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EXPLORING THEATRE OF THE OPPRESSED AND MEDIA SYNCHRONICITY TO SUPPLEMENT VIRTUAL LEARNING ENVIRONMENTS: EXPERIENCES WITH MADOS

by

PEDRO SILVA
B.A. University of Central Florida, 2010

A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Fine Arts in Emerging Media
in the School of Visual Arts and Design
in the College of Arts and Humanities
at the University of Central Florida
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ABSTRACT

This thesis explored the application of Media Synchronicity Theory and its potential for translating Critical Pedagogy (specifically Boal's Theatre of the Oppressed) into a computer-supported collaborative work (CSCW) environment. It introduces the Maquina dos Oprimidos (Mados) prototype, a CSCW supplement to traditional asynchronous learning networks. Mados operates as a role-playing debate game, in which students debate a pre-selected prompt while performing assigned character roles. The study explores the prototype's potential to affect student's identification with their assigned character and personal attitude toward the prompt, as well as examining the effect of presence on students' performances.

The study was performed with 38 8th grade students. Subjects debated a prompt which proposed a banning cell phones from classrooms. Results show that subjects collaboratively constructed solutions that compromised between both positions, while slightly favoring the anti-ban position. Results also show that subjects experienced gains in character identification after participating in the task regardless of assigned character, hinting at a separation between perceived similarity to characters and affinity for characters' position. The ability of subjects to defend their assigned character's position while inhabiting their own perspective, that of an 8th grade student, also hints at this separation. Additionally, results indicated correlations between subjects' control factors, a subset measure for presence, and total change in prompt agreement. Other positive correlation exist between subject's reprocessing attempts and task performance, as well as total presence and task performance.

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CHAPTER I: THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction

Intelligence quotients (IQ) have increased in the United States over the decades of the last century, an effect now termed the Flynn effect. Flynn (2007) later concluded that IQs have increased worldwide throughout the past century, attributing the increase to reduced inbreeding, improved nutrition and increased affluence worldwide. Likewise, scores on the Torrance Tests for Creative Thinking (TTCT), the most widely used measure for creativity in educational field (Davis, 1997), have steadily increased from 1974 to 1990 (Kim, 2011). However since 1990, creativity scores have experienced significant losses across all subscales measured via the TTCT.

Creativity Pedagogies, such as Treffinger's (1995) Creative Problem-Solving (CPS) method, and Critical Pedagogies, influenced by Freire and Boal, have succeeded in affecting increases in students' creativity scores (Scott et al, 2010; Yee, 2004). However, recent migrations toward online curricula shuffle students into asynchronous learning networks (ALN); the communication tools available in these virtual environments are not optimized to foster collaboration and bilateral thinking, traits that operate at the core of Creativity and Critical pedagogy. In addition, traditional methods of synchronous computer-mediated communication (CMC) encounter problems of cohesion when transplanted into the virtual landscape.

This thesis explores the application of Media Synchronicity Theory (MST) and its potential uses in translating Critical Pedagogy (specifically Boal's Theatre of the Oppressed) into a computer-supported collaborative work (CSCW) environment. It introduces the Maquina dos Oprimidos (Mados) prototype, a CSCW supplement to traditional ALNs. Mados operates as a role-playing debate game, in which students debate a pre-selected prompt while performing

assigned character roles. The study explores the prototype's potential to affect student's identification with their assigned character and personal attitude toward the prompt, as well as examining the effect of presence on students' performances.

This chapter outlines the problem and purpose of the research, followed by a description of the specific research questions and overall thesis structure.

Statement of the Problem

The Decrease in Creative Thinking Scores

The Torrance Test for Creative Thinking (TTCT) stands as the most widely used test of creativity (Davis, 1997) and is the most referenced of all creativity tests (Lissitz & Willhoft, 1985). The TTCT has been translated into more than 35 languages (Millar, 2002). Developed in 1966, the TTCT has been renormed 4 times: in 1974, 1984, 1990, and 1998.

Still, the TTCT does not entirely operationalize Torrance's definition of creativity (Kim, 2006; Chase, 1985), which Torrance defines as the process by which individuals (1) become sensitive to problems, deficiencies, and gaps in knowledge, (2) formulate hypotheses about these deficiencies, (3) test and retest these hypotheses, and (4) communicate the results (1966, p. 6).

Attempts at operationalizing creativity have produced numerous models, ultimately motivating researchers to seek clarification. McWilliam (2007, p. 2) remarks on the "amorphous nature of what counts as 'creativity'… and the energetic investment in its clarification through predominantly psychology-based research modeling." Greene (2007) comments on the disconnect between models of creativity and those communities of practice which operate upon

them, characterizing the diversity of models as "so attenuated, extenuated, or misunderstood that operationalization of key concepts is missing or impossible" (p. 2).

Despite difficulties operationlizing the concept of creativity, the TTCT benefits from 25 years of extensive development and evaluation (Millar, 2002), one of the largest norming samples, with valuable longitudinal validations and high predictive validity over a very wide age range (Kim, 2006).

Torrance (1972, 1981a, 1981b; Millar, 2002) points to a significant correlation between individuals' CI and creative accomplishments as an adult. Kaufman et al. (2008) calculate the correlation of lifetime creative accomplishment to children's CI as significantly greater than that of childhood intelligence quotients (IQ). When predicting creative achievement, Kim (2008) reports that scores on the TTCT predict creative achievement better than other measures of creative or divergent thinking.

Torrance (1976; Torrance & Safter, 1986) examined changes over time, reporting increases in Fluency, Originality, and Elaboration scores on the TTCT-Figural from 1967 to 1976 and from 1976 to 1982. From 1990 onward, Kim (2011) documents significant losses across all subscales of measurement collected across the TTCT-Figural in the past 20 years. (Details about the TCTT, testing conditions and various subscales that comprise a subject's composite CI are elaborated upon in chapter 2). Elaboration scores, which measure the ability of students to expand upon ideas, registers as the most severely affected subscale, suffering a 19.41% decrease in scores from 1984 to 1990. In addition, recent years exhibit accelerating rates of decline: From 1984 to 1998, students' elaboration scores suffered a 24.62% decrease; from 1984 to 2008, a 36.80% decrease.

In order to better understand the decline, Kim (2010) isolates trends across highly creative individuals, adapting these trends into strategies for preserving creativity. Such trends include: preserving curiosity, focusing on ideas, promoting the integration of feminine and masculine behavioral traits, promoting higher education, fostering independence, and placing less emphasis on organization. In addition to researching programs and techniques that promote creativity, Kim (2010) urges self-examination to first isolate and correct those environments that inhibit creativity: "The best creative techniques, or the strongest creative programs, cannot compensate for a culture that crushes creativity. Creative growth demands that we adapt our environments into a creativity-friendly environment."

Creativity Pedagogy

Creativity pedagogies have emerged in order to promote bilateral thinking, the ability to engage in divergent thinking punctuated with bouts of convergent thinking. These pedagogies urge teachers to shift from the banking model as described by Freire (1963), or sage-on-the-stage/guide-on-the-side, to "meddler-in-the-middle" (McWilliam, 2005). They invite students to "become 'prod-*users*' of disciplinary and interdisciplinary knowledge, rather than passive recipients of the knowledge of academics (McWilliam, 2007). Pedagogies that reinforce students' roles as "prod-user" remove the need of a supply or value chain in which knowledge is passed down from top to bottom. Instead, they cast teachers and students as "co-creators of information products, drawing on a network of people and ideas that is fluid and organic" (McWilliam, 2007, p. 9).

These pedagogies face new difficulties. The digital divide continues to separate teachers and students; the separation is not merely cultural, but physiological, what neuroscientists and cognitive psychologists term as neruoplasticity. In turn, just as literate man's brain adjusted to the written word, digital technologies have molded the brains of digital natives into a machines for parallel processing, random access and non-linearity. Educational materials are at a disadvantage when competing for student's attentions across a technological landscape already attuned to their neurophysiology. As Prensky (2001) states, "today's students are no longer the people our educational system was designed to teach."

Beck & Wade (2006) explore the generational gap between the 'gamer' generation and their baby boomer predecessors, concluding that the 'gamer' generation is more likely to engage in serious play than previous generations, and less likely to show interest in those pedagogical methods which focus on the transmission of knowledge from elders. According to Beck and Wade (2006), gamers have already learned that problems are best tackled through trial and error. McWilliam (2007) characterizes the "two blunt messages coming from social researchers and from cognitive scientists" (p. 9) as "explain less, welcome error."

Creativity pedagogies and problem-based learning methodologies closely adhere to McWilliam's (2007) summation, 'explain less, welcome error'. Research (Scott et al, 2010; Yee, 2004) demonstrates the ability of certain creativity pedagogies to increase students' CI. Treffinger's (1995) Creative Problem-Solving (CPS) method, for example, translates curriculums into problem-based learning exercises. Similar to Treffinger's CPS method, Freire's *Pedagogy of the Oppressed* (1963), as well as Boal's subsequent writings on the *Theatre of the Oppressed* (1985) and *Legislative Theatre* (1995), operate on closely related principals.

Virtual Learning Networks

Networking technologies allow for increased accessibility to instructional materials; this new level of accessibility aims to meet the needs of a diverse public historically underserved by traditional offline instruction. In turn, the ever-increasing demand for VLNs and their ease of their scalability converge on universities and colleges "in ways that go beyond the past limitations of distance education" (Strizich, 2010). Sloan Consortium surveys (Allen & Seaman, 2007; 2008; 2009) report that the number academic leaders who "rate online as either the same or superior to face-to-face continues to increase over time as well, and now represents just under two-thirds of all respondents" (Allen & Seaman, 2010). Student enrollment data show migrations toward online instruction, reflecting a 21% increase in online enrollment from 2009 to 2010, a growth rate that far exceeds the 2% increase in post-secondary student population. Distance education, survey respondents suggest, need not *feel* distant -- a welcome alternative ready to stand alongside traditional instruction.

Such rapid implementation and adoption of VLNs obscure the limiting factors of online instruction, those aspects of face to face instruction that require nuanced translation onto the online space. Several discrepancies across student experience and performance depict VLNs as a vehicle of instruction still in its early years. For example, comparative assessments highlight declining performance scores for post-secondary students across online introductory courses in English and math (Jaggers, 2011). Addtionaly, disadvantaged students are more likely to withdraw from online courses than their face to face alternative (Xu & Jaggers, 2011).

Finally traditional methods of synchronous computer-mediated communication (CMC) encounter problems of cohesion when transplanted into the virtual landscape; inter-leaved threads of conversation -- an inexorable consequence of chat rooms -- pose a challenge for

educators hoping to steer synchronous student discussions in online spaces. In turn, students often experience difficulty in coalescing dialogue into meaningful and cohesive wholes. Thus, as public and private non-profit universities continue to expand their online offerings students shuffle across curricula increasingly isolated, peer interactions limited to forum posting and email messaging.

In order to foster instruction that effectively engages students, content must be transcribed into new modalities of interaction, translated into the language of the digital natives, while minimizing the accent of the digital immigrants. With the advent of collaborative online games, along with the sprouting of asynchronous learning networks (ALN), digital game-based learning holds the unique potential to communicate creative problem-solving pedagogies through students' native digital language.

Purpose of Research

This thesis explores the application of Media Synchronicity Theory (MST) and its potential uses in translating Critical Pedagogy (specifically Boal's Theatre of the Oppressed) into a computer-supported collaborative work (CSCW) environment. It introduces the Maquina dos Oprimidos (Mados) prototype, a CSCW supplement to traditional ALNs.

Mados operates as a role-playing debate game, in which students debate a pre-selected prompt while performing assigned character roles. Students assume the roles of well-known characters relevant to their field of study; students are then tasked with debating controversial issues relevant to school curricula.

Teachers construct units entitled "plays." Each play consists of two components:

- Prompt: Prompts allow students to obtain an outline of the dilemma they will soon debate. Prompts are quotations taken from students' course material that encapsulates a real-world controversy present in their field of study (e.g. the concept of subjective morality in Dostoevsky's *Crime and Punishment*, or state representation in *The Federalist Papers*).
- Character: Teachers designate two characters for students to role-play (e.g. for a prompt regarding *The Federalist Papers*, teachers may choose Hamilton, Jay or Madison, perhaps even restage a constitutional convention).

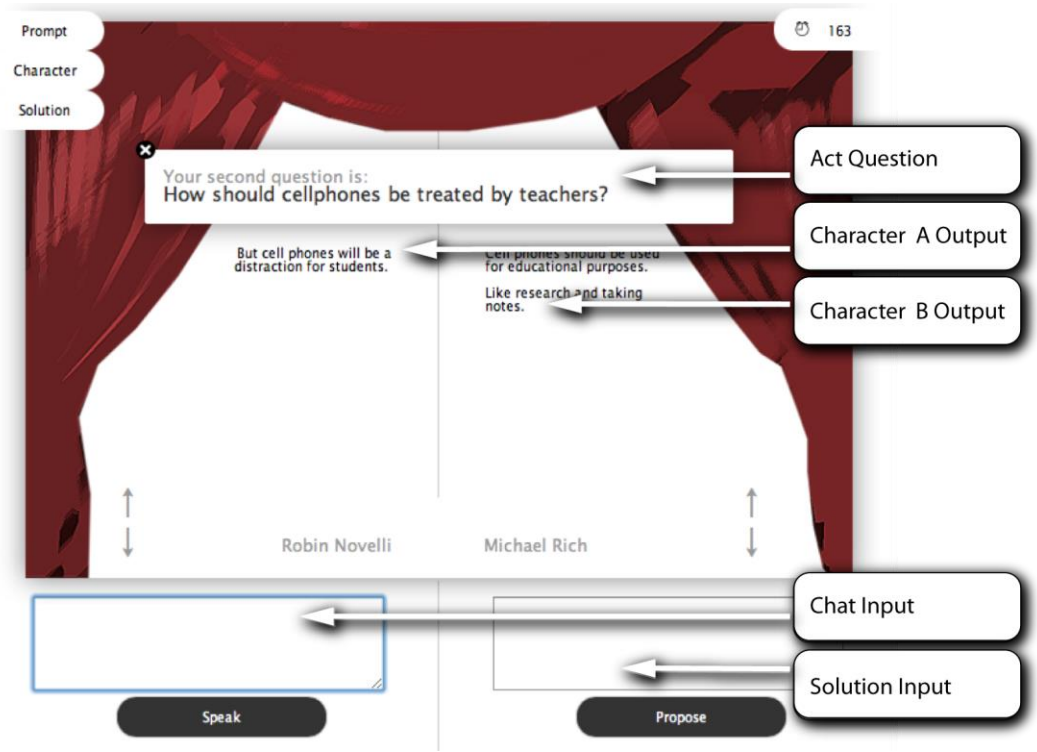


Figure 1. The Mados interface.

Through the Mados interface (see in figure 1), students collaborate to find a solution to the prompt's controversy, all the while maintaining their character's role. Students are free to

submit solutions for the approval of their fellow participant at any time. Once both students, as their respective characters, agree to a proposed solution, the play comes to an end.

The study explores the prototype's potential to affect student's identification with their assigned character and personal attitude toward the prompt, as well as examining the effect of presence on students' performances.

Research Questions

1. Is there a statistically significant difference between pre- and post-task scores for prompt agreement?
2. Is there a statistically significant difference between the absolute change in pre- and post-task prompt agreement scores of subjects assigned character A and subjects assigned character B?
3. Is there a statistically significant difference between pre- and post-task scores for perceived similarity and wishful identification?
4. Does a statistically significant correlation exist between subjects' reprocessing attempts and subjects' task success?
5. Is there a statistically significant difference between pre- and post-task scores for character agreement?
6. Does a statistically significant correlation exist between subjects' levels of presence/immersion tendency and subjects' absolute difference in pre- and post-task prompt agreement scores?

Relevance of Study

Researchers (Barab et al., 2005, 2006, 2007; Young et al., 2006) discuss multi-user virtual environments (MUVEs), and their potential for engaging students and boosting learning outcomes. However, with such environments, discretion is removed from teachers, those closest to students and most aware or their diverse needs, and placed within the purview of game designers. Such MUVEs are graphically intensive applications, which in turn, afford little opportunities for teachers to make adjustments or create content. Such MUVEs often focus on cultivating specific environments, which are then packaged and delivered to teachers.

The lack of teacher agency across educational games is a problem that may be tackled with two approaches: The creation of complex tools for content creation across graphic-intensive MUVEs, or the creation of less graphically intensive games that allow for greater accessibility for teachers. A fully customizable MUVE, which grants teachers agency and allows for content creation, face several obstacles. More complex MUVEs necessitate similarly complex tools for their customization and content generation. In turn, such tools face problems of accessibility, necessitating large time investments for training and content creation. On the other hand, less graphically intensive games may suffer lower scores for presence and character identification, measures which research has shown to increase student engagement and performance (Barab et al., 2005, 2006, 2007; Young et al., 2006). Witmer and Singer list scene realism as a contributing factor for measures of presence, citing factors such as scene content, texture, resolution, light sources, field of view and dimensionality (1998).

However, considerations or presence and character identifications are still applicable for experiences which offer less graphical fidelity. In turn, these experiences can substitute graphical

fidelity for teacher agency, affording teachers more accessible tools for content creation and customization.

It is the purpose of the thesis to explore character identification and presence in a CSCW environment that allows for teacher content creation and customization. In order to facilitate teacher accessibility, the CSCW environment strays from graphically intensive experiences. The study hopes to contribute guidelines and considerations for future teacher-centered CSCW spaces, especially regarding applications of MST and influences of character identification and presence.

Limitations of Study

The study presented here featured a single prompt, and as a result, it is outside the scope of this thesis to generalize findings across multiple prompts. Additionally, the study gathered data from a modest sample size, 38 8th grade students.

Due to space limitations, subjects shared the same testing site. Whereas subjects sat across from each other during the study, real-world applications of the Mados platform would have subjects in wholly separate physical environments, eliminating factors that may influence subjects' interaction.

The study's prompt, Cell Phones in the Classroom, was designed by the researcher for relevancy across several 8th grade classrooms, and did not specifically reference student's current topic of study.

Finally, this study operated as an initial inquiry into the potential for translating creativity pedagogy into a CSCW environment. The Mados prototype was envisioned as a CSCW platform

for positively impacting users' creativity index. However, de to time restrictions, this study did not incorporate the TTCT, and as such, subsequent research hopes to utilize creativity index scores as measure for the prototype's success in future iterations.

Organization of Thesis

This thesis is organized as follows: Chapter 1 has presented an overview of the study, the problem and its clarifying components. Chapter 2 contains a review of the literature concerning virtual learning networks, computer-supported work, the *Theatre of the Oppressed*, player identification, presence and media synchronicity theory. Chapter 3 presents the methodology used in the study. Data analysis and findings are presented in Chapter 4, followed by a discussion of the findings and recommendations for future research.

CHAPTER II: LITERATURE REVIEW

Torrance Tests for Creativity

The TTCT has two versions, the TTCT-Verbal and the TTCT-Figural, each with two parallel forms, Form A and Form B. In its current form, the TTCT-Figural measures scores across the following categories:

- Fluency: The number of relevant ideas; shows an ability to produce a number of figural images.
- Originality: The number of statistically infrequent ideas; demonstrates an ability to produce uncommon or unique responses. Scoring procedures count the most common responses as 0 and all other legitimate responses as 1. Originality lists have been prepared for each item on the basis of normative data, which are then readily memorized by scorers.
- Elaboration: The number of added ideas; shows the subject's ability to develop and elaborate on ideas.
- Abstractness of Titles: The degree a title moves beyond concrete labeling of the pictures drawn; based on the idea that creativity requires an abstraction of thought.
- Resistance to Premature Closure: The degree of psychological openness, or "open-mindedness"; based on the belief that creative behavior requires a person to consider a variety of information before rendering a thought complete.

In addition, 13 creative personality traits were later added to the scoring (Torrance, 1990), comprising the Creative Strengths Subscale. These traits include: emotional expressiveness, storytelling articulateness, movement or action, expressiveness of titles,

synthesis of incomplete figures, synthesis of lines or circles, unusual visualization, internal visualization, extending or breaking boundaries, humor, richness of imagery, colorfulness of imagery, and fantasy.

The TTCT-Figural consists of three activities; subjects are granted ten minutes for each activity. Kim (2011, p. 286) describes the activities of the TTCT-Figural as follows:

In Activity I, the subject constructs a picture using a pear or jelly bean shape provided on the page as a stimulus. The stimulus must be an integral part of the picture construction. Activity II requires the subject to use ten incomplete figures to make an object or picture. The last activity, Activity III, is composed of three pages of lines or circles which the subject is to use in creating a picture or pictures.

Although the tests' applications have evolved to focus on identifying gifted children, Torrance (1966, 1974) initially intended the TTCT to function as part of a long-term program for promoting the research of classroom activities to stimulate creativity; the TTCT sought to "understand and nurture qualities that help people express their creativity. The tests were not designed to simply measure creativity, but instead to serve as tools for its enhancement" (Kim, 2006, p. 4). The test may yield a composite score (the Creativity Index [CI]), but Torrance discouraged interpreting an individual's CI as a static measure of ability; arguing instead for its use as a "profile of strengths [with which] to understand and nurture a person's creativity" (Kim, 2006, p. 4). Additionally, Torrance (1974) states that demonstrating high creative ability via the TTCT does not signal a person's likelihood to engage in creative behavior, nor the success at which they accomplish creative tasks; in addition to creative ability, creative motivation and skills are necessary in order for adult creative achievement to occur (Torrance, 1990, 1998;

Torrance & Ball, 1984). Torrance warned that such evaluative interpretations may be misleading as each subscale score has independent meaning.

Kim (2011) documents significant losses across all subscales of measurement collected across the TTCT-Figural in the past 20 years. Elaboration scores, which measure the ability of students to expand upon ideas, registers as the most severely affected subscale, suffering a 19.41% decrease in scores from 1984 to 1990. In addition, recent years exhibit accelerating rates of decline: From 1984 to 1998, students' elaboration scores suffered a 24.62% decrease; from 1984 to 2008, a 36.80% decrease. (Include other subscales decreases).

In order to understand the decline, Kim (2010) isolates trends across highly creative individuals, adapting these trends into strategies for preserving creativity. Such trends include: preserving curiosity, focusing on ideas, promoting the integration of feminine and masculine behavioral traits, promoting higher education, fostering independence, and placing less emphasis on organization.

Creativity Pedagogies and Theatre of the Oppressed

Creativity pedagogies and problem-based learning methodologies closely adhere to McWilliam's (2007) summation, 'explain less, welcome error'. Research (Scott et al, 2010; Yee, 2004) demonstrates the ability of certain creativity pedagogies to increase students' CI. Treffinger's (1995) Creative Problem-Solving (CPS) method, for example, translates curriculums into problem-based learning exercises. Its lessons allow students to alternate between divergent and convergent thinking across four stages of problem-solving: fact-finding (researching relevant information necessary to understand and solve the problem), problem-

finding (outlining potential pitfalls to avoid), idea-finding (generating as many ideas as possible, free from group judgment), and solution-finding (evaluating ideas for the best solution).

Similar to Treffinger's CPS method, Freire's *Pedagogy of the Oppressed* (1963), as well as Boal's subsequent writings on the *Theatre of the Oppressed* (1985) and Legislative Theatre (1995), operate on closely related principals. These principals eschew what Freire describes as the "banking method" and promote those qualities important to the 'prod-user' by casting participants as 'spect-actors'. Freire's educational methods urge subjects to question the nature of their historical and social situations by "not only reading the word, but reading their world, with the goal of acting as subjects in the creation of a more just society" (Conrad, 2004, p. 89). Freire stressed that education should be the practice of freedom, an exchange where both teachers and students learned, questioned, reflected, and participated in constructing meaning.

In response to Freire, Boal's theatre challenged traditional theatrical conventions by transforming a traditionally passive audience, the spectators, into "spect-actors" by allowing them to take part in the action. In Boal's Image Theatre and Forum Theatre, participants select problematic situations and arrange their experiences and understandings of the situation into an image or scene. Once the image or scene is enacted, "spect-actors can re-sculpt or add themselves to the image, stop the action to discuss plans for change, re-direct the actions, or take the place of a character seen as 'oppressed' to try out different solutions to the problems presented" (Conrad, 2004, p. 90). Later adaptations (Boal, 1995) avoided the characterization of groups or individuals as either "oppressed" or "oppressor," allowing participants to explore situations through dialogue-focused exchanges and "engaging them in embodied, experiential discussion" (Conrad, 2004, p. 90).

The following section provides a background on VLNs and CSCW, and explores the challenges of translating the principals at the heart of creativity pedagogy onto traditional VLN-based courses.

Virtual Learning Networks and Computer-Supported Cooperative Work

Online education is often rooted in historical models of distance education and in turn, assumed to be synonymous with asynchronous teaching and learning models, whose course content and teacher-student interactions are administered via learning management systems (LMSs). However, expanding access to high-bandwidth CMC technologies have stimulated new approaches to online education, including "blended/hybrid approaches in which instructors may combine different forms of media (e.g., text, audio, video) and different timescales (e.g., asynchronous, synchronous) within the same course" (Roseth et al., 2013, p. 54).

Cooperative learning is a term that includes various methods in which students work together in small groups in order to maximize each other's learning; examples include collaborative learning and peer tutoring. Research documents the positive effects of cooperative learning on student achievement, motivation, and interpersonal relationships: According to Roseth et al. (2013), "meta-analyses including over 650 primary studies across 9 decades and 27 countries makes cooperative learning one of the most robust, research-based instructional methods on record" (p. 55).

Schmidt (2009, p. 213) describes computer-supported cooperative work as "an endeavor to understand the nature and characteristics of cooperative work with the objective of designing adequate computer- based technologies." Schmidt asserts the role of CSCW in forgoing the

abstractions of CMC-based research for a more grounded, environment-specific approach, promoting the use of ethnography and related fieldwork as means for data collection. Such approaches focus on documenting previously obscure computer-supported collaborative activities. Wong et al. (2009) explore character sharing in *World of Warcraft*, in which players coordinate character borrowing and lending despite the illegal (by the publisher's standard) nature of the activity and an environment tailored to suppress such behavior. Brosch et al. (2009) explore collaborative conflict resolution for versioning control systems in which all contributing authors involved in eliminating conflicts to obtain one consistent model version. Vyas et al. (2009) studied two educational design departments over the course of eight-months in an effort to codify the collaborative practices that best support the creativity of design professionals.

The development of the CLARE environment, and its corresponding components (RESRA and SECAL), highlight the potential of computer-supported cooperative work (CSCW) environments for engineering a group knowledge base among distributed learning groups (Wan, 1994). Further efforts seek to expand the field of CSCW research to the social (emotional) components inherent in collaborative learning, characterizing existing CSCW environments as either functional (those that provide task-specific support) or sociable (those environments that emphasize the social aspects of group learning) (Kreijns, 2005). Researchers continue to validate scales for the measure of perceived sociability across CSCW environments.

When researching the effects of sociability upon CSCW environments, Mudrack (1995) corroborates the effectiveness of functional roles over that of spontaneous roles. Roles are defined as "more or less stated functions/duties or responsibilities that guide individual behavior and regulate intra-group interaction" (Mudrack, 1995). Group cohesion and responsibility align with positive interdependence and individual accountability; roles allow groups to foster these

traits and in turn increase group cohesion and responsibility by stimulating awareness of overall group performance and member contributions.

Networking technologies allow for increased accessibility to instructional materials; this new level of accessibility aims to meet the needs of a diverse public historically underserved by traditional offline instruction. Student enrollment data charts migrations toward online instruction, reflecting a 21% increase in online enrollment from 2009 to 2010, a growth rate that far exceeds the 2% increase in post-secondary student population (Allen & Seaman, 2010).

Such rapid implementation and adoption of VLNs obscure the limiting factors of online instruction, those aspects of face to face instruction that require nuanced translation onto the online space. Several discrepancies across student experience and performance depict VLNs as a vehicle of instruction still in its early years (see Chapter 1). On the other hand, such qualities of parallelism allow for a greater frequency of student interaction than traditional face-to-face classrooms (where studies report average teacher dialogue at 80% of total classroom dialogue) (Sullivan, 1996). Additionally, many researchers have suggested that CMC, whether synchronous or asynchronous, allows for a less threatening medium of expression, more motivating and inclusive for non-native speakers as well as shyer, disadvantaged students (Chun, 1994; Beauvois, 1998).

Character Identification and Presence

Researchers continue to evolve their definitions of social presence: Gunawardena (1997), for example, defines social presence as the degree to which subjects engaged in CMC perceive their communication partners as "real." Garrison et al. (2000) characterize social presence as an

active concept, the ability of subjects to project themselves socially and emotionally as "real" people. Finally, Tu et al. (2002) describe social presence as "the degree of feeling, perception, and reaction to another intellectual entity in the CMC environment" (p.146).

Despite contrasting definitions of social presence, researchers share similar results regarding the effects of social presence in online learning environments. A positive correlation exists between social presence and student satisfaction in online learning environments (Gunawardena, 1997). In other words, those students who exhibit higher levels of social presence describe higher levels of perceived learning and satisfaction with their online instructor. Additionally, studies (Russo et al., 2005; Rourke, 2001) describe the correlation between student satisfaction with learning and instructor presence, and a positive correlation between student satisfaction and perceived presence of other students. Russo et al. (2005) describes a positive correlation between students' perceived level of social presence and class grade.

Media Synchronicity and Information Richness

Information Richness Theory (IRT) (Richard & Lengel, 1986) characterizes media into levels of media richness, defined as the rate (understanding/time) with which the media can resolve uncertainty and ambiguity. Uncertainty is classified as the absence of an objective answer to a user's questions, while ambiguity defines a state of confusion where the user may not be aware of what questions will lead to objective understanding. Those media that are considered rich are especially good at alleviating ambiguity at a high rate, whereas less rich media (such as asynchronous text messages, forum postings, and emails) succeed at efficiently removing uncertainty. IRT predicts that when users' needs concern the clarification of

ambiguous information, "rich media resolve the ambiguity faster than less rich media. Conversely, to communicate with increased certainty, the theory suggests using a less rich medium such as text only asynchronous email" (Richard & Lengel, 1986). As a result, media must be effectively tailored in order to maximize the rate of communication.

Media synchronicity theory (MST) extends IRT, assuming the variability of a media's richness over time and assigning a dynamic synchronicity value that charts the extent to which a medium is synchronized with a user's communication needs. In turn, "rich media at one instant of information mediation may not be appropriate, therefore as rich, at another time in the process of information understanding" (Dennis & Valacich, 1999). A medium's level of synchronicity at any given time is a product of its six constitutive properties, properties that may be an inherent quality of the medium, or fluctuate over time: (1) immediacy of feedback, (2) symbol variety, (3) parallelism, (4) rehearse-ability, and (5) reprocess-ability. MST predicts that highly synchronous media (those high in immediacy and low in parallelism) are most beneficial when applied to tasks of information convergence; conversely, media low in synchronicity (those low in immediacy and high in parallelism) are most beneficial when applied to tasks of information conveyance.

Traditional educational media (face to face lectures, film, and ALNs) are limited to a static level of richness and synchronicity, bound by the rigidity of their communication media. In order to engage students across information conveyance and convergence, through bouts of ambiguity uncertainty, teachers must divide instructional time across disparate blocks dedicated to specific mediums of communication. As traditional face to face classes migrate from lecture to discussion to film to student presentations, ALN students migrate from textual modules to forum discussions to synchronous chat to email. The rigidity of these media blocks oftentimes prevents

students from vocalizing discontinuities across media. Examples include the student who must wait for a classroom video's completion before addressing an uncertainty, or the student who, upon failing to receive adequate symbol variety during a lecture, must struggle to catch up amidst sessions blocked off for convergence and discussion.

Unlike face to face instruction and ALNs, the potential of computer games lies in the fluidity of their synchronicity. Within its frame, a computer game carries the ability to dynamically reorganize its MST characteristics to meet the demands of learner and content. This flexibility lays credit to the dynamic nature of the computer game's MST properties. The computer game's level of interactivity demands high immediacy when communicating with the *program*, but in terms of *inter-player* communication, computer games may operate across a broad spectrum of immediacy and symbol variety, adapting to the communication needs of players situated within the scenario at hand.

Endless Forest (Tale of Tales, 2005) tasks players with role-playing a deer, restricting available symbols for communication to those behavioral gestures common to dear. On the other hand, *World of Warcraft* (Blizzard, 1994) players may leverage all in-game behaviors, avatar gestures, and voice-chat tools at their disposal. The ability to seamlessly shift between high and low synchronicity, convergence and conveyance, facilitates the rapid alternation of divergent and convergent thought at the heart of bilateral thinking. As a result, students are no longer held hostage to rigid media characteristics; instead, they shape their media's synchronicity toward a harmony of content and personal learning preferences.

Player Motivation

According to Castronova (2003), "we're witnessing what amounts to no less than a mass exodus to virtual worlds and online game environments." As confirmation, McGonigal (2011) places the average gamer at 10,000 hours of gameplay by the age of 21 -- what she terms as "an entire parallel track of education" when compared to the 10,080 hours spent from 5th grade through high school graduation in the U.S. public education system. The average weekly playtime for a World of Warcraft player is 22 hours; collectively, *World of Warcraft* players have contributed 5.93 million years of gameplay.

According to Boston (2009), some gamers realize that virtual words serve as more reliable means of fulfilling basic human needs than reality. Boston (2009) maps categories of human psychogenic needs, and ascribes the holding power of computer games to the proficiency at which they satisfy those needs:

Materialistic needs are met as players acquire objects, often manifested as looting (items dropped upon defeating enemies); as players purchase virtual items with real-world currencies, the reach of virtual objects often extend beyond the virtual world (the economy of *EverQuest* stands as 77th largest real-world economy, its currency surpassing the value Japanese Yen and the Italian Lira [Castronova, 2003]).

Power needs are met primarily through aggression and combat, yet also hold a place within the social structure of virtual communities; as players progress through the ranks of a community (a massively multiplayer online role-playing game [MMORPG] guild, for example), they expect to influence and control players of lower ranks.

Information needs are reflected in games couched within a diverse and detailed fiction (*World of Warcraft*, for example, holds the second largest wiki in the world, totaling at 80,000

articles; the willingness of players to document a virtual world's history demonstrates an affinity to the world's fiction in which players search for meaning).

Sensual needs are often met through the visual and auditory realism or artistic merit of the virtual world. Additional sensual needs such as play or sex require appropriate NPC interactions. Sex in particular remains a controversial aspect of game publishing; psychologists stress the importance of distinguishing virtual sex with a real person from virtual sex with a virtual character. According to Boston (2009), "although it hardly provides sexual fulfillment for the player, this form of intimacy may also lessen loneliness, improve self-esteem, and induce euphoria."

While some of the computer games' advantaged characteristics rely on the computer's natural ability for interaction, other characteristics stem from the fact that games, in their current state of commercial entertainment, are "engineered from the ground up to make us happy" (McGonigal, 2011). Designers focus on generating fiero, an emotion that elicits feelings of blissful productivity and just reward. McGonigal (2011) likens fiero to "an outcome that is so extraordinarily positive you had no idea it was even possible until you achieved it." The allure of games lies in their dispersion of fiero, activities designed to reward players with well-timed bursts of surmountable challenge and triumph.

McGonigal categorized the attribute of *blissful productivity*, the urge to engage in hard, meaningful work, a quality of players fostered through extensive gameplay. Players harness the best of their skills in order to tackle a game's challenges, searching for a level of blissful productivity in which they feel steady progress at the hands of their optimal self. This urge for blissful productivity is augmented by what McGonigal terms "urgent optimism," the desire to act

immediately to tackle obstacles and the belief that the obstacles are surmountable. As a result, within virtual worlds, gamers are characterized as highly self-motivated, optimistic individuals.

In turn, McGonigal's game designs aim to leverage gamers' skills in pursuit of real-world goals. *Breakthrough to Cures* (Baxter, 2009) tasks players to contribute ideas for medical research and drug development reform; *Superbetter* (McGonigal, 2009) uses gaming tropes to facilitate patient rehabilitation; *World Without Oil* (ITVS Interactive, 2007) challenged players to engineer solutions to a potential near-future global oil shortage. Through McGonigal's game designs, thousands of players seek blissful productivity by tackling real-world problems; *World Without Oil* alone garnered over 60,000 players. According to McGonigal (2011), if presented within the context of a game, players direct attention toward pressing, important topics that may not ordinarily engage them.

CHAPTER III: METHODOLOGY

Introduction

This section provides a description of the Mados prototype. A description of the research design is provided, including research questions, procedures, measures and data analysis.

Description of the Prototype

Mados is inspired by Freire‘s model of *conscientization* through dialogue (1963), and Boal’s subsequent research with the *Theater of the Oppressed*, particularly legislative theatre and forum theatre (1995). In turn, Mados’ main goal was to translate the principals of popular theatre into a CSCW environment. Staying true to Freire’s and Boal’s emphasis on characterization through dialogue, the main form of interaction in Mados occurs through a custom-designed chat interface. In this environment, students observe a conflict and the conflict’s relevant actors, assume the roles of these characters, and participate as actors in search of the conflict’s resolution. These elements take shape in the form of a dramatic unit called a “play.”

Each play consists of six components: one prompt, two characters, and three act questions. These components are outlined in greater detail below:

- *One prompt*: Prompts are a screen of text that present students with an outline of the dilemma they will soon debate. Prompts are quotations taken from students’ course material that encapsulates a real-world controversy present in their field of study (e.g. the concept of subjective morality in Dostoevsky’s *Crime and Punishment*, or state representation in *The Federalist Papers*). In this preliminary stage, prompts are taken from recent news reports.

- *Two characters*: Character descriptions are presented as text, which outline students designated role during the debate. Character descriptions provide students insight into their character's attitude and stance regarding the prompt. Teachers designate two characters for students to role-play (e.g. for a prompt regarding The Federalist Papers, teachers may choose Hamilton, Jay or Madison).
- *Three acts*: In an effort to guide participants' discussions toward the prompt's central questions, each play consists of three acts, specific questions to which participants must find unanimous solutions. Whereas the prompt outlines the overall context for the debate, acts address specific questions relevant to the actions proposed in the prompt. (For example, a prompt regarding state representation may include acts that focus on (1) the extent to which states should administer separate educational policies, or (2) differences in federal funding for individual states).

Since students may often find themselves inhabiting a character whose attitude toward the prompt contradicts their own personal beliefs, Mados explores the tensions inherent in player-character relationships, a tension further exacerbated as students attempt to persuade their peers toward a unanimous solution, the game's winning condition.

Mados was envisioned as a supplementary tool for face to face and online classrooms, as a result, the aforementioned building blocks are authored by teachers and relevant to students' field of study. A social science teacher, for example, wanting to restage the 2012 presidential debates may configure a play as follows: A *prompt*, which outlines the debate's focus on domestic policy. *Character descriptions* of President Obama and Governor Romney, which allow students insight into each character's stance on domestic policy issues. Three *act*

questions, which focus students' discussion toward specific controversies within the broader prompt.

During the course of the play, participants use the online chatting interface to find a solution to the three act questions centered around the prompt's controversy, all the while maintaining their character's role. The play progresses as follows:

1. Students select the play in which they will participate (as shown in figure 1), followed by their partner (as shown in figure 2). Plays operate as content-specific units, each comprised of one prompt, two character descriptions, and three act questions.
2. Students are shown the selected play's prompt and their assigned character's description (as shown in figure 3). Character descriptions provide students insight into their character's attitude and stance regarding the prompt. Character descriptions are assigned randomly upon play selection; students are not allowed to choose which character they will role-play. Students are only shown their assigned character's description; they are not shown their partner's character description.
3. Once both students have read the prompt and their assigned character description, students are shown the act 1 question, and the play begins (as shown in figure 4).
    a. For each act of the play, students are tasked with collaboratively constructing an answer to the act question; both players must agree upon the answer. Each act is timed, allowing players five minutes to construct an answer agreeable to both characters. During each act, students may perform two main actions:
    b. Converse with their partner through chat message, debating toward a unanimous answer.

c. Submit solutions for their partner's approval. Upon submission, solutions appear on both players screen. Players are free to minimize the current solution and continue debating through chat messages. The receiving player is free to decline his or her partner's submitted solution at any time; likewise, the submitting player is free to withdraw their solution at any time.

d. Upon either declining or withdrawing, the solution is dismissed. The receiving player is free to accept his or her partner's submitted solution at any time. Upon accepting, the act comes to an end, and the players gain one point for successfully completing the act. Otherwise, if players fail to agree upon a solution within the five minute time limit, the act ends, and the players do not receive points. Finally, players are shown the following act's question.

4. When all acts are completed, players are shown an overview of their score, the three act questions, and any accepted solutions.



Figure 2. Selecting a play.

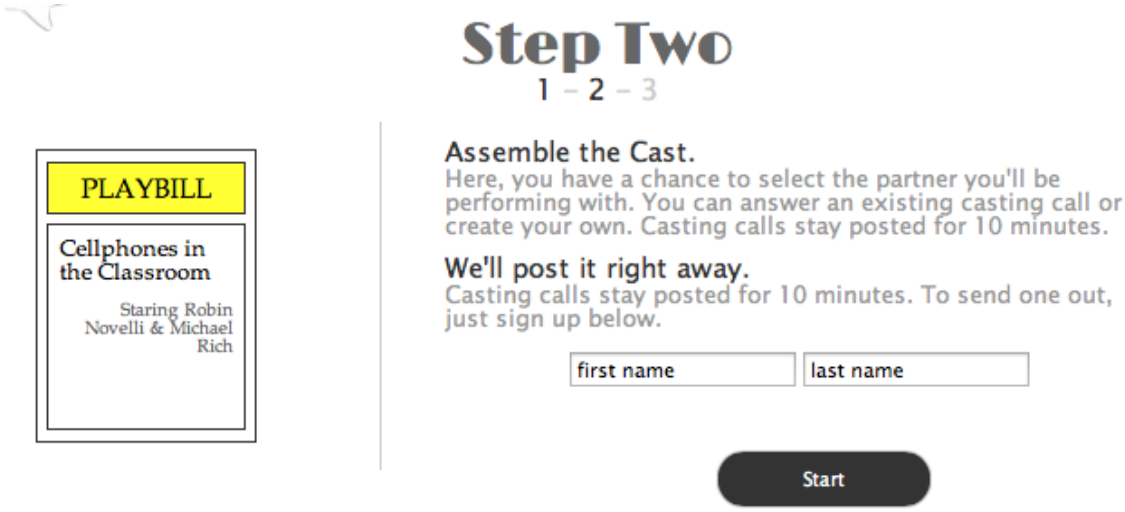


Figure 3. Selecting a partner.

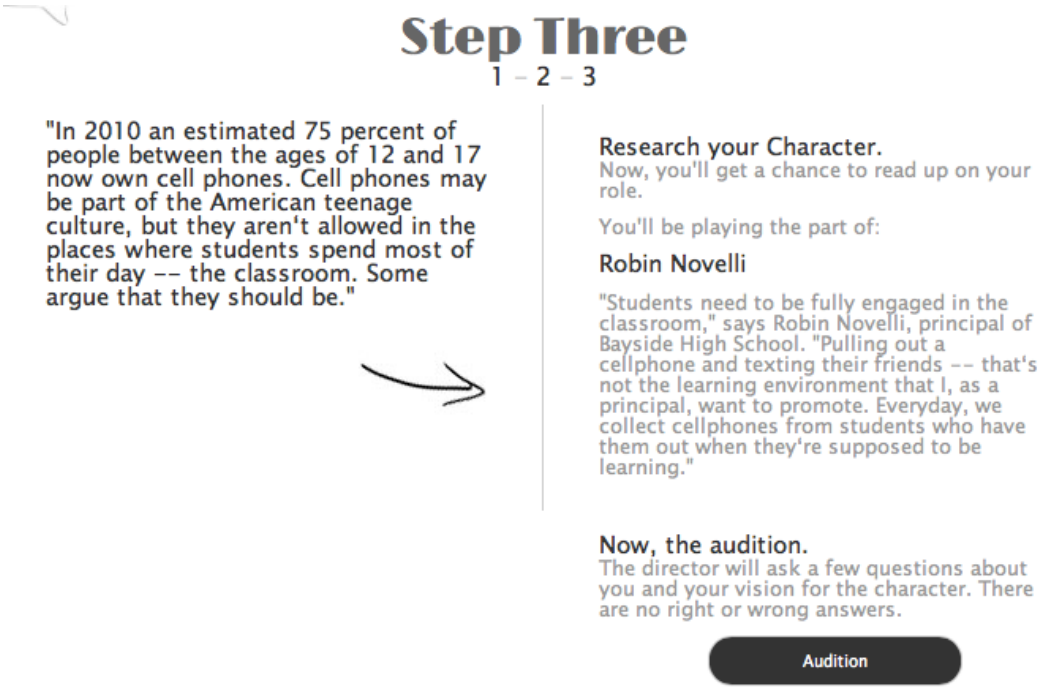


Figure 4. Prompt and character description.

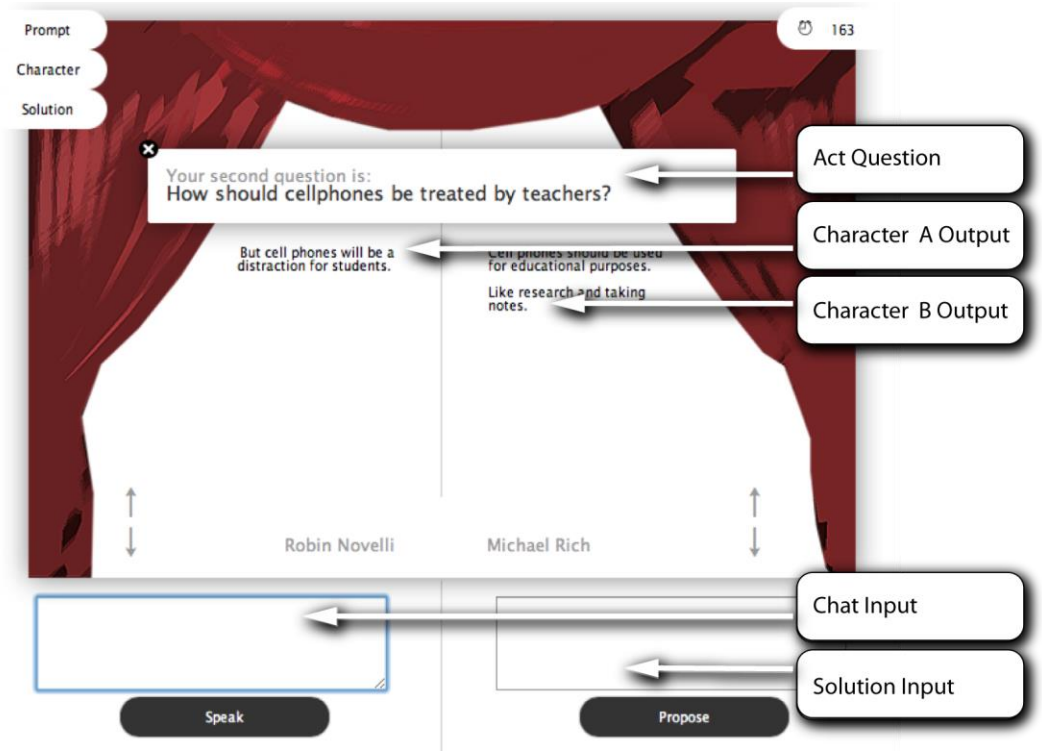


Figure 5. The Mados interface.

Prototype Design

The Mados prototype was designed and developed for use in this study, and is powered by HTML/CSS, PHP, MySQL, JavaScript, and Ajax/JQuery. This section provides an overview of the prototype's implementation, and describes how the aforementioned languages were used in its design.

The prototype employed a MySQL database to store three categories of data: play information (i.e. prompt, character descriptions, and act questions), performance information (i.e. participants, character assignment, and reprocessing attempts), and chat information (i.e. chat messages and solution proposals). Additionally, the prototype employed HTML/CSS for its front-end design. PHP, Javascript and the JQuery/Ajax library was used to seamlessly update the front-end interface with information stored in the database.

Upon selecting a play, users are asked to create a casting call, an action which creates an new instance of the user's selected play in the performance information table. Play information, including user name and play title, are formatted, sanitized, and uploaded into the database via PHP. Under the prototype's current implementation, each play instance supports two players. This instance is visible to other users searching for a partner; once a partner joins (e.g. both player slots are filled), the casting call is removed and the play instance is declared as "in progress".

As users progress through the play's act questions, their chat utterances and solution proposals are uploaded into the database's chat information table. Using Ajax/JQuery calls, chat data is uploaded, queried and displayed on each user's individual interface. Similarly, users' state of agreement with proposed solutions, reprocessing attempts and current act question are also tracked.

Upon completing a play instance, all information pertaining to that instance is removed from the chat information table, formatted, and relocated into the appropriate row of the performance information table. As such, the chat information table only holds data for play instances currently in progress.

Research Design

Research Questions and Hypotheses

1. Is there a statistically significant difference between pre- and post-task scores for prompt agreement? Prompt agreement measures subjects' level of agreement toward the actions proposed in the prompt.
    a. H1: A statistically significant difference exists between pre-task prompt agreement scores and post-task prompt agreement scores.
2. Is there a statistically significant difference between the absolute change in pre- and post-task prompt agreement scores of subjects assigned character A and subjects assigned character B? Absolute change in agreement measures the extent to which subjects' pre-task prompt agreement score differed from subjects' post-task prompt agreement score.
    a. H2: A statistically significant difference exists between the change in pre- and post-task prompt agreement scores of subjects who are assigned character A and subjects who are assigned character B.
3. Is there a statistically significant difference between pre- and post-task scores for perceived similarity and wishful identification? Perceived similarity and wishful

identifications are subset measures of character identification. Perceived similarity measures the extent to which subjects believe they share characteristics with their assigned characters. Wishful identification measures the extent to which subjects desire to share characteristics with their assigned character.

   a. H3: A statistically significant difference exists between pre- and post-task scores for perceived similarity and wishful identification.

4. Does a statistically significant correlation exist between subjects' reprocessing attempts and subjects' task success? Reprocessing attempts measure the number of times subjects utilized interface features to reread prompts, character descriptions, and messages from their partner. Task success measures the number of solutions subjects were able to agree upon within the allotted time limit.

   a. H4: A statistically significant correlation exist between subjects' reprocessing attempts and subjects' task success.

5. Is there a statistically significant difference between pre- and post-task scores for character agreement? Character agreement measures the extent to which subjects agree with their character's attitude regarding the actions proposed in the prompt.

   a. H5: A statistically significant difference exists between pre- and post-task scores for character agreement.

6. Does a statistically significant correlation exist between subjects' levels of presence/immersion tendency and subjects' absolute difference in pre- and post-task prompt agreement scores? Presence and immersion tendency are subset measure for presence. Administered during the pre-task questionnaire, immersion tendency measures subjects' ability to easily immerse themselves in narrative media.

Administered during the post-task questionnaire, presence measures subjects' level of immersion within the Mados prototype.

a. H6: A statistically significant correlation exists between subjects' levels of presence and immersion tendency, and subjects' absolute difference in pre- and post-task prompt agreement scores.

Procedures

The study regarding student role-play via a CSCW environment and subsequent levels of character identification, presence and prompt agreement was conducted at the University of Central Florida in Orlando, Florida. The sample consisted of 38 students enrolled in the 8th grade (13 - 14 years old), whose teacher administered a field trip to the University of Central Florida's Institute for Simulation and Training, where the following tasks and measurements were conducted: (1) Pre-task questionnaire used to measures subjects' level of prompt agreement, character agreement, character identification and immersion tendency, (2) a series of three tasks conducted via the Mados prototype, and (3) a post-task questionnaire to measure absolute changes across prompt agreement, character agreement, character identification, as well as the extent of presence experienced by subjects throughout the task.

The testing environment consisted of two laptop computers and a table; seating was arranged so that students were unable to view their partner's screen. Subjects were randomly paired and arrived at the testing site together. Upon arriving at the testing site, subjects were guided through the following procedures:

1. Introduction to the game mechanics. The researcher described the prototype as a debate game in which the subjects would be asked to find a solution to a given problem. The researcher explained that subjects would be playing the role of a character that already had a stance on the problem's issues.
2. Subjects were introduced to the play titled "Cell Phone in the Classroom." The play's central problem focused on whether cell phones should be banned from classrooms. The researcher explained that the play included two characters: one character who supported for the ban, and one character who opposed the ban.
3. Subjects were asked to read the play's prompt. The prompt read as follows:

   > "In 2010 an estimated 75 percent of people between the ages of 12 and 17 now own cell phones. Cell phones may be part of the American teenage culture, but they aren't allowed in the places where students spend eight hours a day -- the classroom. Some argue that they should be. Should cell phones be banned from classrooms?" (CNN, 2010).

4. Subjects were assigned characters and asked to read their character description. Characters were assigned randomly; subjects did not have a choice as to whom they would be role-playing. Subjects were not allowed to their partner's character description, only their own. The character descriptions are as follows:

   > Pro-ban, Robin Novelli: "Students need to be fully engaged in the classroom," says Robin Novelli, principal of Bayside High School. "Pulling out a cell phone and texting their friends -- that's not the learning environment that I, as a principal, want to promote. Every day, we still

collect cell phones from students who have them out when they're supposed to be learning." (CNN, 2010).

Anti-ban, Michael Rich: "The technologies are here," says Michael Rich, pediatrician and media expert. "What we need to do is take control of them instead of letting them control us. It's not really a phone; it's their computer for class. Students can use their phones for projects and researching online." (CNN, 2010).

5. Students were asked to complete a pre-task questionnaire. The pre-task questionnaire measured subjects' level of prompt agreement, character agreement, character identification, and immersion tendency.
6. Students were asked to complete the task, as described in section Description of the Prototype (step 5). The three act questions were as follows:
    a. Act 1: What is the role of cell phones in schools?
    b. Act 2: How should cell phones be treated by teachers?
    c. Act 3: How much should students be trusted to follow guidelines about the use of technology, especially when their actions might make it harder for others to learn?
7. Students were asked to complete a post-task questionnaire the post-task questionnaire measured absolute changes across prompt agreement, character agreement, character identification, as well as the extent of presence experienced by subjects throughout the task.

Measures

Data was collected via pre- and post-questionnaires; pre- and post- questionnaires collected data through 5-point Likert scale. Pre- and post- questionnaires collected the following measures:

1. *Prompt agreement*: Prompt agreement measured subjects' personal attitude toward the prompt (i.e. should cell phones be banned from classrooms). Measure for prompt agreement were collected during the pre- and post-task questionnaires.
2. *Character agreement*: Character agreement measured the extent to which subjects agree with their character's attitude regarding the actions proposed in the prompt. Measure for character agreement were collected during the pre- and post-task questionnaires.
3. *Character Identification*: Measures for character identification were based of Van Looy et al.'s (2010) measures for identification in MMORPGs and adapted to the of the Mados prototype. Van Looey et al. derived a measure for character identification through three subset measures: Wishful identification measured the degree to which a player desires to be more like their avatar. Similarity identification measured the degree to which the player sees their avatar as similar to themselves. Embodied presence measured the degree to which the player feels as if they *are* their avatar when playing the game. Measure for character identification were collected during the pre- and post-task questionnaires.

4. *Immersive Tendency*: Adapted from Witmer & Singer (1998), immersive tendency measures the tendencies of subjects to experience presence. Immersion tendency measures were collected during the pre-task questionnaire.
5. *Presence*: Adapted from Witmer & Singer (1998), presence measures the subjective experience of being in one place or environment, even when one is physically situated in another. Measures for presence were collected during the post-task questionnaire. According to Witmer & Singer, presence is a composite score of the following factors:
    a. Control factors: the extent to which subjects feel they are in control of the task environment.
    b. Sensory factors: the richness in which the task environment conveyed to the subjects appropriate senses.
    c. Distraction factors: the extent to which subjects are willing or able to focus on the task environment and to ignore distractions that are external to the task environment.
    d. Realism factors: the extent to which information conveyed via the task environment remains consistent with that learned through real-world experience.

Qualitative analysis was also performed. Solutions created within Mados were coded into separate categories by an independent coder. Each play consisted of three act questions, which in turn, allowed for the submission of three solutions -- a total of 48 possible solutions given the sample size. Solutions were coded based on the following 5-point scale:

- Pro-ban: Supports the banning of cell phones of schools under all circumstances.
- Pro-ban with conditions: Supports the banning of cell phones from school, yet allows their use under special circumstances.
- Neutral
- Anti-ban with conditions: Opposes the banning of cell phones from school, yet supports their confiscation under special circumstances.
- Anti-ban: Opposes the banning of cell phones from school under all circumstances.

Data Analysis

The data was analyzed using the SOFA Statistics (2013) statistical software. The following statistical tests were conducted in order to address the aforementioned research questions:

A Wilcoxin Signed Ranks test was conducted to measure differences between prompt agreement, character agreement and character identification (wishful identification and perceived similarity) across pre- and post-task questionnaires.

A Mann-Whitney U test was conducted to measure differences between absolute change for subjects assigned character A and subjects assigned character B, as well as differences in character identification between subjects assigned character A and subjects assigned character B.

A Spearman's test was conducted to measure correlations between subjects reprocessing attempts and task success, as well as embodied presence (immersion tendency and presence) and task success.

CHAPTER IV: RESULTS AND DISCUSSION

Introduction

This section provides an overview of the study's results, discusses analysis methods, and addresses research questions and their respective hypotheses. A discussion of the results is provided, followed by recommendations for future research.

Sample

The sample consisted of 38 students enrolled in the 8th grade (13 - 14 years old), whose teacher administered a field trip to the University of Central Florida's Institute for Simulation and Training. 3 experimental pairs (6 subjects) deviated from experimental procedures or failed to complete all items on pre- and post-task questionnaires and their data were removed from analysis. Analysis was performed on data collected from 32 subjects.

Results

Research Questions

1. *Research question 1*: Is there a statistically significant difference between pre- and post-task scores for prompt agreement? Prompt agreement measures subjects' level of agreement toward the actions proposed in the prompt.
    a. *H1*: A statistically significant difference exists between pre-task prompt agreement scores and post-task prompt agreement scores; post-task scores will be greater than pre-task scores.

b. A Wilcoxin Signed Ranks test indicated that subjects exhibited greater level of agreement with the prompt before participating in the task (M = 2.63, SD = 1.39M) than after participating in the task (M = 2.22, SD = 1.21), Z = -2.10, p = 0.04.

2. *Research question 2*: Is there a statistically significant difference between the absolute change in pre- and post-task prompt agreement scores of subjects assigned character A and subjects assigned character B? For the experimental task, character A represented a pro-ban position, and character B represented an anti-ban position. Absolute change in agreement measures the extent to which subjects' pre-task prompt agreement score differed from subjects' post-task prompt agreement score.
    a. H2: A statistically significant difference exists between the change in pre- and post-task prompt agreement scores of subjects who are assigned character A and subjects who are assigned character B.
    b. A Mann Whitney U test indicates no statistically significant difference between the change in pre- and post-task prompt agreement scores of subjects who are assigned character A and subjects who are assigned character B, U = 86.5, p = 0.10.
3. *Research Question 3*: Is there a statistically significant difference between pre- and post-task scores for perceived similarity and wishful identification? Perceived similarity and wishful identifications are subset measures of character identification. Perceived similarity measures the extent to which subjects believe they share characteristics with their assigned characters. Wishful identification measures the extent to which subjects desire to share characteristics with their assigned character.

a. H3: A statistically significant difference exists between pre- and post-task scores for perceived similarity and wishful identification.
b. A Wilcoxin Signed Ranks test indicates no statistically significant difference between pre- and post-task scores for wishful identification, $Z = -0.05$, $p = 0.96$. However, results indicate that subjects exhibit greater perceived levels of perceived similarity to their assigned character after participating in the task ($Mdn = 14.0$) than before participating in the task ($Mdn = 12.0$), $Z = -2.42$, $p = 0.02$.

4. *Research Question 4*: Does a statistically significant correlation exist between subjects' reprocessing attempts and subjects' task success? Reprocessing attempts measure the number of times subjects utilized interface features to reread prompts, character descriptions, and messages from their partner. Task success measures the number of solutions subjects were able to agree upon within the allotted time limit.
    a. H4: A statistically significant correlation exist between subjects' reprocessing attempts and subjects' task success.
    b. A Spearman's Correlation test indicates a correlation between subjects' reprocessing attempts and subjects' task success, $r(30) = 0.448$, $p = 0.01$.
5. *Research Question 5*: Is there a statistically significant difference between pre- and post-task scores for character agreement? Character agreement measures the extent to which subjects agree with their character's attitude regarding the actions proposed in the prompt.
    a. H5: A statistically significant difference exists between pre- and post-task scores for character agreement.

b. A Wilcoxin Signed Ranks test indicates no statistically significant difference between pre- and post-task scores for character agreement, $Z = -0.52$, $p = 0.6$.

6. *Research Question 6*: Does a statistically significant correlation exist between subjects' levels of presence/immersion tendency and subjects' absolute difference in pre- and post-task prompt agreement scores? Presence and immersion tendency are subset measure for presence. Administered during the pre-task questionnaire, immersion tendency measures subjects' ability to easily immerse themselves in narrative media. Administered during the post-task questionnaire, presence measures subjects' level of immersion within the Mados prototype.
    a. H6: A statistically significant correlation exists between subjects' levels of presence and immersion tendency, and subjects' absolute difference in pre- and post-task prompt agreement scores.
    b. A Spearman's Correlation test indicates no significant correlation between immersion tendency and change in agreement ($r(30) = 0.158$, $p = 0.386$), and presence and change in agreement ($r(30) = 0.16$, $p = 0.381$). However, a Spearman's Correlation test indicates a positive correlation between control factors, a subset measure of presence (Witmer & Singer, 1998) and change in prompt agreement, $r(30) = 0.458$, $p = .008$. Control factor is a measure of the extent to which subject's believe they are in control of the task environment. Lastly, a Spearman's Correlation test indicates a positive correlation between presence and task success, $r(30) = 0.359$, $p = 0.044$.

Quantitative Analysis

Task Success

A Spearman's Correlation test indicates that a positive correlation exists between subjects level of presence and their success in the task, $r(30) = 0.359$, $p = 0.044$. Task success is measured by how many of the play's three acts subjects were able to complete successfully. In order to successfully complete an act, subjects must collaborate with their partner and construct a solution within the five minute time limit.

Prompt Agreement

A Spearman's Correlation test indicates that a positive correlation exists between agreement with the play's prompt (i.e. support for banning cell phones from classrooms) and change in agreement, $r(30) = 0.622$, $p < 0.001$. Those subjects that exhibited the greatest levels of support for the ban before participating in the task exhibited the greatest changes in agreement after participating in the task.

A Mann Whitney U test indicates that before participating in the task subjects assigned character A (i.e. pro-ban) exhibited greater levels of agreement with the prompt (i.e. the institution of the ban) ($Mdn = 3.0$) than subjects assigned character B (i.e. anti-ban) ($Mdn = 2.0$), $U = 0.72$, $p = 0.032$. However, A Mann Whitney U test indicates no significant difference between levels of agreement between those subjects assigned character A and those assigned character B after participating in the task, $U = 0.79$, $p = 0.059$.

Character Identification

Tables 1 and 2 contain pre- and post-task results for perceived similarity, prompt agreement, immersive tendency, and presence.

A Spearman's Correlation test indicates that a positive correlation exists between subjects' level of perceived similarity and wishful identification with their assigned character before participating in the task ($r(30) = 0.711$, $p < 0.001$) and after participating in the task ($r(30) = 0.753$, $p < 0.001$).

A Mann Whitney U test indicates that subjects assigned character B (i.e. anti-ban) exhibited greater levels of perceived similarity to their character ($Mdn = 15.5$) than subjects assigned character A (i.e. pro-ban) ($Mdn = 12$) after participating in the task, $U = 74.5$, $p = 0.043$. On the other hand, a Mann Whitney U test indicates no significant difference between levels of perceived similarity for those subjects assigned character A (i.e. pro-ban) and those assigned character B (i.e. anti-ban) before participating in the task, $U = 78.5$, $p = 0.061$.

Table 1. Pre-task scores for perceived similarity, prompt agreement and immersive tendency.

		perceivedSimilarity_pre			promptAgreement_pre			immersiveTendency		
		Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median
Character	Pro-ban	10.44	3.24	10.00	3.13	1.36	3.00	12.63	4.47	12.00
	Anti-ban	12.63	2.99	12.50	2.13	1.26	2.00	11.69	3.79	11.00

Table 2. Post-task scores for perceived similarity, prompt agreement and presence.

		perceivedSimilarity_post			promptAgreement_post			presence		
		Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev	Median
Character	Pro-ban	11.38	4.05	12.00	2.50	0.89	3.00	4.00	1.75	3.50
	Anti-ban	14.25	3.44	15.50	1.94	1.44	1.00	3.00	2.25	3.00

Qualitative Analysis

Qualitative analysis was also performed. Solutions created within Mados were coded into separate categories by an independent coder. Each play consisted of three act questions, which in

turn, allowed for the submission of three solutions -- a total of 48 possible solutions given the sample size. If subjects were unable to agree upon a solution within the 5 minute time limit, the play automatically advanced onto the next act. As a result, 41 solutions were submitted. These 41 solutions were coded based on the following 5-point scale:

- Pro-ban: Supports the banning of cell phones of schools under all circumstances.
- Pro-ban with conditions: Supports the banning of cell phones from school, yet allows their use under special circumstances.
- Neutral
- Anti-ban with conditions: Opposes the banning of cell phones from school, yet supports their confiscation under special circumstances.
- Anti-ban: Opposes the banning of cell phones from school under all circumstances.

The following solution, for example, was coded as a 1: "they should just not bring them." Conversely, the following solution was coded as a 4: "I think teachers should let students have and use their cell phones not only at emergencies but as part of the class." Coding was performed by an independent coder at the request of the researcher.

Act 1 tasked subjects with collaboratively answering the following question: What is the role of cell phones in schools? 12 solutions were coded with an average score of 3.08 (*SD* = 1.24). Act 2 tasked subjects with answering: How should cell phones be treated by teachers? 14 solutions were coded with an average score of 3.29 (*SD* = 1.14). Act 3 tasked subjects with answering: How much should students be trusted to follow guidelines about the use of technology, especially when their actions might make it harder for others to learn? 15 solutions were coded with an average score of 3.73 (*SD* = 0.88).

Discussion

Subject Bias and Prompt bias

Research question 1 asked: Is there a statistically significant difference between pre- and post-task scores for prompt agreement? Data analysis shows a significant decrease in approval for the action proposed in the prompt (i.e. ban cell phones from classrooms). When formulating the study's hypotheses, the researcher predicted that subjects would experience a shift toward the center: Those subjects that strongly agreed with the prompt before participating in the task would exhibit *decreases* in approval after participating in the task, while those subjects that strongly disagreed with the prompt before participating in the task would exhibit *increases* in approval after participating in the task. However, results indicate the shift occurred in one direction. Median pre- and post-task agreement scores for those subjects assigned character A (i.e. pro-ban) remained consistent at 3, while median pre- and post-task agreement scores for those assigned character B (i.e. anti-ban) dropped from 2 to 1. In other words, most subjects experienced a decrease in approval, regardless of their initial level of agreement or character assignment. Qualitative coding demonstrates this tendency toward disapproval, with solutions learning toward opposing the ban. Act 1, 2 and 3 average 3.08, 3.29 and 3.73 respectively, with 1 representing a completely pro-ban solution, and 5 representing a completely anti-ban solution.

Additionally, data shows that those subjects who were assigned character A (i.e. pro-ban) exhibited the greater level of change in agreement than those assigned character B (i.e. anti-ban). Data also shows that those subjects assigned character B (i.e. anti-ban) exhibited significantly greater levels of perceived similarity to their characters than those assigned character A, both before and after participating in the task.

Interpretation of these results hint at several possibilities:

- Subjects may exhibit biases against the cell phone ban. Due to Mados' structure, such a bias may be temporarily obscured due to influence from the prompt and character description. As part of the study's procedures, subjects were asked to read the prompt and their assigned character description before measurements for prompt agreement were collected. The influence of these stimuli may explain the significantly greater level of agreement exhibited by those subjects assigned character A (i.e. pro-ban) than those assigned character B (i.e. anti-ban) before participating in the task. If so, it is interesting to note how influential character assignment seems to be, and how significantly the effect dissipates after participating in the task.
- The prompt may exhibit a bias against the cell phone ban. As a result, it may be that successful solutions must pull toward opposing the ban on cell phones.

This is an issue that warrants further research. Such research would benefit from testing cases across multiple prompts in order to generalize these effects across other areas of study. In addition, the use of less personal prompt (a prompt that strictly focused on a controversy present in traditional curricula [social studies, science, language arts, etc.], rather than one that debates school policies which have direct consequences for the subjects) may reduce this level of bias.

Perceived Similarity and Wishful Identification

As predicted, subject's level of perceived similarity to their character and wishful identification with their character exhibited a strong positive correlation for scores before ($r(30)$

= 0.753, $p < 0.001$) and after ($r(30) = 0.711$, $p < 0.001$) participating in the task. The researcher predicted a correlation between these factors for character identification and character agreement. However, no such correlation exists. Results show statistically significant gains in levels of perceived similarity, regardless of subject's assigned character. Levels of perceived similarities for subjects assigned character A (pro-ban) before participating in the task showed a median of 10; after participating in the task, levels of perceived similarity grew to a median of 12. Likewise, levels of perceived similarity for subjects assigned character B (anti-ban) before participating in the task sowed a median of 13.5; after participating in the task, levels of perceived similarity grew to a median of 15.5.

Although subjects assigned character B(anti-ban) exhibited greater gains in perceived similarity, it is interesting to note that while subjects assigned character A(pro-ban) showed decreases in prompt agreement (i.e. grew in opposition to the ban) these subjects continued to exhibit gains perceived similarity.

Data suggests that subjects perceive themselves as more similar to their character after engaging in the role-play tasks. More importantly, this gain in perceived similarity operates apart from characters' position on the prompt and whether or not conflict exists between characters' positions and subjects' personal position. A separation exists between perceived similarity to characters as a whole and affinity for characters' position toward a prompt.

Such a separation would seem more likely for more expansive, detailed character descriptions. If subjects receive more information about their assigned characters, they may be more likely to exhibit greater levels of perceived similarity. In such cases, these expanded character descriptions would provide subjects stimuli apart from characters' position, and

subjects may latch onto this additional information in turn, allowing it to inform their levels of perceived similarity.

As detailed in chapter 3, Mados includes sparse character descriptions, comprising mostly of characters' profession and position on the prompt. Play transcripts demonstrate subjects' ability to embody their characters' position. However, subjects do not embody their assigned character as a whole. Play transcripts show subjects arguing for their assigned character's position from an 8th grade student. The following example follows two subjects as they tackle act 3's question: How much should students be trusted to follow guidelines about the use of technology, especially when their actions might make it harder for others to learn?

"Robin Novelli (4:28:25) says: not at all

Robin Novelli (4:28:42) says: we push adults to much

Michael Rich (4:29:09) says: very true. the full trust should belong to those who earn and deserve it.

Robin Novelli (4:29:37) proposes: only the right to have phones with a 4.0 gpa average

Michael Rich (4:29:56) says: grades have nothing to do with character

Michael Rich (4:30:49) proposes: trust those who earn it and keep up with work. no set specific grade though.

Robin Novelli (4:31:07) says: yes it does if you care about your grades you care about authority

Michael Rich (4:31:34) says: not everyone has a 4.0

Michael Rich (4:32:04) says: some good students who are hardworking and trustworrthy have 3.8 and 3.0

Michael Rich (4:32:23) says: don‘t be the person who denies them something they clearly deserve [*sic*].”

Comments such as “we push adults too much” are articulated from an 8th grade student’s perspective, relying on the first person perspective and forgoing the role of Robin Novelli who is described as a high school principal. However, despite forgoing the character’s role, the subject continues to argue for the character’s position on the prompt, foregrounding concerns regarding authority and its link to student performance.

Another pair of subjects tackle the same question:

“Robin Novelli (3:53:37) says: they sould not even have the phones out for us to even consider to trust them

Michael Rich (3:53:39) says: the teachers should chose if the student is mature anotgh

Robin Novelli (3:54:37) says: the teach is in charge for that class and they have the right to confinscate anything they would like

Michael Rich (3:55:41) says: so if your phone falls from your pocket would you like a teach to take it ?

Robin Novelli (3:56:49) says: yes the teacher takes the phone and places it in the front of th class room the the owner of it stays after class for there punishment [*sic*].”

The subject assigned the character of Robin Novelli argues in favor of the ban. Role-play is interrupted when the subject assigned the character of Michael Rich asks “so if your phone falls from your pocket would you like a teach to take it?” The question removes both subjects from their roles and affixes them firmly within their personal perspective as 8th grade students.

However, despite being thrust out of character, both subjects continue to uphold their respective character's position.

As the play continues, it is clear that the subject assigned the character of Robin Novelli reassumes the role of the character:

> "Michael Rich (3:47:27) says: just put them on silent
>
> Robin Novelli (3:47:31) says: you cat learn with your phonr on you
>
> Robin Novelli (3:48:16) says: no it doesnt wok on silent its still the fact the a student could be texting and the teacher wouldnt know
>
> Michael Rich (3:48:31) says: yes you can you can take notes on you iPod and other things
>
> Robin Novelli (3:49:38) says: but the teacher wolnd not know if your texting or not . what if it gets stollen roken then they try to blame it on us [*sic*]."

The subject appears to display concern for the liability of teachers and school administration, while employing the first person perspective: "what if it gets stollen roken then they try to blame it on us". This pair demonstrate a flexibility for assuming and dropping roles, a skill performed with varying levels of success across all experimental pairs.

As with the possibility of subject or prompt bias, this issue requires further research. In particular, experimental cases with multiple plays may benefit from observing subjects' reactions toward character descriptions of varying length and detail. In addition, the ability of subjects to drop and assume their assigned roles may be measured through qualitative coding and tested for correlation with task performance, immersive tendency, presence and learning outcomes -- particularly if this facility influences subjects' ability to engage in bilateral thinking or better adapt to problem-based learning pedagogies.

Presence

Research question 6 asked: Does a statistically significant correlation exist between subjects' levels of presence/immersion tendency and subjects' absolute difference in pre- and post-task prompt agreement scores? A Spearman's Correlation test indicates no correlation between levels of presence and absolute difference in pre- and post-task prompt agreement scores. However, a Spearman's Correlation test indicated a positive correlation between control factors, a subset measure for presence, and task success. According to Witmer and Singer (1998), Control factors measure the extent to which subjects feel they are in control of the task environment.

Additionally, research question 4 asked: Does a statistically significant correlation exist between subjects' reprocessing attempts and subjects' task success? A Spearman's Correlation test indicated a positive correlation between subjects' reprocessing attempts and subjects' task success. These attempts at reprocessing information (prompt, character description and act question) may demonstrate aspects related to control factors.

In addition to control factors, the composite score for presence included measures for:

- Sensory factors: The richness in which the task environment conveyed to the subjects appropriate senses.
- Distraction factors: The extent to which subjects are willing or able to focus on the task environment and to ignore distractions that are external to the task environment.
- Realism factors: The extent to which information conveyed via the task environment remains consistent with that learned through real-world experience.

Witmer and Singer (1998) developed these measures for use in virtual environments, where subjects are fully immersed within a visual simulation. Witmer and Singer propose that VEs elicit increased levels of presence from subjects when subjects are isolated (distraction factors) within a richly detailed, visual environment (realism factors). However, Witmer and Singer discuss other considerations that contribute to distraction and realism factors. Realism factors, for example, need not be measured by fidelity to the real-world visuals alone, although technical considerations (e.g. texture resolution, shaders, lighting effects, etc.) certainly contribute to a VE's realism factors. Likewise, distraction factors need not be determined by ability of VE's to isolate subjects from the real-world with head-mounted displays or CAVE automatic VEs. As such, these measures were retained for use in evaluating Mados.

However, the researcher proposes that due to Mados chat-based interface, distraction and realism factors did not contribute to subjects' sense of presence. In turn, these factors did not contribute to subjects' change in prompt agreement. On the other hand, a positive correlation exists between presence and task performance, demonstrating that these factors hold sway over subjects' ability to collaboratively construct solutions to the act questions. Further research is necessary in order to determine if low contributions from these factors hamper the prototype's ability to foster changes in agreement, and if greater contributions would result in subsequent gains.

Guidelines

The aforementioned results make clear several guidelines and considerations for the construction of teacher-centered CSCW spaces:

1. Presence continues to play a crucial role in participant's ability to collaboratively construct solutions to the problems posed.
2. It is clear that when constructing CSCW environments that do not benefit from graphical realism, control factors exhibit the largest influence over participant's sense of presence.
3. Opportunities for reprocessing information play a crucial role in participant's ability to collaboratively construct solutions.

Conclusions

This thesis explored the application of Media Synchronicity Theory and its potential uses in translating Critical Pedagogy (specifically Boal's *Theatre of the Oppressed*) into a computer-supported collaborative work (CSCW) environment. It introduces the Maquina dos Oprimidos (Machine of the Oppressed) prototype, a CSCW supplement to traditional asynchronous learning networks. Mados operates as a role-playing debate game, in which students debate a pre-selected prompt while performing assigned character roles. The study explores the prototype's potential to affect student's identification with their assigned character and personal attitude toward the prompt, as well as examining the effect of presence on students' performances.

The study was performed with 38 8th grade students. Subjects debated a prompt which suggested banning cell phones from classrooms. Results show that subjects collaboratively constructed solutions that compromised between both positions, while slightly favoring the anti-ban position. Results show that subjects experienced gains in character identification after participating in the task regardless of assigned character, hinting at a separation between

perceived similarity to characters and affinity for characters' position. The ability of subjects to defend their assigned character's position while inhabiting their own perspective, that of an 8th grade student, also hints at this separation. Additionally, results indicated correlations between subjects' control factors, a subset measure for presence, and total change in prompt agreement. Other positive correlation include exist between subject's reprocessing attempts and task performance, as well as composite presence and task performance.

Further research is necessary in order to determine if low contributions from distraction and realism factors hamper the prototype's ability to foster changes in agreement, and if greater contributions would result in subsequent gains. Also, the ability of subjects to drop and assume their assigned roles may be measured through qualitative coding and tested for correlation with task performance, immersive tendency, presence and learning outcomes -- particularly if this facility influences subjects' ability to engage in bilateral thinking or better adapt to problem-based learning pedagogies. Additionally, future research would benefit from testing cases across multiple prompts in order to generalize effects across other areas of study. The use of less personal prompt (a prompt that strictly focused on a controversy present in traditional curricula [social studies, science, language arts, etc.], rather than one that debates school policies which have direct consequences for the subjects) may reduce the level of subject bias. Finally, this study operated as an initial inquiry into the potential for translating creativity pedagogy into a CSCW environment. The Mados prototype was envisioned as a CSCW platform for positively impacting users' creativity index. Subsequent research may utilize creativity index scores, gathered via the TTCT, as measure for the prototype's success in affecting users' creativity index.

The study contributed guidelines for the creation of teacher-centered CSCW environments: (1) Presence continues to play a crucial role in participant's ability to collaboratively construct solutions to the problems posed, despite text-focused interface. (2) It is clear that when constructing CSCW environments that do not benefit from graphical realism, control factors exhibit the largest influence over participant's sense of presence. (3) Opportunities for reprocessing information play a crucial role in participant's ability to collaboratively construct solutions.

APPENDIX A: PRE- AND POST-TASK QUESTIONNAIRE

Pre- and post-task questionnaires were constructed based on Witmer & Singer (1998) and Van Looey (2010) and measures were collected via a 5-point Likert scale; option 1 was labeled as strongly disagree, and option 5 was labeled as strongly agree.

Pre-Task Questionnaire

Please indicate the degree to which you agree or disagree with each statement below.

I believe that cell phones should be banned from the classroom.

My character's personality resembles my personality.

I often become so involved in a TV show or book that people have problems getting my attention.

My character is a better version of me.

I remain scared long after watching a scary movie.

My character represents me well.

I'd enjoy spending time with my character.

Given enough time, my character would suggest a good solution to the problem.

I am proud of my character.

I often get scared by something happening on a TV show or in a movie.

I'd like to follow my character's example.

Oftentimes, I become so involved in a daydream that I'm not aware of things happening around me.

My beliefs resemble the beliefs of my character.

Post-Task Questionnaire

Please indicate the degree to which you agree or disagree with each statement below.

When I was playing the game, I lost tract of time.

My character represents me well.

I believe that cell phones should be banned from the classroom.

I'd enjoy spending time with my character.

Given enough time, my character would suggest a good solution to the problem.

My character's beliefs resemble my beliefs.

I wish I could be more like my character.

As I played the game, I was very aware of the real world around me.

My personality resembles my character's personality.

I learned new techniques that will help me play the game better.

My character sets an example for me.

I am proud of my character.

APPENDIX B: PLAY DETAILS AND TRANSCRIPTS

Play Details

Cell Phones in the Classroom

Prompt: In 2010 an estimated 75 percent of people between the ages of 12 and 17 now own cell phones. Cell phones may be part of the American teenage culture, but they aren't allowed in the places where students spend eight hours a day -- the classroom. Some argue that they should be. Should cell phones be banned from classrooms?

Character Descriptions

Pro-ban, Robin Novelli: "Students need to be fully engaged in the classroom," says Robin Novelli, principal of Bayside High School. "Pulling out a cell phone and texting their friends -- that's not the learning environment that I, as a principal, want to promote. Every day, we still collect cell phones from students who have them out when they're supposed to be learning."

Anti-ban, Michael Rich: "The technologies are here," says Michael Rich, pediatrician and media expert. "What we need to do is take control of them instead of letting them control us. It's not really a phone; it's their computer for class. Students can use their phones for projects and researching online."

Act Questions

Act 1: What is the role of cell phones in schools?

Act 2: How should cell phones be treated by teachers?

Act 3: How much should students be trusted to follow guidelines about the use of technology, especially when their actions might make it harder for others to learn?

Play Transcripts

Play 1

c1y10 c1y10, Michael Rich (3:22:48) says: they allow us to use calculators and other good technologies

c1x10 c1x10, Robin Novelli (3:23:42) says: it is good becase we can use it to help us in class

c1y10 c1y10, Michael Rich (3:24:15) says: yes. Should that be the answer.

C1x10 c1x10, Robin Novelli (3:24:54) says: yes it will be the answer

c1y10 c1y10, Michael Rich (3:25:21) proposes: to let us research stuff like our homework and use calculator related technology.

End of Act

c1y10 c1y10, Michael Rich (3:27:03) says: not to be confiscated unless the student is using apps that 64ngli help the class

c1x10 c1x10, Robin Novelli (3:28:21) says: the teacher should take it away it is not being use for a good cause

c1y10 c1y10, Michael Rich (3:29:19) says: the same as i said, but you said it in 64nglish (the easier to understand way)

c1x10 c1x10, Robin Novelli (3:29:31) says: if is not being used for a good cause

c1y10 c1y10, Michael Rich (3:30:13) proposes: cell phones should be taken if they are being miss-used

End of Act

c1y10 c1y10, Michael Rich (3:31:51) says: 75% percent trust to the students for following guide lines.

C1x10 c1x10, Robin Novelli (3:32:38) says: they should be trusted if the teacher see the students using the cell phone a least once they should take away

c1y10 c1y10, Michael Rich (3:33:10) says: i agree completely

c1x10 c1x10, Robin Novelli (3:33:32) says: ok is that answer or not

c1y10 c1y10, Michael Rich (3:33:40) says: yes it is

c1x10 c1x10, Robin Novelli (3:33:56) says:

c1x10 c1x10, Robin Novelli (3:34:31) says: yes

c1y10 c1y10, Michael Rich (3:35:13) proposes: the teacher should trust each student once and then take it away if caught misbehaving again

End of Act

Act 1 Solution:

to let us research stuff like our homework and use calculator related technology.

Act 2 Solution:

cell phones should be taken if they are being miss-used

Act 3 Solution:

the teacher should trust each student once and then take it away if caught misbehaving again

Play 2

c1x9 c1x9, Robin Novelli (3:46:05) says: the should be band because there a destruction

ciy9 c1y9, Michael Rich (3:46:08) says: so a parent can call you

ciy9 c1y9, Michael Rich (3:46:34) says: entertanment

c1x9 c1x9, Robin Novelli (3:46:39) says: you cant focuse with a cell on your person

ciy9 c1y9, Michael Rich (3:47:27) says: just put them on silent

c1x9 c1x9, Robin Novelli (3:47:31) says: you cat learn with your phonr on you

c1x9 c1x9, Robin Novelli (3:48:16) says: no it doesnt wok on silent its still the fact the a student could be texting and the teacher wouldnt know

ciy9 c1y9, Michael Rich (3:48:31) says: yes you can you can take notes on you iPod and other things

c1x9 c1x9, Robin Novelli (3:49:38) says: but the teacher wolnd not know if your texting or not . what if it gets stollen roken then they try to blame it on us

ciy9 c1y9, Michael Rich (3:50:34) says: the teachers just have to look at your screen

End of Act

c1x9 c1x9, Robin Novelli (3:51:37) says: if a cellfone ould to be confiscated then the teacher will contact the parent or garden

c1x9 c1x9, Robin Novelli (3:52:05) says: *gaedian

ciy9 c1y9, Michael Rich (3:52:10) proposes: students should only take phones out for notes and when not in calls

End of Act

c1x9 c1x9, Robin Novelli (3:53:37) says: they sould not even have the phones out for us to even consider to trust them

ciy9 c1y9, Michael Rich (3:53:39) says: the teachers should chose if the student is mature anotgh

c1x9 c1x9, Robin Novelli (3:54:37) says: the teach is in charge for that class and they have the right to confinscate anything they would like

ciy9 c1y9, Michael Rich (3:55:41) says: so if your phone falls from your pocket would you like a teach to take it ?

c1x9 c1x9, Robin Novelli (3:56:49) says: yes the teacher takes the phone and places it in the front of th class room the the owner of it stays after class for there punishment

End of Act

Act 1 Solution:

Act 2 Solution:

students should only take phones out for notes and when not in calls

Act 3 Solution:

Play 3

c1x7 c1x7, Robin Novelli (4:21:57) says: good way to contact parents

c1y7 c1y7, Michael Rich (4:22:04) says: to look up things and use as a dictionary?

c1y7 c1y7, Michael Rich (4:22:21) says: very good for research.

c1x7 c1x7, Robin Novelli (4:22:33) says: they should be only used to contact adults

c1x7 c1x7, Robin Novelli (4:23:16) proposes: we can collect phones before class and put them in a container till end of period

c1y7 c1y7, Michael Rich (4:23:21) says: i feel you bro. That‘s what i usually use it for but it‘d be nice to be able to look stuff up

c1x7 c1x7, Robin Novelli (4:23:48) says: that was mean

c1x7 c1x7, Robin Novelli (4:23:55) says: i thought alot on that

c1y7 c1y7, Michael Rich (4:23:57) says: idc

c1x7 c1x7, Robin Novelli (4:24:09) says: so mean

c1y7 c1y7, Michael Rich (4:24:16) says: i know

c1y7 c1y7, Michael Rich (4:24:45) proposes: Only use phones when teachers tell you that you can

c1x7 c1x7, Robin Novelli (4:25:26) proposes: we can have a rule that they need to be on silent unless told other way to keep them

End of Act

c1x7 c1x7, Robin Novelli (4:26:04) says: wow thats hard

c1x7 c1x7, Robin Novelli (4:26:34) says: maybe they should ignore it unless it becomes a issue

c1y7 c1y7, Michael Rich (4:26:38) says: They should have the right to confiscate them but not hold the whole day.

c1y7 c1y7, Michael Rich (4:27:29) says: Sometimes i have no clue how im getting home and i need my phone to contact my parents

c1x7 c1x7, Robin Novelli (4:28:00) proposes: there should be warnings like 1 then the teacher should confiscate it until the end of class

End of Act

c1x7 c1x7, Robin Novelli (4:28:25) says: not at all

c1x7 c1x7, Robin Novelli (4:28:42) says: we push adults to much

c1y7 c1y7, Michael Rich (4:29:09) says: very true. the full trust should belong to those who earn and deserve it.

c1x7 c1x7, Robin Novelli (4:29:37) proposes: only the right to have phones with a 4.0 gpa average

c1y7 c1y7, Michael Rich (4:29:56) says: grades have nothing to do with character

c1y7 c1y7, Michael Rich (4:30:49) proposes: trust those who earn it and keep up with work. no set specific grade though.

c1x7 c1x7, Robin Novelli (4:31:07) says: yes it does if you care about your grades you care about authority

c1y7 c1y7, Michael Rich (4:31:34) says: not everyone has a 4.0

c1x7 c1x7, Robin Novelli (4:31:44) proposes: a and b grades

c1y7 c1y7, Michael Rich (4:32:04) says: some good students who are hard working and trustworrthy have 3.8 and 3.0

c1y7 c1y7, Michael Rich (4:32:23) says: don‘t be the person who denies them something they clearly deserve

c1x7 c1x7, Robin Novelli (4:32:33) says: that is a good sulution

End of Act

Act 1 Solution:

We can have a rule that they need to be on silent unless told other way to keep them

Act 2 Solution:

there should be warnings like 1 then the teacher should confiscate it until the end of class

Act 3 Solution:

a and b grades

Play 4

C1y2 c1y2, Robin Novelli (5:11:32) says: To be used for educational reasons and to help kids if they are in trouble and need their parent/guardian.

C1y2 c1y2, Robin Novelli (5:12:23) proposes: To be used for educational reasons and to help kids if they are in trouble and are of help from their parent/guardian.

c1x2 c1x2, Michael Rich (5:12:56) proposes: cell phones in schools are used to text others kids which is not supposed to be school.

C1y2 c1y2, Robin Novelli (5:14:09) proposes: To be used by kids fori mprotant reasons not for games and such but to help kids with their research and if they are need of help from a parent/guardian.

End of Act

C1y2 c1y2, Robin Novelli (5:16:05) proposes: Well if a teacher takes a kids phone he should treat it like it is the teahcers phone and treat it with good care. And to make sure nothing bad happens to it and that when it is givin back to the owner it is the way that it was given.

C1y2 c1y2, Robin Novelli (5:17:04) proposes: TREAT THEM NICE AND CLEAN LIKE ITS THEIR PHONE!!!

C1y2 c1y2, Robin Novelli (5:17:30) says: Cellphons

c1x2 c1x2, Michael Rich (5:17:35) proposes: if a teacher caught someone one on their cellphone i would think its fair to take it. but the teacher should give it back at the ed of the class or day. if the student was using the hone as a calculator then it would be fine to have it in class and the teacher should not taake it away. if a teacher takes a phone it should be treated with care

C1y2 c1y2, Robin Novelli (5:17:36) says: =/

End of Act

C1y2 c1y2, Robin Novelli (5:18:18) says: How much should students be trusted to follow guidelines about the use of technology, especially when their actions might make it harder for others to learn?

c1x2 c1x2, Michael Rich (5:19:38) proposes: well i would personally give each student a chance to show that they can handle having a phone in class without it being a distraction. but if they show they cant handle it phones shouldnt be allowed.

C1y2 c1y2, Robin Novelli (5:20:24) proposes: Students should be trusted alot i mean technogy is advanice evyday and it is good for kids to learn and to firgure out what the earth is coming to everyday. And as they use them they learn that what it is like for the technology now. So i think student should be trusted because when they grow up most of their time their work might require alot of technology.

c1x2 c1x2, Michael Rich (5:20:54) proposes: heres something FREE PHONES TO EVERYONE go have fun! BIG DISTRACTION!

C1y2 c1y2, Robin Novelli (5:21:00) proposes: Students should be trusted alot i mean technogy is advanice evyday and it is good for kids to learn and to firgure out what the earth is coming to everyday. And as they use them they learn that what it is like for the technology now.

So i think student should be trusted because when they grow up most of their time their work might require alot of technology.

C1y2 c1y2, Robin Novelli (5:21:20) says: Students should be trusted alot i mean technogy is advanice evyday and it is good for kids to learn and to firgure out what the earth is coming to everyday. And as they use them they learn that what it is like for the technology now. So i think student should be trusted because when they grow up most of their time their work might require alot of technology.

C1y2 c1y2, Robin Novelli (5:21:24) says: Students should be trusted alot i mean technogy is advanice evyday and it is good for kids to learn and to firgure out what the earth is coming to everyday. And as they use them they learn that what it is like for the technology now. So i think student should be trusted because when they grow up most of their time their work might require alot of technology.

C1y2 c1y2, Robin Novelli (5:21:30) says: Students should be trusted alot i mean technogy is advanice evyday and it is good for kids to learn and to firgure out what the earth is coming to everyday. And as they use them they learn that what it is like for the technology now. So i think student should be trusted because when they grow up most of their time their work might require alot of technology.

C1y2 c1y2, Robin Novelli (5:21:40) says: i dont have any more solutions..

c1x2 c1x2, Michael Rich (5:21:43) proposes: students should be given chances to have phones in class but if they are a distraction then no they should not be in classrooms.

End of Act

Act 1 Solution:

To be used by kids fori mprotant reasons not for games and such but to help kids with their research and if they are need of help from a parent/guardian.

Act 2 Solution:

if a teacher caught someone one on their cellphone i would think its fair to take it. but the teacher should give it back at the ed of the class or day. if the student was using the hone as a calculator then it would be fine to have it in class and the teacher should not taake it away. if a teacher takes a phone it should be treated with care

Act 3 Solution:

students should be given chances to have phones in class but if they are a distraction then no they should not be in classrooms.

Play 5

C1Y4 C1Y4, Robin Novelli (6:22:15) says: THEY ARE NOT TO BE OUT AT ANYTIME AT ALL .

c1x4 c1x4, Michael Rich (6:22:59) says: i think the role is to help you with problems by searching them up and also helping you type them with notes and is just a good resource

C1Y4 C1Y4, Robin Novelli (6:24:27) proposes: i think that they should not be out but only out for educational reasons. then they may use them before or after school for their own reason

C1Y4 C1Y4, Robin Novelli (6:25:40) says: i think that they can be used for educational resources but not as for anything else considering music or games .

c1x4 c1x4, Michael Rich (6:26:09) proposes: maybe the teachers can block games and have no texting whatsoever all they are allowed to do is research or get it taken away

End of Act

c1x4 c1x4, Michael Rich (6:27:13) says: teachers can use them for help also

C1Y4 C1Y4, Robin Novelli (6:27:23) says: i think teachers should let students use them but only for educational purposes and not for calling texting music games etc .

C1Y4 C1Y4, Robin Novelli (6:28:37) proposes: that teachers should be able to let the students use cell phones for educational reasons only and have the power to take it away when they are being used for things other than education

End of Act

C1Y4 C1Y4, Robin Novelli (6:30:12) says: i think occasionally they may use their cell phones for a resource but other times for not so they wont get distracted . they may use such as textbooks for another resource

c1x4 c1x4, Michael Rich (6:30:55) says: they should be trusted well because the teachers have allready set up the guidelines and that if they really want to keep their cellphones they will follow the rules

C1Y4 C1Y4, Robin Novelli (6:31:22) says: they may use their cell phones for a resource when the teacher gives them permission to

c1x4 c1x4, Michael Rich (6:31:57) proposes: teachers should keep a good eye on students but should also let them understand boundaries

End of Act

Act 1 Solution:

maybe the teachers can block games and have no texting whatsoever all they are allowed to do is research or get it taken away

Act 2 Solution:

that teachers should be able to let the students use cell phones for educational reasons only and have the power to take it away when they are being used for things other than education

Act 3 Solution:

teachers should keep a good eye on students but should also let them understand boundaries

Play 6

c1y5 c1y5, Robin Novelli (6:42:41) proposes: to use them for calculators or to write down notes so that u don‘t have to carry so much paper

End of Act

c1y5 c1y5, Robin Novelli (6:43:57) proposes: keep them away from other students if taken so that they don‘t take them and if taken keep them on your desk

End of Act

c1y5 c1y5, Robin Novelli (6:45:54) proposes: half and half because there are some students that try and be sneaky so they should only be used for educational purposes

End of Act

Act 1 Solution:

to use them for calculators or to write down notes so that u don‘t have to carry so much paper

Act 2 Solution:

keep them away from other students if taken so that they don‘t take them and if taken keep them on your desk

Act 3 Solution:

half and half because there are some students that try and be sneaky so they should only be used for educational purposes

Play 7

c2y10 c2y10, Robin Novelli (3:10:54) says: to be turned off and used only in the case of an emergency.

c2x10 c2x10, Michael Rich (3:11:19) proposes: the role of cell phones should be to be turned on

c2x10 c2x10, Michael Rich (3:11:36) says:

c2y10 c2y10, Robin Novelli (3:11:56) proposes: turned off amd only be used an emergency

c2x10 c2x10, Michael Rich (3:12:23) says: cellphones cant be used or heard if they are turned off

c2y10 c2y10, Robin Novelli (3:12:41) proposes: only be used with the permission of a teacher

End of Act

c2x10 c2x10, Michael Rich (3:14:19) proposes: i think teachers should let students have and use their cel phones not only at emergencies but as part of the class

End of Act

c2x10 c2x10, Michael Rich (3:16:15) proposes: i think that although the cell phones should take part of the class should be treated as a privilege and be taken away if not used properly

End of Act

Act 1 Solution:

only be used with the permission of a teacher

Act 2 Solution:

i think teachers should let students have and use their cel phones not only at emergencies but as part of the class

Act 3 Solution:

i think that although the cell phones should take part of the class should be treated as a privilege and be taken away if not used properly

Play 8

c2x9 c2x9, Robin Novelli (3:30:38) says: cellphones in school cause a distraction to students because the students are more focused on their phones than they are on their school work

c2y9 c2y9, Michael Rich (3:31:00) says: Cellphones should be allowed in school because it can help kids learn

End of Act

c2y9 c2y9, Michael Rich (3:33:58) says: I dont think teachers should freak out when they see a cellphone. Kids are not always doing something wrong on the phone. I don‘t think they need to take away the cellphone either.

c2x9 c2x9, Robin Novelli (3:36:12) proposes: your teacher could check what you are doing on the phone and if it has nothing to do with the class he or she could tell you to put it away

End of Act

c2y9 c2y9, Michael Rich (3:38:34) proposes: Teachers could monitor them. If they are doing something wrong then they can get in trouble. But teachers should trust them a little.

End of Act

Act 1 Solution:

Act 2 Solution:

your teacher could check what you are doing on the phone and if it has nothing to do with the class he or she could tell you to put it away

Act 3 Solution:

Teachers could monitor them. If they are doing something wrong then they can get in trouble. But teachers should trust them a little.

Play 9

C2 Y8 C2 Y8, Robin Novelli (3:48:02) says: Cell phones can be a major distraction.

C2 Y8 C2 Y8, Robin Novelli (3:48:36) says: And children will only use them to text and use the internet for non-educational purposes.

ctx8 ctx8, Michael Rich (3:49:29) says: to rearch thing (needed for class facts) cell phones also can be used for appropriate times tho

C2 Y8 C2 Y8, Robin Novelli (3:49:54) says: yes but only few students would use it for such purposes.

ctx8 ctx8, Michael Rich (3:50:58) says: but some one can which the and tell some one if being misused

ctx8 ctx8, Michael Rich (3:51:20) says: watch not which

ctx8 ctx8, Michael Rich (3:51:42) says: k

C2 Y8 C2 Y8, Robin Novelli (3:51:56) says: what if there was blocks on certain things so that it is harder to misuse the internet.

ctx8 ctx8, Michael Rich (3:52:06) says: true

ctx8 ctx8, Michael Rich (3:52:25) says: thats what i was trying to propose

C2 Y8 C2 Y8, Robin Novelli (3:52:36) says: then i‘ll propose it.

End of Act

ctx8 ctx8, Michael Rich (3:52:49) says: kool

ctx8 ctx8, Michael Rich (3:53:36) says: fine i mean if theres blocks students can‘t miss use them

C2 Y8 C2 Y8, Robin Novelli (3:53:59) says: cell phones should be monitered and blocked from certain things so that they can be used as more of a reasourse than a distraction.

C2 Y8 C2 Y8, Robin Novelli (3:54:08) says: that‘s my proposal.

ctx8 ctx8, Michael Rich (3:54:20) proposes: teachers should not be worried if there is blocks also used in right timing

End of Act

C2 Y8 C2 Y8, Robin Novelli (3:56:58) proposes: students should be trusted minimully and be monitered closely until they have proven they are completely trustworthy.

ctx8 ctx8, Michael Rich (3:57:27) proposes: depends on how much the students are troublemakers should be watched incase of not making the guidelines but if your trustworthy the is nothing to worry about

End of Act

Act 1 Solution:

Act 2 Solution:

teachers should not be worried if there is blocks also used in right timing

Act 3 Solution:

depends on how much the students are troublemakers should be watched incase of not making the guidelines but if your trustworthy the is nothing to worry about

Play 10

C2y7 c2y7, Robin Novelli (4:10:19) proposes: Not to be used during class or any part of the day until you leave school

c27 c2x7, Michael Rich (4:10:55) proposes: to provide an extra resource, and that sense of reassurance in case of an emergency with permission of a teacher.

End of Act

C2y7 c2y7, Robin Novelli (4:12:09) says: Does this mean how should teachers use phones in class

c27 c2x7, Michael Rich (4:12:25) says: i think so

C2y7 c2y7, Robin Novelli (4:12:35) says: ok Thank You

c27 c2x7, Michael Rich (4:12:44) says: welcome

C2y7 c2y7, Robin Novelli (4:13:01) proposes: I think teachers should have the same rules apply

End of Act

c27 c2x7, Michael Rich (4:14:17) proposes: If in advanced classes, the students should be trusted more with technology than with normal classes.

End of Act

Act 1 Solution:

to provide an extra resource, and that sense of reassurance in case of an emergency with permission of a teacher.

Act 2 Solution:

I think teachers should have the same rules apply

Act 3 Solution:

If in advanced classes, the students should be trusted more with technology than with normal classes.

Play 11

c2y10 c2y10, Robin Novelli (4:29:00) says: students shouldnt be allowed to use them during school hours for learning purposes.

c2x10 c2x10, Michael Rich (4:29:09) proposes: They keep us amused when we dont have anything to do

c2y10 c2y10, Robin Novelli (4:29:30) proposes: the should be able to use then a certain points

End of Act

c2x10 c2x10, Michael Rich (4:30:23) says: They dont need to handled by teachers at all

c2y10 c2y10, Robin Novelli (4:30:24) proposes: they should give warnings then be taken away if students dont listen

End of Act

c2x10 c2x10, Michael Rich (4:31:14) proposes: They should be trusted to the fullest extent possible

End of Act

Act 1 Solution:

the should be able to use then a certain points

Act 2 Solution:

they should give warnings then be taken away if students dont listen

Act 3 Solution:

They should be trusted to the fullest extent possible

Play 12

c2y2 c2y2, Michael Rich (4:41:35) says: I think they are to help st

c2y2 c2y2, Michael Rich (4:42:08) says: I think they dis

c2x11 c2x11, Robin Novelli (4:42:19) proposes: they should help, but children do not focus.

c2x11 c2x11, Robin Novelli (4:42:59) says: they should be banned.

c2x11 c2x11, Robin Novelli (4:44:01) proposes: they should just not bring them.

c2x11 c2x11, Robin Novelli (4:45:43) says: Cellphones do not help students focus.

c2y2 c2y2, Michael Rich (4:45:52) says: They distract students and should not be allowed

c2x11 c2x11, Robin Novelli (4:46:07) says: i agree

End of Act

c2x11 c2x11, Robin Novelli (4:47:04) proposes: they should be taken until the end of the day.

c2y2 c2y2, Michael Rich (4:47:28) says: They should take them away I completely agree with you

End of Act

End of Act

Act 1 Solution:

they should just not bring them.

Act 2 Solution:

they should be taken until the end of the day.

Act 3 Solution:

Play 13

c2y3 c2y3, Robin Novelli (4:57:42) says: emergencys

c2x2 c2x2, Michael Rich (4:58:06) says: the role of cell phones are some what important

c2x2 c2x2, Michael Rich (4:58:22) says: yea I agree

c2y3 c2y3, Robin Novelli (4:58:55) proposes: they can have cellphones in class if they are turned off

End of Act

c2x2 c2x2, Michael Rich (4:59:50) says: teachers should let the students have them but it should be turned off

c2y3 c2y3, Robin Novelli (5:00:20) says: yaeh i agree

c2x2 c2x2, Michael Rich (5:00:29) says: okay

c2x2 c2x2, Michael Rich (5:01:13) proposes: The teachers should let the students have them it just has to be turned off.

End of Act

c2x2 c2x2, Michael Rich (5:02:40) says: Some students can be trusted not all.

c2y3 c2y3, Robin Novelli (5:03:45) proposes: when it is necessary for students to use their phone they should be able to

End of Act

Act 1 Solution:

they can have cellphones in class if they are turned off

Act 2 Solution:

The teachers should let the students have them it just has to be turned off.

Act 3 Solution:

when it is necessary for students to use their phone they should be able to

Play 14

c2y4 c2y4, Robin Novelli (5:47:22) says: to keep students safe.

c2x4 c2x4, Michael Rich (5:47:28) says: cellphones are for researching and projects

c2y4 c2y4, Robin Novelli (5:48:00) proposes: to keep students safe.

End of Act

c2x4 c2x4, Michael Rich (5:48:54) says: let students use them for in school work

c2y4 c2y4, Robin Novelli (5:49:15) says: they shoul d take them away if they are used in class for n school relate stuff.

c2x4 c2x4, Michael Rich (5:49:51) proposes: dont take them to school

End of Act

c2y4 c2y4, Robin Novelli (5:50:26) says: they sholdnt be trusted at all.

c2x4 c2x4, Michael Rich (5:51:22) proposes: they should sign a paper that

c2x4 c2x4, Michael Rich (5:52:12) says: they should sign off that they can use phones for school assignments. NOT FACEBOOK

c2y4 c2y4, Robin Novelli (5:52:21) proposes: they should not use technology unless the teacher says so and they are closley monitored

c2x4 c2x4, Michael Rich (5:52:22) says: OR INSTAGRAM

c2x4 c2x4, Michael Rich (5:52:42) proposes: AGREE

End of Act

Act 1 Solution:

to keep students safe.

Act 2 Solution:

dont take them to school

Act 3 Solution:

AGREE

Play 15

c2y5 c2y5, Robin Novelli (6:01:56) says: To call for Emergencies or looking things up

C2X5 C2X5, Michael Rich (6:02:48) says: I think cellphones have many uses. at school you can take notes, or listen to music if your doing work

c2y5 c2y5, Robin Novelli (6:03:13) proposes: Bring Phones to school if needed to but only use them before or after school

c2y5 c2y5, Robin Novelli (6:04:09) says:

C2X5 C2X5, Michael Rich (6:04:15) proposes: If the teacher allows it, use them to get work done, listen to music to help you concentrate,etc.

End of Act

c2y5 c2y5, Robin Novelli (6:05:12) proposes: They should let us use them if we are searching things up for homework;projects or search up a concept we do not understand

c2y5 c2y5, Robin Novelli (6:05:22) says: . .

C2X5 C2X5, Michael Rich (6:05:35) says: Teachers should not be able to confiscate our items! We bought them!!!! they have no right to take them away!

c2y5 c2y5, Robin Novelli (6:05:55) proposes: We should be able to break them

C2X5 C2X5, Michael Rich (6:06:20) proposes: teachers can‘t take our stuff!

End of Act

c2y5 c2y5, Robin Novelli (6:07:12) proposes: (>‘-‘>) Bruh this is how we do it

C2X5 C2X5, Michael Rich (6:07:33) says: Some kids are immature, and would abuse the right to using cellphones in class..

c2y5 c2y5, Robin Novelli (6:07:50) says: $

c2y5 c2y5, Robin Novelli (6:08:36) proposes: I like potatoes

C2X5 C2X5, Michael Rich (6:08:46) proposes: most teachers wouldnt trust the kids, but they need to!! we come to school to learn. if phones help us, lets use them!

End of Act

Act 1 Solution:

If the teacher allows it, use them to get work done, listen to music to help you concentrate,etc.

Act 2 Solution:

teachers can‘t take our stuff!

Act 3 Solution:

most teachers wouldnt trust the kids, but they need to!! we come to school to learn. if phones help us, lets use them!

Play 16

c2y6 c2y6, Michael Rich (6:19:57) proposes: not to use unless you are using it with a teachers permission

End of Act

c2y6 c2y6, Michael Rich (6:22:26) proposes: cellphones should be treated with respect if a teacher is aloud to use one so should a student what makes a teacher higher in rank than a student

C2x6 C2x6, Robin Novelli (6:22:54) proposes: Teachers should not take them away from us since they are our property. they should just warn us when we have them out or give us an alternative punishment. BUT DONT TOUCH MY PHONE

C2x6 C2x6, Robin Novelli (6:24:23) proposes: what i said before

End of Act

C2x6 C2x6, Robin Novelli (6:25:58) proposes: Students shouldnt be trusted with eletcronics because i know that no matter how hard we try we will be tempted to use them during class.

c2y6 c2y6, Michael Rich (6:26:09) proposes: it depends on who the student is becuz if the student gets in trouble a lot then the student should have a less chance of using it but if the student is a good kid they should be able to use it

c2y6 c2y6, Michael Rich (6:26:41) proposes: what i said before

End of Act

Act 1 Solution:

not to use unless you are using it with a teachers permission

Act 2 Solution:

what i said before

Act 3 Solution:

what i said before

APPENDIX C: STATISTICAL TESTS

Wilcoxin Signed Ranks

NPAR TESTS
NPAR TEST
/WILCOXON promptAgreement_pre perceivedSimalarity_pre WITH promptAgreement_post perceivedSimalarity_post (PAIRED).

		N	Mean Rank	Sum of Ranks
promptAgreement_pre - promptAgreement_post	Negative Ranks	4	8.38	33.50
	Positive Ranks	13	9.19	119.50
	Ties	15		
	Total	32		
perceivedSimalarity_pre - perceivedSimalarity_post	Negative Ranks	19	15.21	289.00
	Positive Ranks	8	11.13	89.00
	Ties	5		
	Total	32		

	promptAgreement_pre - promptAgreement_post	perceivedSimalarity_pre - perceivedSimalarity_post
Z	-2.10	-2.42
Asymp. Sig. (2-tailed)	.04	.02

Mann Whitney U

NPAR TESTS
NPAR TESTS
/MANN-WHITNEY = perceivedSimalarity_pre BY player_char (1,2).

	N			Mean Rank		Sum of Ranks	
	1	2	Total	1	2	1	2
perceivedSimalarity_pre	16.00	16.00	32.00	13.41	19.59	214.50	313.50

	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
perceivedSimalarity_pre	78.50	214.50	-1.88	.06

NPAR TESTS
/MANN-WHITNEY = promptAgreement_pre BY player_char (1,2).
Ranks

	N			Mean Rank		Sum of Ranks	
	1	2	Total	1	2	1	2
promptAgreement_pre	16.00	16.00	32.00	20.00	13.00	320.00	208.00

	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
promptAgreement_pre	72.00	208.00	-2.17	.03

Spearman's

Results of Spearman's Test of Linear Correlation for "Solutionsucess" vs "presence"
p value: 0.044
Spearman's R statistic: 0.359
Degrees of Freedom (df): 30

Results of Spearman's Test of Linear Correlation for "Solutionsucess" vs "Char_Prompt"
p value: 0.006
Spearman's R statistic: 0.471
Degrees of Freedom (df): 30

Results of Spearman's Test of Linear Correlation for "Solutionsucess" vs "Char_Question"
p value: 0.002
Spearman's R statistic: 0.537
Degrees of Freedom (df): 30

Results of Spearman's Test of Linear Correlation for "Solutionsucess" vs "Char_Character"
p value: 0.010
Spearman's R statistic: 0.448
Degrees of Freedom (df): 30

Results of Spearman's Test of Linear Correlation for "Solutionsucess" vs "Char_Up"
p value: < 0.001
Spearman's R statistic: 0.623
Degrees of Freedom (df): 30

Results of Spearman's Test of Linear Correlation for "perceivedSimilarity_Pre" vs "Wishfulid_Pre"
p value: < 0.001
Spearman's R statistic: 0.711
Degrees of Freedom (df): 30

Results of Spearman's Test of Linear Correlation for "perceivedSimilarity_post" vs "Wishfulid_Post"
p value: < 0.001
Spearman's R statistic: 0.753
Degrees of Freedom (df): 30

APPENDIX D: RAW DATA

Pre-task Questionnaire Data

case	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13
1	1	4	4	4	1	4	4	4	4	2	4	2	4
2	4	2	3	4	5	1	2	5	4	5	3	2	2
3	2	2	3	1	3	1	3	4	3	2	2	3	2
4	5	2	1	3	3	2	3	4	4	2	4	4	2
5	4	1	3	3	5	4	3	5	3	3	2	3	2
6	3	2	4	3	2	3	3	4	3	4	4	5	3
7	4	2	4	2	5	2	4	4	4	4	2	3	2
8	2	3	1	2	1	3	3	4	3	1	2	1	3
9	2	4	3	3	1	3	3	3	3	3	3	3	3
10	1	4	3	4	3	4	4	4	4	3	4	3	3
11	3	1	2	2	1	3	2	2	2	3	2	1	2
12	4	2	4	2	3	2	2	1	3	2	2	4	2
13	2	1	3	4	2	1	2	4	2	2	3	2	1
14	1	1	4	2	3	2	3	4	3	2	3	1	2
15	5	4	4	3	5	4	4	4	4	5	4	4	3
16	2	3	4	4	4	3	3	4	4	4	4	5	3
17	1	3	5	3	1	3	2	5	4	1	3	5	3
18	5	3	4	2	5	2	3	4	3	5	4	5	2
19	1	4	2	3	2	3	4	4	4	2	4	3	4
20	5	1	4	2	3	2	1	3	3	2	2	2	3
21	1	4	4	3	5	4	3	4	4	4	4	5	4
22	3	2	3	2	5	2	3	3	3	4	2	5	3
23	5	3	4	2	2	3	3	4	4	2	4	4	4
24	2	4	1	1	1	4	4	4	4	1	4	2	4
25	2	2	3	2	3	2	2	4	4	3	4	3	2
26	2	3	4	3	4	3	2	3	3	4	3	5	3
27	1	3	4	2	1	3	3	4	4	3	3	3	2
28	3	3	2	4	5	4	3	4	4	5	4	4	3
29	2	2	4	1	1	2	3	3	2	3	2	4	2
30	5	2	5	2	1	2	3	4	3	1	2	4	2
31	3	2	2	1	2	1	1	3	2	4	2	3	2
32	2	3	3	4	2	4	3	4	4	3	4	2	4
33	1	4	1	2	4	4	4	5	4	2	4	1	5
34	1	1	4	1	5	1	1	5	1	4	1	5	1
35	3	2	1	1	1	1	1	4	3	1	1	4	2
36	3	2	2	1	4	2	3	4	3	4	3	4	2
37	3	4	5	1	5	4	1	3	3	5	1	5	3
38	1	5	3	1	2	3	1	3	3	1	3	2	1

Post-task Questionnaire Data

case	pq1	pq2	pq3	pq4	pq5	pq6	pq7	pq8	pq9	pq10	pq11	pq12
1	4	4	1	4	5	5	3	4	3	3	4	4
2	3	1	2	2	4	1	1	3	1	3	1	3
3	2	2	2	3	4	3	2	4	2	3	2	4
4	2	4	3	2	5	3	1	4	2	4	3	5
5	4	3	2	3	5	3	2	4	2	5	4	3
6	3	4	1	4	4	4	3	4	4	4	3	4
7	4	4	2	4	4	3	3	4	4	3	2	4
8	5	5	3	3	5	5	2	3	4	5	3	4
9	5	5	5	5	3	3	3	5	5	5	5	5
10	5	4	1	4	2	1	4	4	5	4	4	4
11	2	2	2	2	2	2	2	3	2	3	2	2
12	2	3	4	3	3	2	2	4	3	4	4	3
13	4	5	1	1	4	1	3	3	2	4	2	5
14	5	5	1	3	4	4	3	2	4	4	3	5
15	3	4	3	4	4	3	3	4	3	4	4	4
16	4	3	2	4	4	4	3	2	3	4	4	4
17	1	1	1	1	3	1	1	5	1	1	1	1
18	4	3	1	4	5	1	3	4	2	5	5	5
19	5	5	1	3	3	5	3	3	3	3	3	3
20	4	3	3	3	4	3	3	3	4	4	4	5
21	2	4	1	4	4	5	3	4	4	4	4	3
22	3	2	2	2	3	2	2	4	2	4	2	3
23	3	4	3	4	4	4	2	3	4	5	4	4
24	4	5	1	5	5	5	3	5	5	5	4	5
25	2	4	1	2	4	2	2	2	2	3	2	4
26	4	5	1	4	4	4	3	2	4	4	5	5
27	5	5	1	3	3	5	3	3	3	3	3	3
28	4	3	3	3	4	3	3	3	4	4	4	5
29	3	2	3	2	4	3	2	3	1	3	3	4
30	2	2	5	2	4	2	1	4	2	2	2	1
31	4	2	3	2	4	2	1	3	2	3	2	2
32	4	4	1	4	4	4	2	4	4	4	4	4
33	1	1	1	3	1	4	2	4	2	1	3	4
34	5	1	1	1	5	1	1	1	1	4	1	1
35	3	2	3	1	3	2	2	3	1	4	1	2
36	2	3	2	3	4	2	1	4	2	5	2	4
37	3	3	4	2	4	4	1	5	1	4	1	4
38	3	3	1	3	3	3	1	5	3	3	1	3

Play Data

case	play	player_char	solutionSucess	char_up	char_solution	char_prompt	char_character
1	10	2	3	0	2	2	0
2	10	1	3	1	7	3	3
3	11	2	1	0	1	0	0
4	11	1	1	0	0	0	0
5	12	1	3	0	0	0	0
6	12	2	3	1	0	2	0
7	13	2	3	0	1	0	0
8	13	1	3	0	7	1	2
9	14	2	2	0	4	1	0
10	14	1	2	0	2	0	0
11	15	1	3	0	1	0	0
12	15	2	3	0	0	0	0
13	16	1	2	0	0	0	0
14	16	2	2	0	0	0	0
15	17	1	3	0	1	1	1
16	17	2	3	0	0	0	0
17	18	2	3	1	0	0	0
18	18	1	3	0	0	0	0
19	19	2	3	0	0	0	0
20	19	1	3	0	0	0	0
21	20	2	2	0	0	0	0
22	20	1	2	0	2	0	1
23	21	1	2	0	0	0	0
24	21	2	2	0	1	0	0
25	24	1	3	0	1	1	1
26	24	2	3	0	0	0	0
27	25	2	3	0	0	0	0
28	25	1	3	0	0	0	0
29	26	1	2	0	1	1	2
30	26	2	2	0	0	0	0
31	27	1	3	0	0	0	0
32	27	2	3	0	0	0	0
33	28	2	3	0	4	2	3
34	28	1	3	0	0	0	0
35	30	1	3	2	9	1	1
36	30	2	3	0	1	1	1
37	31	1	3	1	1	0	0
38	31	2	3	1	8	0	0

Character identification and Presence

case	perceived Simalarity _pre	perceivedSimalarity_post	wishful ID_pre	wishfulID_post	immersionTend	embodied Presence	deltaAgreementAbs	deltaAgreement
1	16	16	8	7	9	3	0	0
2	9	6	7	2	15	3	2	2
3	8	11	3	4	11	1	0	0
4	10	14	7	4	10	2	2	2
5	10	11	5	6	14	5	2	2
6	11	16	7	6	15	3	2	2
7	10	15	4	5	16	3	2	2
8	12	18	4	5	4	7	1	-1
9	13	18	6	8	10	5	3	-3
10	15	14	8	8	12	5	0	0
11	8	8	4	4	7	2	1	1
12	9	11	4	6	13	2	0	0
13	5	13	7	5	9	5	1	1
14	8	18	5	6	10	7	0	0
15	15	14	7	7	18	3	2	2
16	13	14	8	7	17	6	0	0
17	13	4	6	2	12	-3	0	0
18	10	11	6	8	19	5	4	4
19	15	16	7	6	9	5	0	0
20	9	15	4	7	11	5	2	2
21	16	16	7	7	18	2	0	0
22	10	9	4	4	17	3	1	1
23	14	16	6	6	12	5	2	2
24	16	20	5	7	5	4	1	1
25	10	12	6	4	12	3	1	1
26	12	18	6	8	17	6	1	1
27	12	16	5	6	11	5	0	0
28	14	15	8	7	16	5	0	0
29	8	10	3	5	12	3	1	-1
30	9	7	4	3	11	0	0	0
31	7	8	3	3	11	4	0	0
32	15	16	8	6	10	4	1	1
33	17	11	6	5	8	-2	0	0
34	4	4	2	2	18	8	0	0
35	8	7	2	3	7	4	0	0
36	9	11	4	3	14	3	1	1
37	14	12	2	2	20	2	1	-1
38	12	12	4	2	8	1	0	0

APPENDIX E: IRB APPROVAL

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Robb W. Lindgren** and Co-PIs: **Charles E. Hughes, Eileen M. Smith, Jack M. Moshell, Shaun Gallagher**

Date: **January 17, 2013**

Dear Researcher:

On 1/17/2013, the IRB approved the following minor modifications to human participant research until 07/19/2013 inclusive:

Type of Review:	IRB Addendum and Modification Request Form
Modification Type:	This year, research will take place at the Orlando Science Center, in addition to the Museum of Science and Industry in Tampa. A version of the science learning simulation includes "force feedback" and a description of the device and effect on participant is explained. Revised Informed Consent documents (museum and lab versions) have been approved for use. Dr. Michael Tscholl and Carolyn Glasshoff are being added to the study as research associates.
Project Title:	Full Study: Metaphor-Based Learning Through Whole-Body Interaction in a Mixed Reality Science Center Experience
Investigator:	Robb W Lindgren
IRB Number:	SBE-11-07772
Funding Agency:	National Science Foundation
Grant Title:	Metaphor-Based Learning of Physics Concepts through Whole-Body Interaction in a Mixed Reality Science Center Exhibit
Research ID:	1051278

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

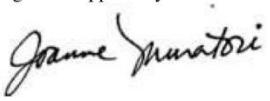
If continuing review approval is not granted before the expiration date of 07/19/2013, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 01/17/2013 02:59:01 PM EST



IRB Coordinator

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