave socially? Should the agent be omnipresent within the context of the learning system or should it only appear when summoned or needed? How can we ensure that learners who work with agents not only feel good and are motivated about learning, but actually improve their performance? How will different user groups react to having a social relationship with a computer?

Additional complexity is added to the situation by the inevitable progress in computing technology. Future systems are already being proposed with multi-layer architectures that will be able to handle multiple learning environment modes such as augmented reality, augmented virtuality, and full virtual reality (Doswell, 2006). Real time sensors are also being prototyped in some learning systems that will allow the learner's affective state to be dynamically determined so that a pedagogical agent can respond appropriately to a variety of learning situations (Burleson & Picard, 2007). Network architectures that go beyond the current one-to-one pairing of learner and agent are being designed to engage multiple learners and agents in collaborative

scenarios that increase the useful learning bandwidth at an exponential rate compared to existing systems (Hamilton, 2007). Changes in learning system architectures will challenge the instructional designer in the task of optimizing the design of pedagogical agents for a particular platform.

If one can understand the instructional design issues concerning pedagogical agents and implement tools and techniques to assist designers, he or she will find that applications where agents can be used to be practically unlimited. Routine instruction can be handled by pedagogical agents so human teachers can be involved in personalizing instruction and mentoring learners. Pedagogical agents may find widespread use in applications outside traditional education and training domains. For example, pedagogical agents might be used as therapists in medical applications, an area that likely will see increasing emphasis due to the aging population and expected increase in life expectancy in the developed world (Canton, 2006).

Pedagogical agents may be implemented to serve in different roles within a learning system. These roles are often modeled after similar human social roles and reflect the importance of social relationships in the learning process. Role validation experiments have shown that two major sets of factors are used by learners to determine the role or persona of the agent: information usefulness, which consists of the agent's

credibility and facilitation of learning, and emotive interaction, which consists of the perception of the agent as an engaging and human like entity (Baylor, 2007b). In many learning systems, the role of the pedagogical agent is one of a teacher, advisor, or therapist who assumes responsibilities for both learning and motivation. Examples of these include a system to assist in the planning and conduct of physical exercise and nutrition (Bickmore, 2007) and a system for helping Parkinson's disease patients speak more clearly and loudly (Cole, et al., 2007). Pedagogical agents in these types of systems have high levels of both information usefulness and emotive interaction.

Another approach to pedagogical agent role assignment is to assign learning and motivational roles to distinct pedagogical agents. For example, Baylor and Kim (2003) identify three roles: expert, motivator, and mentor. The expert's role is to transmit information, the motivator's role is to motivate and encourage the learner, and the mentor's role combines the information transmission and motivation tasks of expert and motivator. The cognitive mode of learning is provided by the expert agent in the role of information transmitter, while the more socially oriented roles involving motivation and encouragement are provided by the mentor and motivator roles. Expert agents, therefore, possess high levels of information utility, motivator agents possess high levels of emotive interaction, and mentor agents have a combination of both information utility and emotive interaction factors.

In order to support a learning by teaching approach, Davis, et. al. (2003) identified a role called a teachable agent. A teachable agent is based on the premise that tutors often receive as much benefit from the tutoring process as those who are tutored; in this case, the learner assumes the role of the tutor and the agent assumes the role of the tutee. Human learners create concept maps that are used to teach the agent. System functions are available to query the teachable agent to find out what it understands about the concept map and to formally quiz the agent against a standard concept map constructed by an expert that is stored in the system. Based on the results of the quiz and questions, the human learner gains additional insight to refine the concept map and increase learning. Holmes (2005) described a similar approach when an agent assists the learner in preparing and refining explanations about a river ecosystem that is situated in the ActiveWorlds 3D virtual environment. The agent, which is graphically represented by an avatar, prompts the student to prepare an explanation of an observation concerning the system and also helps the student to refine the explanation.

Kim and Baylor (2006) emphasized the social and collaborative approach to learning by defining an agent they referred to as a Pedagogical Agent as Learning companion, or PAL. Characteristics of a PAL are defined by an agent's attributes of competency, interaction type, gender, affect, ethnicity, multiplicity, and feedback; these constituents are grounded in a three-part social-cognitive framework that is based on distributed cognition, social interaction, and the social-cognitive theory of Bandura. Lee, Nass, Brave, Morishma, Nakijima, and Yamada (2007) discussed an agent role similar to the PAL which they designate as a co-learner. Incorporation of a co-learner agent in a learning system emphasizes the importance of the peer-based social and communicative aspects of learning. The concept of a co-learner

is not unlike that of a role normally seen in educational television programming; Lee et al. noted how children's programming such as *Sesame Street* or *Barney and Friends* and adult television programming such as "how-to" programs often feature characters who are co-learners with the television viewers, albeit in a more passive mode than a computer system that would contain a pedagogical agent as a co-learner.

Roles of pedagogical agents can be implemented by changing the character's image, animation, voice, script and affect (Baylor & Kim, 2003). An expert role, for example, might be portrayed in the image of a confident, emotionally detached, middle-aged college professor; such an agent has a limited set of gestures and a limited set of voice intonations, uses a script that emphasizes the transmission of information, and demonstrates a low degree of affect. Other factors of appearance that have an impact on motivation or learning are realism, gender, ethnicity, attractiveness, and age (Baylor, 2007b). Males tend to learn better with realistic, human-like agents; for females there is no significant difference between a human-like and cartoon character pedagogical agent (Baylor & Kim, 2003). The effects of agent gender on learning and motivation have shown mixed results in experimental studies. Baylor and Kim (2003), in a study that examined the effect of agent realism, gender and ethnicity on self-regulation, self-efficacy, and learning, reported that self-regulation and self-efficacy were higher for subjects who used male agents. Baylor (2007b) later reported that, holding everything else constant, subjects who interacted with female agents tended to have higher emotional outcomes, especially self-efficacy. Baylor (2007b) also stated that, holding every thing else constant, male agents are generally perceived as being more competent than females and that interactions with male agents tend to result in a greater perception of overall satisfaction with the learning system and agent effectiveness.

Conclusions regarding the effect of agent ethnicity have been formed from several different perspectives. An experiment by Baylor and Kim (2004) reported that the interaction between agent ethnicity and agent role had a major effect on learning, with black experts being perceived as being more effective than white experts. Baylor (2007b) stated that black subjects are more likely to consider agents they choose to be more engaging and human-like than are white subjects; however, if subjects chose an agent with like ethnicity, then they consider the agent to be more human like and affable, as well as more effective in influencing attitudinal outcomes.

Results regarding agent appearance were reported by Baylor and Plant (2005) in an experimental study that examined how pedagogical models were viewed by female students as social models for the engineering profession. Sixteen different agents that were characterized by the combination of gender (male and female), age (young and old), attractiveness (attractive and unattractive), and coolness (cool and uncool) were presented to the female undergraduates. Subjects were asked to select which agent image they respected, identified with, wanted to be like, perceived to look like an engineer, and wanted as an engineering instructor. Attractiveness was selected as an attribute for agents the subjects respected, identified with, and wanted as an instructor.

The impact of agents' verbal and non-verbal communication styles were summa-

rized by Baylor (2007b). Voice-based communications by pedagogical agents have been found to increase meaning in messages transmitted by agents. Learners prefer a natural voice to one that is computer generated, but there is no effect on learning outcomes between the human and computer-generated voice. Deictic gestures, such as pointing, gaze, and emotional expressions, can help learners interpret an agent's message and facilitate procedural learning, but have no significant effect on attitudinal learning. Emotional expressions should be used with care as they can distract the learner and cause cognitive overload if they are used excessly; on the positive side, emotional expressions were found to improve message persuasiveness.

The social nature of agents has been examined in several studies. Gulz (2005) studied the preference of learners for an agent that was primarily task-oriented and one that was both task- and relation- oriented. Subjects who preferred the more social agent (task- and relation-oriented) said they chose that style of agent because it was fun and interesting, and one had the opportunity to get to know that character better. Those who preferred the less social agent (task-oriented) based their decision on negative perceptions of the social agent, saying it would be distracting to the central task and a tiresome nuisance. In addition, several subjects mentioned that "the character is a computer character and not a human being and that they therefore do not want to be personal with it" (p. 413). Several of the subjects expressed a preference for being able to select either of the two agent types based on whether their current orientation was more task-oriented and purposeful or sociable.

Lee et al. (2007) studied how a caring co-learner might increase social support to a leaner and enhance the learning process. A caring co-learner would express encouragement and show empathy towards the learner in an effort to build trust, thereby promoting learning. A teacher agent provided the direct instruction in the learning system, which was designed to teach English idioms to Japanese students. Results of the study showed that the caring co-learner did increase trust in the co-learner; however, the effect of the agent on the learner was only significant for one of the two learning measures.

Bickmore (2007) reported on aspects of building a long-term social relationship between a learner and teacher agent in an exercise and nutrition counseling application. Interactions between the learner and teacher agent were designed to be distant and professional at the start, but progressed to be more personal and caring as the number of sessions between teacher agent and learner increased. Both verbal and non-verbal communications were used by the agent to establish a caring relationship with the learner. An experiment was conducted to test the effect of the long-term relationship building between learner and agent on the desired performance goal of increasing the exercise frequency of the learner. Two experimental groups were used; one group (relational) used the system with the relationship feature and one group (non-relational) used a version of the system without the relationship feature. After a month of daily sessions, the subjects in the relational group showed a higher degree of relationships between agent and learner, but there was no significant difference in the performance measure of the amount of physical ac-

tivity the learner performed between the relational and non-relational groups.

Many learning systems that use pedagogical agents feature constant contact between teacher and agent, but some researchers have suggested that a better approach might be for the learners to have more control over the appearance and engagement of the agent. Some studies observed that learners can become frustrated if they think the agent is too rigid or controlling in its communications with the learner; this problem is especially apparent when the agents have limited intelligence or follow a static script (Holmes, 2005). Sklar and Richards (2006) discussed two strategies for increasing learner control. In one strategy, the pedagogical agent is directly summoned by the learner through some overt action such as clicking on a help button. In the other strategy, the agent appears indirectly when the learning system detects some performance measure that it is monitoring to be out of range. A prototype learning system described by Burleson and Picard (2007) implements the indirect approach. If the user is in a state of flow where the challenges presented by the system match the current skills of the learner, then the agent is not present. In contrast, if the user is in a state of "stuck", the agent appears and attempts to move the learner from the current suboptimal state to an optimal state of flow. A learner's emotion and behaviors that indicate the presence of a flow state or stuck state are read by a set of sensors and interpreted by the system. A prototype system at the MIT Media Lab senses such measures as the strength of the user's grip on the mouse and seating posture, and also analyzes the facial expressions of the learner through a camera. Experiments are currently proceeding to measure the system's impact on perseverance, frustration, social bonding, and motivation.

Discussion and Recommendations

Research in the area of pedagogical agents has been ongoing for less than 20 years, so our understanding of pedagogical agents and the associated instructional design issues is just beginning. From the brief literature review presented in this paper, many gaps in the research record of this domain can be identified. Only a few subject domain areas have been studied, so there is certainly potential to increase that scope. Lack of coverage also exists for a wide variety of user populations; a notable missing segment is the adult learner. Beyond the theory proposed by Kim and Baylor (2006) for PAL agents, little work has been done in establishing a more comprehensive theoretical framework, although some work has been done in establishing a framework based on a cognitive approach (Moreno, 2005). Other potential research areas for pedagogical agents include investigation of the use of agents in online environments for a number of different purposes such as discussion moderators, evaluation of their effectiveness over long time-periods, and continuing study of agent interaction styles and media features (Baylor, 2007a). The knowledge base that can be used to derive relevant instructional design practices definitely needs to be expanded.

An understanding of recent changes in the instructional design profession is required in order to most effectively develop appropriate design practices for pedagogical agents. As Merrill and Wilson (2007) note, subject matter experts who are on temporary assignment are now performing much of the instructional design work today. Traditional instructional design roles are shifting away from hands-on design to more of a facilitative role. Part of this facilitative role, at least for post-graduate

Table 1.
Technical Term Definitions

Term	Definition
Agent	An autonomous software program that provides services to a user
Augmented Reality	An environment characterized by the use of digital objects in a real environment. An example might include a travel guide hosted on a mobile phone that is aware of the user's current location.
Augmented Virtuality	An environment characterized by the use of real objects in a virtual environment. An example is the projection of the image of a real person into a environment consisting of computer-generated images.
Avatar	A graphical representation or embodiment of a computer user as seen in computer games and virtual environments.
Chatbot	A computer program that can simulate a conversation with a human, often in the form of a question and answer dialog. An example is Anna, an automated sales assistant agent at the IKEA web site (http://www.ikea.com/us/en).
Deictic Gesture	A human gesture that points to a particular object and is accompanied by a contextual verbal reference to that object such as "that" or "there."
Flow	A mental state characterized by full immersion, focus, and involvement in an activity, often accompanied by a loss of sense of time.
Open Standard	A public, non-proprietary specification that is collaboratively developed and generally available for use without the payment of fees. The HyperText Markup Language (HTML) standard maintained by the W3C organization is an example of an open standard.
Reusable Learning Object	A self-contained digital object that is designed to support learning activities in multiple contexts and technologies.
Virtual Reality	An environment characterized by the use of virtual objects in virtual surroundings.

instructional designers, is to construct models from theory and develop those models into useful tools for the on-assignment designers. To meet the challenges of instructional design for the area of pedagogical agents, therefore, first requires development of a process model built upon the pedagogical agent knowledge base. As development of the model proceeds, tool development needs to follow. An automated tool is mandatory given the large number of design parameters that need to be considered in the development of pedagogical agents and the high level of complexity associated with the design of social agents. Ideally, these pedagogical agent development tools should be based on open standards and reusable learning objects that will enable them to integrate with the authoring systems that are being currently designed for advanced learning systems (Sims, 2007).

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DIFFERENCES IN RELATEDNESS ACROSS GENDER AND ETHNICITY IN AN URBAN HIGH SCHOOL

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Abstract

In this study we used a self-determination theory (SDT) framework to investigate gender and ethnic differences among high school students' perceptions of relatedness. Participants (N = 344) attended a diverse urban high school in the mid-south. Sixty-five percent of the sample was Latino, 16 % Caucasian, and 19 % African American. For Disruptive Classroom Climate, females reported higher means than males and Caucasians and African-Americans reported higher means than Latinos. The association between Classroom-Relatedness and School-Relatedness was stronger for African-Americans and Latinos compared to Caucasians. Caring and high expectancies from the teacher was associated with a greater connection with the school.

Over the last decade there has been a marked increase in the diversity of public high schools. Some of this increase is the result of recent immigration, particularly from Central and South America (Rong & Brown, 2002). Many of these families have children who will attend middle or high schools with a majority of these students attending urban schools (Lollock, 2001). Imagine yourself in a foreign country and enrolled in an unfamiliar school system. This scenario raises several questions. Would fitting in be an easy or a smooth transition, would the teacher be helpful and supportive, would motivation decline, and would scores for academic achievement decrease?

Besides new immigrants, students who members of families which move frequently (i.e., military commitments, homelessness, and job relocations) raise similar questions. Would fitting in with people who have been going to the same school for years be easy? Would what you are learning in the new school be more advanced, or would it seem elementary? Would the socioeconomic status (high or low) of the school have an impact on whether you fit in or not?

For most adolescent students, especially immigrants, minorities, and transient students, identifying where one belongs or fits into a new school is a priority. For this study we used a self-determination theory (SDT) framework to investigate school-level relatedness (belonging and alienation) and classroom-level relatedness (teacher-student relations, academic press, and disruptive

classroom climate) of high-school students attending an urban high school. We investigated if there were gender and ethnicity (African-American, Caucasian, and Latino) differences for group means, patterns of correlations, and magnitudes of correlations.

Theoretical Framework for the Study and Supporting Literature

Relatedness

Self-Determination Theory recognizes that social context plays an important role in understanding behavior, development, and well-being (Deci & Ryan, 2000; Ryan & Deci, 2000) and has identified relatedness, the presence of secure and satisfying interpersonal connections with others, as a key construct related to achievement motivation and academic performance (Deci, Vallerand, Pelletier, & Ryan, 1991). In this study, we investigated students' self-reports of relatedness at the school-level and at the classroom-level. Recently school-level relatedness has been investigated in terms of school belonging. Social relationships are especially important at school because they provide students a sense that they are accepted, respected, and supported by others in the school social environment (Anderman, 2003; Goodenow1993b). In addition, Goodenow (1993a) found in a sample of adolescents that a stronger sense of school belonging was associated with increased classroom participation and engagement, higher motivation and academic achievement,

and higher rates of school completion.

Another school-level relatedness variable is School Alienation, which is characterized by students' disconnecting or disengaging from school. Alienation is associated with low effort, inattention, poor task completion, cutting class, and high rates of disciplinary problems (Ekstrom, 1986). Findings from Murdock (1999) suggest that for middle school students, alienation was positively related to teacher disapproval and criticism, while there was some evidence for a weak negative relation between teacher encouragement and alienation.

At the classroomlevel, we investigated relatedness in terms of interactions with teachers since these interactions play a prominent role in students' motivation and engagement in academic activities (Murdock, 1999). Within the social environment of the classroom we suggest that relations between teacher and student can express themselves in terms of interactions centered around social relations, academics, and classroom discipline.

The quality of social relations has been variously conceptualized as social support, pedagogical caring, and teacher-student relations. Finn (1993), in a large scale study of 8th-graders using NELS:88, found student motivation and success at school to be related to the level of respect, caring, and support that occurred between teachers and students. Likewise, Goodenow (1993b) found teacher support to be associated with student motivation and achievment in middle school English classes. In a longitudinal sample of 248 students from 6th to 8th grade significant

differences were found for the perceived caring of teachers. It was found that teachers who were perceived as caring had students with lower distress levels, increased pursuit of prosocial and responsibility goals, and higher grade-point averages (Wentzel, 1997). Ryan, Stiller, and Lynch (1994) found that, when students have a sense of emotional security with their teachers, they have a greater sense of control and tend to be more engaged in school.

Relations centered on academic interactions have been tapped by measures of Academic Press, which assess if teachers, through their interactions and relationships with students, create a challenging academic environment. Characteristics of Academic Press include focusing student attention, checking understanding, drawing out reasoning, and making connections (Blumenfeld, 1992). According to Middleton and Midgley (2002), academic press is related to adaptive patterns of learning. After surveying African American and Caucasian 8th- and 9th-graders from nine middle schools totaling 586 students, Middleton and Midgley found that "challenging students to think deeply does not undermine their approach to doing work or their competency beliefs but is positively related to those outcomes" (Middleton & Midgley, 2002, p. 385). A longitudinal study conducted by Shouse (1996) examined the effects of academic press on school achievement in 8th through 12th grade students. He concluded that academic press was related to achievement with the strongest effects occurring in low-SES schools.

Interactions also occur between students and teachers during the management of student behavior. It seems likely that classrooms with a high level of disruptions and off-task behavior would not be conducive to the development of quality social and academic relations among teacher and students.

Culture and Relatedness

While we recognize there is considerable variance within ethnic groups, there is evidence in the research literature that some behaviors, values, and practices are endorsed more by particular ethnic groups than others. Tyler et al. (2008) identified culture based values with regards to preferences for interpersonal interactions. For Latinos, cultural research suggests that collectivism is a predominant cultural value resulting in an emphasis on social interaction, interdependence, and sensitivity to the needs and feelings of others (e.g., Cox & Ramirez, 1981; Greenfield, Quiroz, & Raeff, 2000).

For African-Americans, communalism has been identified as a culture-based value. Communalism is a social orientation where duty to the group takes precedence over the goals and interests of the individual. Communalism encourages sharing of possessions among group members and discourages individuals from promoting themselves above others in the group (Boykin, 1986). Collectivism and communalism are in contrast to Western or mainstream values that promote individualism and competition. In Western culture, being

independent and doing better than others are valued (Tyler et al., 2008). As a result of culture-based differences in how relatedness is socialized, we expect classroom relatedness variables to explain more variance in school relatedness variables for Latino and African-American students than for Caucasian students.

Gender and Relatedness

There is some evidence from the developmental literature that the maintenance of close and trusting relationships play a more prominent role in influencing the actions of adolescent females than males (e.g., Buhrmester & Fruman, 1987; Bukowski & Kramer, 1986). Studies of school-belonging and teacher relatedness variables have generally found that females report higher scores than males (e.g., Furrer & Skinner, 2008; Goodenow 2003b; Wentzel, 1997). We expect classroom relatedness variables to explain more variance in school relatedness variables for females than for males.

The purpose of this study was to investigate and describe school-level relatedness (belonging and alienation) and classroom-level relatedness (teacher-student relations, academic press, and disruptive classroom climate) with regards to differences in gender and ethnicity in an urban high school environment. The specific research questions addressed by this study were::

1. Are there gender and ethnicity differences in group means for school-level relatedness and classroom-level relatedness?

2. Are there gender and ethnicity differences in the pattern of correlations between school-level relatedness and classroom-level relatedness?

Method

Participants

The participants were drawn from a larger project which involved an urban high school located in a large metropolitan area in the mid-south. Ninety-six percent of the student body is eligible for free lunch. The school has a high mobility rate, the students are absent an average of 32 days a year, and the four-year dropout rate is near 50%. According to teachers and administration, about one third of the students have ties to gangs, and a substantial percentage of the school Latino population travels between the United States and Mexico during the school year.

Participants (N = 418) were recruited from English classes. Thirty-three percent of the sample were 9th-graders, 38% were 10th-graders, and 30% were 11th- and 12th-graders. Two students did not report their grade level. Sixty-five percent of the sample was Latino, 16 % was Caucasian, and 19% was African American. Fifty-two percent of the sample was male and 41% was female. Twenty-nine students did not report gender. Approximately 11 % of students identified English as their primary language, and 25.5% of students identified Spanish as their primary language. Thirty-three percent of students identified themselves as bilingual, and five did not report their primary language. Researchers did not assess if teachers, through their interactions and relationships with students, created a challenging academic environment. Disruptive classroom climate which addressed perceptions that the classroom is disorderly, was measured using a three item scale (e.g., "In this class, there is noise and disorder").

Instruments

A self-report survey was used to assess the variables being studied. Items that measured School-Belonging, School Alienation, Teacher-Student Relations, Academic Press, and Disruptive Classroom Climate were measured using a six-point Likert-type scale ranging from one *(strongly disagree)* to six *(strongly agree).* At the school level, relatedness measures included seven items of School Belonging (e.g., "School is a place where I feel like I belong.") and three items of School Alienation (e.g., "School is a place where I feel like an outsider."). The measure of School Belonging was adapted from the Psychological Sense of School Belonging developed by Goodenow (1993a) and has demonstrated good psychometric proper-ties with adolescents. The measure of School Alienation was created by the authors and measured students' psychological sense that they are not part of the school.

At the classroom level, measures that assessed social relations were Teacher-Student Relations (e.g., "In this school, most teachers are interested in students' well-being," five items) and academic relations were assessed using Academic Press (e.g., "In this school, most teachers want students to work hard." four items). Teacher- Student Relations addressed the level of respect, caring, and support occurring between teachers and students which were based on Finn (1993). Academic Press was based on Middleton and Midgley (2002) .

Procedure

Research assistants administered the self-report survey during English classes in the spring of 2008. The survey was completed in a single setting and took around 40 to 50 minutes to administer. Data collection was conducted Thursday and Friday throughout the entire school day for a period of two weeks. As many of the students had limited proficiency in English and/or reading, the survey items were read aloud to students. Research assistants monitored the class for pacing and for students' comprehension of the items. Consent forms were completed by

Table 1

Means and Standard Deviations by Ethnicity and Gender and Scale Internal Consistency

	Teacher-Student Relations		Academic Press		Disruptive Class Climate		Belonging		Alienation	
	M	SD	M	SD	M	SD	M	SD	M	SD
African Americans	3.49	1.26	4.37	.99	4.02	1.17	4.11	1.13	2.68	1.01
Males	3.63	1.24	4.47	1.06	3.64	1.16	4.25	1.18	2.38	1.09
Females	3.36	1.27	4.28	.92	4.36	1.09	3.99	1.08	2.94	.87
Caucasians	3.60	1.17	4.30	.99	4.03	1.07	4.04	1.25	3.05	1.18
Males	3.59	1.14	4.17	.91	3.99	1.06	3.90	1.10	3.09	1.07
Females	3.60	1.27	4.58	1.10	4.12	1.12	4.32	1.49	3.00	1.39
Latinos	3.90	1.06	4.40	.91	3.7	1.05	4.14	1.12	2.73	1.03
Males	3.91	1.06	4.43	.88	3.64	1.03	4.12	1.12	2.71	1.07
Females	3.89	1.07	4.37	.95	3.82	1.08	4.18	1.12	2.76	.99
Cronbach's Alpha	.80		.60		.60		.76		.60	

Note. Cronbach's Alpha based on whole sample.

Table 2
Correlations among Relatedness Variables

	Belonging	Alienation
Teacher-Student Relations		
African Americans	**.556**[a]	-**.337**
Caucasians	.162[b]	-.099
Latinos	**.258**[b]	-**.213**
Males	**.305**	-**.292**
Females	**.269**	-.080
Academic Press		
African Americans	**.496**[a]	-**.260**
Caucasians	.042[b]	.099
Latinos	**.338**	-**.274**
Males	**.372**	-**.255**
Females	**.270**	-.033
Disruptive Classroom Climate		
African Americans	-**.356**[a]	**.358**
Caucasians	-.140	**.367**
Latinos	-.068[b]	**.293**
Males	-.114	**.317**
Females	-.083	**.341**

Note. Correlations in bold significant at $p < .05$.
Correlations with different superscripts are significantly different at $p < .05$.

the students as well as their parents. Incentives for student participation included drawings for ten dollar gift cards and a small gift bag for every participant.

Results

The internal consistencies of the scales (see Table 1) were evaluated using Cronbach's alpha and were consistent with those reported in other studies investigating similar urban populations (e.g., Middleton & Midgley, 2002; Murdock, 1999). A series of 2x3 ANOVAs were conducted to investigate gender by ethnicity differences on the outcome variables (School Belonging, School Alienation, Student-Teacher Relations, Academic Press, and Disruptive Classroom Climate). There were main effects for gender and ethnicity on Disruptive Classroom Climate [$F(1, 335) = 5.9$, $p < .01$, $\eta^2 = .02$ and $F(2, 331) = 3.9$, $p < .02$, $\eta^2 = .02$, respectively]. Females reported higher means than males and African Americans and Caucasians

reported higher means than Latino students. Group means and standard deviations are provided in Table 1.

Table 2 shows zero-order correlations among school-relatedness variables and classroom-relatedness variables. To test for statistical differences between the magnitudes of correlations across gender and ethnicity, Fischer's r to z transformations were computed (see Table 2).

Discussion
Group Differences

Mean differences were found for Disruptive Classroom Climate. Females reported perceiving more disruptive interactions in the classroom than males, and African-American and Caucasian students reported the classroom to be noisier and more disruptive than Latino students. Latinos perceiving the classroom climate more positively than other groups may be due to the classrooms assuming cultural norms of the dominant group at the school (Latino). No other differences were found.

Overall there was little variability among the scores of group means, and most mean scores were near the center of the scale. The students' responses may partially be explained by their willingness and/or ability to make a finer discrimination. Reasons for this include trust issues amongst the minority and immigrant students over the use of the collected data and that the items may have been misunderstood as a result of poor language and verbal skills.

Correlations among Classroom Relatedness and School Relatedness

With the exception of correlations between Disruptive Classroom Climate and Alienation the findings were consistent with our hypothesis for correlational differences by ethnicity, but inconsistent with our hypothesis for gender difference.

For gender, the single differences in pattern of correlations occurred for the association between feeling alienated and reporting poor quality relationships with teachers. While the relationship between student-teacher relations and school belonging was of importance for males, it was not for females. Females may have other interpersonal relationships, such as with peers or at home, that help to minimize feelings of disconnectedness from school.

Latino, African-American, and Caucasian students who perceived their classes to be disruptive reported higher levels of school alienation. That is, students who perceived the classroom to be loud and disorderly were more likely to be disconnected from school. Possible explanations for the relationship with alienation are that these students find it difficult to focus on academics in disorderly classrooms and become frustrated, or perhaps the disorder provides an opportunity for other class members to tease or harass them. Another explanation is that since alienation is associated with increased discipline problems at school (e.g., Murdock, 1999), instances of disruption may be more salient to alienated students, as disruptions provide opportunities for engaging in misbehavior.

Three other patterns were identified in the correlational data comparing classroom-relatedness and school-relatedness variables. First, for African American and Latino students positive social and academic interactions with the teacher were associated with school belonging. Second, the relationship between classroom relatedness variables and school belonging appear to be stronger for African-Americans than for Caucasians (teacher-student relations and academic press) and Latinos (teacher-student relations and disruptive classroom climate). Third, for African-American and Latino students lower quality social and academic interactions with teachers were associated with increased alienation from school.

Taken together, these findings suggest that for the Latino and especially for the African American students, having a caring relationship with a teacher who challenges them academically is closely associated with students' sense that they are a valued member of the overall school. We hypothesize that culture-based values centered on the concepts of communalism and collectivism may account for this finding. These issues need to be more carefully considered in further studies by directly assessing students' valuing of communalism, collectivism, and individualism.

Limitations

The reliability of the self-report scales was somewhat problematic. For Latino students, the survey may not have been clearly understood. Providing versions in Spanish or having a Spanish speaker administer the survey would likely improve the reliability of the survey. Another limitation to the study was that only correlation data was reported; statements of the direction of relationships are inappropriate. Further investigations should include the use of Structural Equation Modeling to test for causal relationships among relatedness variables.

Within minority groups the quality of student-teacher relations has been found to be an important variable. Students who perceive that their teacher cares and has high expectations for them are more connected with the

the school as a whole (e.g., Anderman, 2002; Middleton & Midgley, 2002; Murdock, 1999; Tyler et al., 2008). This study contributes to the evidence that interpersonal relations between teachers and students are likely to be important in explaining minority students' sense that they are valued members of the school community.

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TECHNICAL ISSUES, AFFORDABILITY, AND SKILLED EDUCATORS TO UTILIZE ADVANCED TECHNOLOGY IN THE CLASSROOM

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ABSTRACT

The rapid advancements in technology and accessibility to the Internet have opened the doors to new exploratory worlds that have benefitted education, giving students a pragmatic approach to learning by entering virtual worlds, visiting historical places, and exploring a vast amount of information. Instructors can guide students by providing a rich area for research in an educational atmosphere that enhances learner centered practices. As school districts begin to migrate towards digital classrooms, institutions may face budgetary issues, non-technologically skilled educators, and dogmatic thinkers. This literature research discusses the issues faced by school districts, administrators, and instructors while implementing technology and provide possible solutions to overcome the obstacles stated above.

Introduction

Bridging the gap between continents with technology and the Internet, globalization has forced a paradigm shift with the way the world conducts business, exchanges goods and services, communicates, and even educates individuals. As this world flattens, as Friedman conceptualizes, the tools for collaboration become available to more educators. Thus, the gap that currently separates us will no longer exist (Friedman, 2006, p.410). The distance between international countries decreases due to immediate communication tools such as video conferencing, instant messaging, and texting. As individuals join this globalization period in history, Generations I, Z, Y, X, Tweeners, and even the Baby Boomers have assimilated into this new age of technology. The future of education in a school district is de-

pendent on the community and their understanding of the importance of staying abreast of technology and its value to the students. Communities must also understand that technology is constantly evolving with new advancements and discoveries daily.

The professional literature in education is currently addressing various issues related to the future of public education in America. However, much of this literature is limited to position papers, outlining the feelings of individual professional educators unsupported by empirical data based on actual input from other educators, students, or local communities. This literature research discusses the issues faced by school districts, administrators, and instructors while implementing technology and providing possible solutions to overcome these obstacles.

The purpose of this literature research is to illuminate the dogmatic thinking associated with the postponement of the digital divide in the classroom. The research will also unveil perceptions and beliefs about administrators and educators and their unwillingness to innovatively immigrate towards the digital culture. The literature review will discuss the importance of technology in the 21st century classroom while emphasizing the paradigm shifts of the digital immigrants.

Although education in today's globalized world relies heavily on advanced technologies to train students in the 21st century classrooms, educators, administrators and communities must implement the necessary tools for the digital natives to survive futuristically. Dogmatic administrators, and instructors hinder this advancement due to funding, lack of understanding, hesitation to enter unknown territories, and lack of professional development.

Discussion of Literature

In 2005, the National Center for Education Statistics reported that 100% of the schools in the U.S. were able to access the Internet, but only 94% of the classrooms, computer labs, and library/media centers had Internet access (National Center for Education Statistics, 2009). With the availability of Internet access in classrooms, schools can move toward implementing advanced technologies. Rice, Wilson, and Bagley (2001) cite a pragmatic approach, "Researchers believe that technology has the potential for transforming traditional, teacher-centered classrooms into student-centered, collaborative classrooms" (p.211). As globalization evolves educators must be willing to tap into this vast world of rich technology and visual media as an educational tool to immerse students. The availability, rapidly increasing sophistication of that technology, and the socialization preferences adopted from digital worlds, has guided the learner to adapt the use of that technology throughout her culture. The integration of independent technologies has created a culture of mobile, digital immersion (Friedman, 2006; Kurzweil 2005; Beck & Wade, 2004).

According to Means, Olson, and Singh (1995), "All schools that choose to make technology a part of their reform strategies face important challenges with respect to physical infrastructure, funding, equity, and ongoing maintenance" (p.69). These critical challenges faced by school districts must be clearly defined as part of the strategic plan for school districts. According to Jayne Edge (2004), "Education institutions need strong strategic planning to keep them optimally performing in today's competitive environment. The same challenges affecting institutions overall also hold true for information technology departments; thus, raising the demand and need for strategic planning" (p.40). The plan should include a needs assessment, detailed planning, implementation, future expansion, and the necessary funding allocated to meet

specific needs.

The critical challenges faced by most school districts is the lack of funding to adequately equip classrooms with an expandable infrastructure, updated hardware/software, and instructors capable of utilizing advanced technology. Rice, Wilson, and Bagley (2001) stated, "Teachers attempting to integrate technology often experience a lack of funding, training, access to equipment, pedagogical beliefs, administrative support, and time to learn how to use the technologies and integrate them into the curriculum" (p.211). Even though many school districts report lack of funding, Wolf and Hall cited Article II D: Enhancing Education Through Technology (EETT) of the No Child Left Behind Act (NCLB) provides funding for 81% of the schools in the U.S. Wolf and Hall (2005) also stated, "In business, providing technology funding is not even a question companies understand the critical need for technology as productivity, communication, and research tool. However, that is not always the throughout all levels of education" (p.48). The authors also state the fact that twelve states do not receive state level funding for technology. States that mainly consist of rural school districts are more prone to funding difficulties than those districts with larger student population found within metro areas, although the state technology coordinators recognize the potential and benefits to the digital classroom (Sologuk, Stammen, & Vetter, 2001, p.199). Administrators and in-structors are working with local communities and businesses to help offset some of the funding issues faced in some school districts.

According to Rice, Wilson, and Bagley (2001), "There was an immense amount of technology that could be beneficial…but there are many avenues open to teachers and systems to get the funds necessary, all it takes is the commitment of the time necessary to find this funding" (p.211). Working locally with interest groups, communities must strategize and plan to ensure that the local school districts are able to apply or qualify for substantial funding provided at the district, state, and federal levels of government (Wolf & Hall, 2005, p.48). Some teachers have taken matters into their own hands by seeking outside sources willing to assist when funding is not available. Exploratory work noted by one educator who pursued various funding opportunities through grants was able to purchase equipment for his classroom. The efforts were rewarded with four computers, a multimedia projector, a digital camera, two color printers, and a scanner. He applied for five grants, and with his efforts in the local and regional area landed three grants from organizations (Rice, Wilson, & Bagley, 2001, p.211). Bill Gates, founder of Microsoft, has invested billions in schools through the Bill & Melinda Gates Foundation. Recently, philanthropist Warren Buffet became a trustee in 2006, doubling the foundation endowment (Waters, 2007, p.54).

Other notable companies such as Apple, Hewlett-Packard, and Dell sponsor a wide range of grant based programs that provide technology based products, services, and the necessary support for students and teachers. Other technology based giants — Oracle, Intel, and Sun Microsystems — have established educational foundation programs that are beneficial to school districts (Waters, 2007).

Funding presents a huge obstacle for many school districts to overcome, but, the instructors who are not proficient using technology in the classroom are just as detrimental to the digital classroom. School districts that employ faculty including administrators and instructors who are technologically challeneed present barriers when trying to implement technology based curriculum. A key element that is overlooked during the implementation phase is the teacher (Bitner & Bitner, 2002, p.95). The educator is crucial and yet can be detrimental to the success of a digital classroom. Teachers are often overlooked during the discussion and planning phases. Teachers are an integral part of the system when digital classrooms are put into use. Before technology can affect changes in the classroom, those ultimately responsible for the classroom must be considered.

It is up to the teachers to become familiar with technology and the advantages that can be gained. Teachers must revert to a learner role and take control of their learning. This behaviorist approach is vital to the success of the teachers by perpetuating the need for personal and professional development. Peitenati, Giuli, and Khaled (2001) recognizes the need for teachers to become students: "There is a need to help teachers and operators use technology effectively…they need to become proficient as users, acquire new technical skills, and learn to use the technological means efficiently as an educational tool" (p.153). According to Prensky (2001), "Teachers, considered digital immigrants, are those who tend to cling to the old ways and languages (dated pre-digital era) struggle to engage in teaching the new generation of digital natives. Teachers must be willing to shift practices and beliefs of digital design and innovative curriculum in order to break paradigms and demonstrate enthusiasm for the new technological integration." Jamison (2008, p.1) refers to Prensky from 2006 stating that traditional educators and digital learner cannot find common ground; clashing cultures as the traditional educators try to emerge as a digital immigrant while teaching the digital natives.

Change is not easy, but instructors must successfully incorporate this new pedagogical delivery if students are to succeed in the workforce and become comfortable with the ever-changing career demands. The differences between traditional educators and digital learners are real. Current trends point to the continued expansion and integration of the digital culture and to the eventual leadership role these digital learners will

assume in our global society. It seems clear that educators wishing to remain relevant, employed, and successful at creating meaningful learning experiences (if not joining the digital culture) must seek methods of at least becoming familiar with the language and behaviors (Jamison, 2008; Moore, 2005; Plantec, 2004; Barr & Tagg, 1995). According to Bitner and Bitner (2002), instructors must overcome the following obstacles when implementing technology into the classroom: fear of change, training in technology basics, using technology for personal use, teaching models, climate, motivation, and support. Other factors limiting teachers in the classroom, cited by Peitenati, Giuli, and Khaled, were lack of time and computer avoidance.

Effective practices that may interest teachers having trouble adapting technology into the classroom may be as simple as issuing computers for personal use. States, augmented with the contributions of private donors, have created programs that provide teachers with personal computers. These programs require that the educators attend classes on how to use the equipment (Means, Olson, & Singh, 1995, p.69). Such programs provide teachers practical applications that allow them greater efficiencies with the equipment. Similar programs could be designed around Internet access. With their own personal experience of the ways in which technology can support their productivity, teachers are more likely to see its potential for their students (Means, Olson, & Singh, 1995).

As the increase for teachers with tech-

nological backgrounds becomes apparent, school boards and administrators are requiring skill sets before instructors enter the classroom. Chris Rother (2004) stated, "More school boards and district administrators are asking teachers to become computer literate and to use technology tools to increase academic performance. When asked to evaluate their classroom-computing expertise, teachers told us they want more training" (p.43). Training is the key to learning a skill, especially technology. Teachers participating in professional development or ongoing training programs are more likely to implement technology and integrate practical applications into the curriculum. NCLB requires that all teachers attend a professional development program or other accredited training, workshops, that provides support (Fox, 2007, p.36). Mulqueen concluded that professional development programs for teachers were successful when the training they received mirrored a digital classroom (2001), saying "The program's aim included an extensive professional development component that integrated technology and curriculum training... teachers are more likely to feel better prepared to use technology in their classrooms if they receive curriculum-integration training" (p.248).

Teachers need training, models, motivation, and support, but most of all time is required to develop and integrate technology based curriculum. Time allocation is required to integrate applications of technology, test the applications, and confirm pedagogical results from the trials. Developing ac-

tivities so that the applications may be measured and quantified demands expensive processes. These trials give educators the opportunity to grow from team results and learn from colleagues. Greater efficiencies will not be rendered without sufficient allocations unless time is adequately allocated and adopted by administrators (Means, Olsen, and Singh, 1995, p.69). Rice, Wilson, and Bagley (2001) state "A teacher's journey of learning how to use technology in the classroom, reveals several points to be considered by teacher educators. Teacher education programs should be providing information…concerning how technology can aid in applying constructivist principles to classroom learning" (p.211).

Conclusion

The literature has shown that educators, administrators, and the community must work together to provide support and expenditures to expedite the implementation of technology based curriculum in classrooms. Teachers face many uphill obstacles that can be resolved by innovative and creative funding while embracing the desire to grow professionally by utilizing technologies as an instructional tool. Instructors can guide students by providing a rich environment for research in an educational atmosphere that enhances learner centered practices. Students can explore a wealth of knowledge and access information with their fingertips and are able to retrieve instructional curriculum in a manageable online course management systems such as Blackboard and WebCT. With EETT, foundations, local businesses,

and charities, school districts have the opportunity to overcome some budgetary issues if they are willing to be creative and apply for grants. As teachers shift focus towards personal and professional development, the obstacles that challenge them can be overcome through training and support.

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