A Funny Thing Happened on the Way to the Hippocampus:

The Effects of Humor on Student Achievement and Memory Retention

by

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ABSTRACT

Research literature relating to the use of humor as a teaching method or curricula specifically designed to include humor was reviewed to investigate the effects of humor on student learning in various environments from elementary schools to post-secondary classrooms. In this multi-method study, four instruments and a humor treatment were selected to test the hypothesis that students who receive humor-embedded instruction would perform better on assessments than students who did not receive humor instruction. These assessments were analyzed to show student growth in achievement and memory retention as a result of humor-embedded instruction. Gain scores between a pre-test and two post-tests determined student growth in achievement and memory retention. Gain scores were triangulated with student responses to open-ended interview questions about their experiences with humor in the classroom. The gain score data were not statistically significant between the humor and non-humor groups. For the short-term memory gain scores, the non-humor group received slightly higher gain scores. For long-term memory gain scores, the humor group received higher gain scores. However, the interview data was consistent with the findings of humor research from the last 20 years that humor improves learning directly and indirectly.

DEDICATION

"Among those whom I like or admire, I can find no common denominator, but among those whom I love, I can: all of them make me laugh."
W. H. Auden

I would like to dedicate this Doctoral dissertation to my mother, Dr. Martha Rogers McCartney. There is no doubt in my mind that I could not have completed this odyssey without her perpetual guidance and generosity. A trailblazer in the field of physics, she instilled her commitment to education and research in her children. For us, she set lofty expectations and had the utmost confidence that we would achieve every one. She made the impossible possible. She made dreams come true. Thank you for a life of filled with love, kindness, and an abundance of laughter.

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"A sense of humor is part of the art of leadership,
of getting along with people, of getting things done"
Dwight David Eisenhower

I would never have been able to finish this dissertation without the guidance of my committee, help from my friends, and support from my family. I am most grateful for the sense of humor of all of those who helped me achieve this goal.

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TABLE OF CONTENTS

Page

LIST OF TABLES

TABLE PAGE

TABLE OF FIGURES

CHAPTER 1: BACKGROUND

Introduction

The impetus for this study was born in a teacher's lounge. As I scooped a heaping spoonful of enchilada casserole onto my luau-themed paper plate, the teacher behind me in the buffet line leaned over to say, "Sounded like there was a lot of fun going on in your room today. I wish I could do that in my classes, but we just don't have time to laugh." I stared back at her, in her Hawaiian shirt draped in a multi-colored, plastic flower lei, and wondered who was doing something wrong. *Was it me? My classes and I laugh all the time. Was I wasting time? Should I be spending the time covering the material more seriously?* Then, I wondered if it was she who was making a mistake by not making time for fun. On that day, in the teacher's lounge strewn with streamers and tiki cups, I began to wonder if fun still has a place in the 21st century classroom. Irony was not lost on that day when we, the adults, had all taken time out of our heavily laden schedules to enjoy each other and, I dare say, laugh with each other. We made fun a priority for each other, feeling this opportunity would make the environment more enjoyable. Yet, we restrict the same activities with our students as their precious learning time would be wasted. But, what if laughing isn't time wasted? What if it makes students smarter, more creative, or more efficient learners? What if fun was valuable and a priority in education?

Statement of Problem

A recent report by the New York Department of Education ("The impact of high-stakes exams on students and teachers", 2004) states an increased importance placed on high-stakes standardized tests in the 21st century

classroom has heavily burdened teachers and administrators with deadlines, assessments, and constraints of accountability. Constantly under the anxiety of the next approaching benchmark test, teachers and students often are rushing through content to meet or exceed the assessed standards in an effort to make the best use of limited class time. As a result, curriculum and teaching methods also have become standardized and streamlined. In order to accommodate the time to cover the standardized curriculum, recess and playtime have been eliminated from many districts at the detriment of children's physical and mental health (Jacobson, 2008). The current U.S. administration recently proposed extending the school day and/or year to keep our students competitive on a global stage (Obama, 2009). Many teachers, some at the behest of school administrators who are also under tremendous pressure, have eliminated humor and other teaching strategies that might generate higher interest in their curricula. Instead, they have adopted more serious and straightforward methods. Some teachers are accused of "teaching to the test" and students are expressing concern solely for the content of the test (Longo, 2010). The researcher in this study believes that the loss of humor in classroom instruction may be stunting the social and emotional growth of students.

The correlation of humor and cognitive growth in students is often overlooked, underestimated, or disregarded as silliness. Controversy exists in educational circles about whether humor-embedded instruction helps or hinders the learning environment. Past research has examined teacher perceptions of their use of humor in the classroom and student perceptions of humor. However, little research has been conducted to determine to what extent humor affects

learning and memory. Some literature shows using humor to teach content can be an effective tool that aids in retention and student motivation (Garner, 2007; Mobbs, Hagan, Azim, Menon, & Reiss, 2005).

Research on the use of humor in the classroom is riddled with dissenting opinions. Some say humor is distracting, some remember humorous instruction as the best they ever received, and still others say it is a liberating and creative activity (Bradford, 1964; Wandersee, 1982; Zigler & et al., 1966). Previous research on humor-embedded instruction found a variety of benefits ranging from improvement in classroom tension, student enjoyment and understanding, and aid in providing clarity in a confusing world. Researchers found additional benefits of humor in the classroom: instruction was easier for students to grasp, learning was more personal and enjoyable, and the mental faculties of the students improved (Minchew & Hopper, 2008; Pomerantz & Bell, 2007; Wandersee, 1982). Supporters of humor in instruction claim it helps create a more positive classroom environment. Bradford (1964) explains students learn more in enjoyable environments and less if they are miserable; knowledge gained in a positive, pleasurable environment "is better learned, is more surely and usefully and enduringly learned" (p. 67). Further, proponents of humor cite benefits beyond the classroom walls.

Proponents of humor-embedded instruction believe students emerge from the classroom more able to confront a difficult world and humor creates a healthier society. Classrooms not only provide students the setting for content learning but also social education. The student educated with humor "recognizes the insanity and instability of the world around him, he comments upon that

world from a secure, superior point of view, confident of the validity of his own standards" (Hill, 1963, p. 171). Humor provides the ability to recognize the absurdities and inconsistencies of the world from a distance. Humor portrays an optimistic view of the world that aids individuals when they find themselves amongst the insecurities and instabilities of the world (Gordon, 1958). The person who understands humor does not turn a blind eye to the injustices of society, but rather stares head-on at them then openly mocks the injustices. Students who understand or use humor are more prepared individuals in society.

Not all scholars believe humor-embedded instruction is beneficial to students' cognitive and social development. Contradictory research finds humor has negative consequences for the classroom climate. Even if teachers feel instruction can be both fun and serious, believing these terms are not mutually exclusive, the students may not recognize the balance; students see there can be humor or serious work, but not both (Sudol, 1981). Scholars, such as Sudol, believe that teachers who employ humor lose control of their students and their classrooms become chaotic and silly.

Purpose of Study

Research suggests students engaged in a lesson demonstrate increased motivation to learn, willingness to participate, and increased comprehension (Minchew & Hopper, 2008). The effect of humor is consistent across subject matter, including math, science, foreign languages, and English (Gadanidis, Gadanidis, & Huang, 2005; McMahon, 1999; Minchew & Hopper, 2008; Pomerantz & Bell, 2007; Weitkamp & Burnet, 2007).

The purpose of this research is to examine the effects of humor-embedded instruction on student achievement and memory retention in a post-secondary classroom. This study will explore if there is a significant difference in gain scores between students who do and do not receive humor-embedded instruction. Findings from this study will probe into the relationship between humor and engagement, motivation, memory retention, and enjoyment.

Research Questions

- How does humor-embedded instruction affect learning in post-secondary classrooms?
- How will students who receive humor-embedded instruction achieve on post-tests that indicate achievement compared to students who do not receive humor-embedded instruction?
- How will students who receive humor-embedded instruction score on post-tests that indicate memory retention compared to students who did not receive humor-embedded instruction?
- What do students self-report concerning humor, achievement, and memory retention on open-ended interview questions?

Definition of Terms

Term	Definition
Achievement	Student performance on post assessments
Cognition	The act or process of knowing; perception
Cognitive Development	The process of acquiring intelligence and increasingly advanced thought and problem solving ability from infancy to adulthood
Comedy	The act of striving to provoke smiles and laughter using both wit and humor
Comic Effect	Effect arising from a recognition of some incongruity of speech, action, or character (Holman & Harmon, 1992)
Differentiated Instruction	Instruction that matches the student's readiness, interest, and preferred mode of learning.
Embed	To incorporate or contain as an essential part or characteristic
Humor	A comic, absurd, or incongruous quality causing amusement Humor may include an unexpected future, a pleasant surprise, or emotional chaos remembered in tranquility (Sultanoff, 2002)
Humor-embedded Instruction	Comic stimuli, like word play or cartoons, embedded in a lesson or presentation
Motivation	A student's interest, desire, compulsion, and need to participate in and be successful in the learning process
Memory Retention	The ability to store, retain, and recall information for a duration of time
Sarcasm	A mode of satirical wit known for its effect on bitter, caustic, and often ironic language that is usually directed against an individual (Merriam-Webster, 2010)
Satire	A work or manner that blends a censorious attitude with humor and wit for improving human institutions or humanity. Satirists attempt through laughter not so much to tear down as to inspire a remodeling (Holman & Harmon, 1992)
Social Network	A social structure made of individuals connected by one or more types of interdependency, such as friendship, common interest, financial exchange, knowledge, and prestige

Abbreviations Used

Abbreviation	Term
ANOVA	Analysis of variance which provides a statistical test of whether of not the means of several groups are equal
ARCS	Pseudonym for proprietary technical school for digital entertainment certification
ASU	Arizona State University
T-Test	Assesses whether the means of two groups are statistically different from each other

Limitations

This study may have several internal aspects that could invalidate the results.

Namely:

1. The number of participants is relatively small: one teacher in the pilot, two teachers in the study.
2. The sense of humor of each teacher varies.
3. The number of test items is relatively small to determine the range of gain scores.
4. The students have not been selected for their homogeneous academic ability. The achievement level of the students differs within a class, across classes, and within a school. Gain scores will be analyzed to reduce the threat of attributing higher achievement to groups with higher prior knowledge.
5. Randomized order of treatments will be used to reduce threats based on order effect. Each instructor will teach the humor-embedded lesson in the

morning and the afternoon. The order will be randomized to prevent biasing the study to the strength of the teacher (i.e. teaches with more energy in the morning).

6. This study cannot attempt to control the unavoidable and unpredictable occurrences in an operating school setting. Lessons may be interrupted due to schedules, fire alarms, a sick teacher, or any number of normal events.
7. Student absences also cannot be controlled for this study. Students may not be present for pre-tests, post-tests the presentation, or the interview that follows. Students may take the tests at a later date outside the controlled testing environment, but interviews will not be repeated.

Delimitations

This study was conducted with students enrolled in a post-secondary technical school. This study represents small schools; the school selected has a population of approximately 450 students. The findings and results may not generalize schools in areas of high socioeconomic status, inner cities, or areas with high minority populations whom the Phoenix population does not represent. This study does not represent schools with geography that vastly differs, such as schools in rural or densely populated areas. However, the themes of this study — humor's relationship to achievement, enjoyment, and memory retention — may be assumed to apply in a wide variety of classroom settings.

Significance of Study

This study will help administrators expand their definitions of what are "best teaching practices." Humor used as intended in this study may be used to

increase student achievement rather than distract from the learning environment. Professional development designers may also use humor to expand the teaching tool kit they provide to teachers.

Summary

Students sit in rows at tables facing forward as the teacher stands before them. The students are quiet and attentive, looking at the teacher and the PowerPoint of the branches of government projected just behind his outstretched, gesturing arm. The administrator standing at the door nods his head in approval as he observes this picture of learning, this ideal classroom. *There is clearly learning going on here*, he thinks to himself. The administrator is suddenly distracted by a burst of uproarious laughter two doors down the hall. He peers through the 5" by 14" window in the door to find two students at the front of the classroom. The teacher stands at the back near a student's desk. The teacher is smiling, laughing, and wiping tears from her cheeks. Like the teacher, the class is laughing. One student is nearly doubled over in his chair. All students are engaged and attentive to the humorous presentation. *There's clearly learning going on here,* the administrator thinks to himself and makes a mental note to applaud both teachers later that day.

As a result of this study, administrators may walk the halls of school and hear laughter streaming through the doorways, but not suspect horseplay or a disregard for studies. They will, instead, be relieved to know learning, not mischief is occurring as students receive social and academic education. Administrators will encourage teachers to receive training on how to incorporate humor in classroom presentations and material. Humorous students will be

rewarded for showing they understand the material by making a joke, rather than penalized for being a distraction. As a result of this study, teachers and administrators will understand the relationship between humor and critical thinking and, ultimately, student achievement.

CHAPTER 2: LITERATURE REVIEW

Introduction

This study builds upon the historical definitions of humor and evolution of the definition of humor. The current research is founded upon research regarding children's and adult's cognitive, social moral and humor development. This study links those areas of research to the development of students as it relates to academic achievement and humor-embedded lessons. This study also examines dissenting opinions about the use of humor in the classroom. Those who support instruction with humor believe it engages students, increases motivation, creates a positive classroom environment, and helps create a healthy society of creative thinkers. Those who oppose humor instruction believe humor fosters juvenile, chaotic environments where students may feel loss of dignity or exclusion.

Historical Perspectives on Humor

In ancient Greece, a person's temperament was said to be controlled by the four humors: yellow bile (irritability), black bile (melancholy), green bile (sluggishness), and blood (cheerfulness). When a person was in balance, they had "good humor" and to achieve this balance, the prescription was laughter (Slade, 1996). Medical research shows laughter can still bring one into "balance" by reducing stress. The brain releases opiates, which regulate stress caused by the production of adrenaline, vasopressin, and cortisol (Jensen, 1998). The release of opiates is triggered by pleasurable experiences, like laughter. This study operates on the definition humor is a comic, absurd, or incongruous quality

causing amusement. Laughter is a physical reaction to this quality. The term "comedy" has evolved just as the concept of humor has changed.

The definitions of humor and comedy have changed as societies' need and desire for humor and comedy have evolved. Dante Alighieri called his stories of a man who searches through hell and back for his one true love "The Divine Comedy." Hardly thigh-slapping, uproarious laughter material, these stories were called comedies simply because they started in sadness and moved toward a brighter ending. Donelson (1974) agrees humor is the shinier side of the tragedy coin, but he believes humor exists because it is necessary for man. Man needs and enjoys it. In literature, the hero gets defeated in the tragedy. However, in the comedy, a man may take a beating, but rises above it (Gordon, 1958). Through the educational lens, students face many challenges: academic, social, economic, and others. Using humor helps students learn a coping skill that helps them rise above the challenges (Aldridge & Roesch, 2008; Erickson & Feldstein, 2006).

Humor has come to represent more than the ability to make one laugh; it has become an instrument of learning, thinking, and humanizing. Laughter alone is not enough. The goal should be to make one think. Humor may have a triple purpose: the reforming of society, the burgeoning of self-knowledge, and the presenting of an optimistic view of life (Gordon, 1958). Humor is not a magic pill that makes us feel better simply because we laughed (while there is some neuroscience to prove this). Humor is a pill swallowed when we see the incongruities and absurdities in others and ourselves (Chik, Leung, & Molloy, 2005; Gadanidis et al., 2005; Hall, 1969; Uekermann, Daum, & Channon, 2007).

Others define humor as a more universal understanding and expect this enlightenment to reach their students. "My students learn that humor is an important means of discovering profound truths" (McMahon, 1999, p. 70). Often, classrooms are focused on the dull, dark tragic side of the coin. By neglecting humor, students may miss profound truths by not looking at both sides of the same coin.

Webster's dictionary defines humor as "quality of imagination quick to perceive the ludicrous or to express itself in an amusing way; fun; caprice; disposition; mood; state of mind." Humor can further be examined in terms of high and low humor. High humor is exemplified by *New Yorker* magazine*,* whose urbane, sophisticated, witty humor is tinged with the insanity and despair or contemporary society (Hill, 1963). Low humor is telling jokes or funny stories, clowning around, and teasing or being sarcastic (Sudol, 1981). This study will incorporate both high and low humor in language play as appropriate to the context and approximate cognitive development of students.

"Humor needs to be taken seriously. Few people are changed by being objects of anger, but very few can stand being thought objects of comedy" (Gordon, 1958, p. 128). So often humor is mistaken as playing, time-wasting, non-academic fluff. Laughter is learning. Understanding a joke means the student is "getting it." The audiences of satirical television shows like "Saturday Night Live" and "The Daily Show" were "getting it" during the election and their responses changed political behavior of many American voters. Getting a joke operates on two levels: cognitive processing and emotional processing (Slade, 1996). The person must have the cognitive ability to recognize the incongruity

and resolution of the joke and the personal experience, cultural understanding, and personal appraisal of the joke to "get it" (Watson, Matthews, & Allman, 2006). Understanding the absurdity and recognition of the incongruity results in good memory of the material (Schmidt & Williams, 2001).

No one definition of humor completely encompasses its many aspects. This study will not attempt the albatross of exploring the unexplored field of humor. It will not attempt to answer questions about humor: What is funny? What is laughter? What is a joke? This study will examine humor in one small aspect: the effect, if any, humor has on learning.

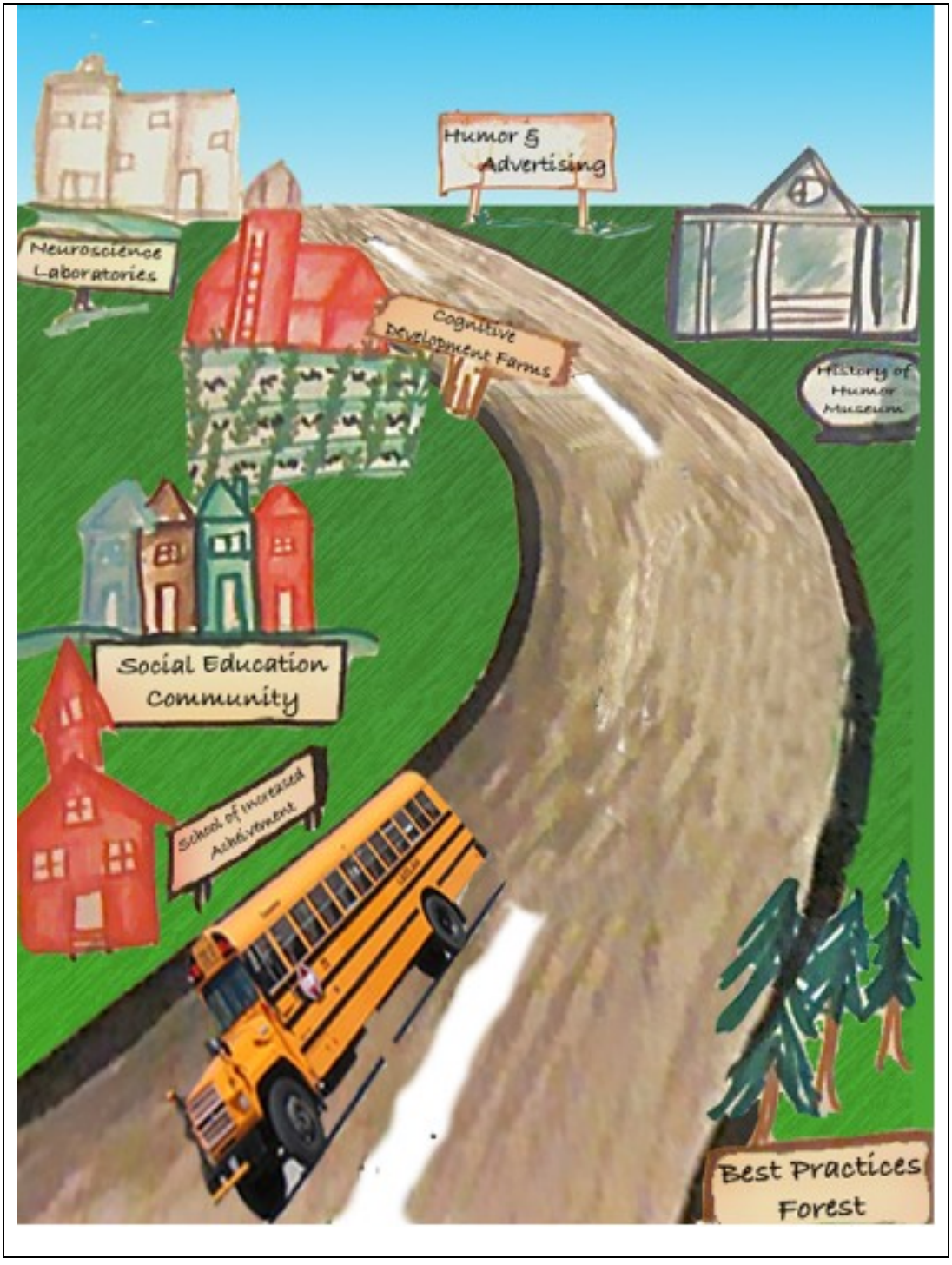
Research on Humor and Learning

Humor and neuroscience. During the past decade, the amount of research on humor and learning in the field of neuroscience has increased considerably. Scientists are beginning to have a better grasp on the connection between humor, emotional states, and memory. Recent brain imaging shows humor activates the ventral tegmentum, ventral striatum, and areas associated with emotion and reward processing (Watson et al., 2006). Stress and perceived threats greatly impact the ability of the brain to process information reliably. Therefore, stress-reducing behaviors such as play and humor are now being recognized by brain researchers as strategies to increase student engagement and recall. Further, reducing threat stress by encouraging humor fosters creativity (Jensen, 1998). Additional research shows the personality type of the person correlates to humor appreciation. Increased activity in the mesocortical-mesolimbic reward circuitry of the right orbital frontal cortex occurs more in subjects whose personality dimensions are extroversion and emotional stability

(Mobbs et al., 2005). Subjects whose personalities are more extroverted have more positive responses to humor stimuli than their introverted peers.

More educational research on the relationship between memory and humor and their effects on learning is needed. Scientists are beginning to see the essential role of the hippocampus for learning new information as it consolidates short-term memories to long-term memories. More research on humor and the hippocampus may reveal a relationship. Research has found participants recall humorous stimuli better than literal stimuli (Schmidt & Williams, 2001).
The business community has been studying this relationship between humor, memory, and product preference for some time. This research includes business and advertising studies because in some ways curriculum is a product that teachers are trying to sell to their customers, the students, every day. One study in the business community, used a humorous and a non-humorous cartoon to sell two different products. The study resulted in better ratings and more consumer preference for the product paired with the humorous cartoon. However, the effect on memory was not significant, meaning that over time perfect choice was not enhanced by humor in advertisement (Strick, van Baaren, Holland, & van Knippenberg, 2009). In terms of education, while enjoyment and preference are important, learning, memory, and growth in achievement are more essential.

Figure 2.1 Roadmap of Literature Review



Cognitive development theory & humor. The cognitive development of children has been studied much in the past century. Piaget delineated early childhood development into four stages: sensory-motor, pre-operational, concrete operational, and hypothetic-deductive operational (Piaget, 1964). These stages and sequences of cognitive and personality development coincide with and overlap the research of other theorists discussed in this chapter. Piaget's stages of development also denote language development. At the final stage of development, children are able to hypothesize and create new operations of propositional logic. All students, as late teens or adults, are expected to have fully developed cognitively to this point.

At this stage, students make logical hypotheses about operations and situations. Understanding humor requires a logical hypothesis and ability to identify and resolve the presented incongruity. Current research shows cognitive flexibility and analytical reasoning declines in older adults. This cognitive regression affects humor comprehension in adults (Carpenter, 2007). Researchers have since built upon Piaget's stages of development and have explored further upon the language and logic components.

Moral development & humor. Kohlberg (1972) expanded Piaget's developmental theory by introducing the concept of justice and ethics to explain the continuum of moral reasoning development. Kohlberg defined six stages of moral development. Kohlberg's research in moral reasoning began where Piaget's reason development research finished. The first stage is punishment and obedience orientation. The student makes decisions based on observed consequences in the environment. Through the lens of humor, observations may

find students at this stage do not want to get into trouble by making a joke or by being seen as misbehaving. The possible reaction to humor-embedded instruction may be that a student feels uncomfortable when there is laughing in school and/or feels as though they are misbehaving.

In stage two, a person responds to a situation based on what they think they can get out of it. This egocentric perspective of moral development and instrumental relativism of rights focuses on human relations about what is right or fair is determined by reciprocity. One hand helps the other. In terms of humor, this may be present with joking with peers, especially with comebacks. If one student makes a joke about another student, the second student may interpret the fair action is to make a joke in return. Students at this stage make their own jokes in response to an instructor who delivers a joke.

The third stage is the orientation to social order of rules and rights. At this stage, students adhere to the rules and are obedient. In classrooms, where humor and laughter were previously punishable, adopting humor instruction should be done carefully and gradually. Students at this stage base their moral sense of rightness on rules. Rules are fair because they are rules. At this stage students find out of order classrooms to be uncomfortable and will try to right the social order by enforcing established rules.

The students in the present study are adolescents and young adults. They are predicted to be as developmentally mature as the remaining stages defined by Kohlberg, which occur during late teens through twenties. The fifth stage, the social-contract legalistic orientation, and the sixth stage, universal ethical-principle orientation, operate on the ethical values of the individual

outside of social conforms. Therefore, the moral development level of the student is confined to operations of social order.

A student of John Dewey, Kohlberg based his work on the Deweyian premise "Education is the work of supplying the conditions which will enable the psychological functions to mature in the freest and fullest manner" (Kohlberg, 1972, p. 2). This study is also based on Dewey's premise that school is a place to foster moral, social, and intellectual growth (Dewey, 1909). Teaching with humor appropriately at the moral, developmental stage of the students helps them learn to treat others more ethically.

Humor development. Research in the field of cognitive child development has included the developing sense of humor. McGhee, (1971) found there are several stages of humor development from infancy to late childhood. While early stages will not be observed in this study, it is important to review building blocks of development. The first stage is laughter without humor, which occurs in infancy. Then, children show laughter at an attachment figure like a parent playing peek-a-boo. More advanced stages begin to incorporate language. Children laugh at incongruities, like misnaming objects and teachers who dress as characters. While this stage is below the predicted level of students in the study, observations of behavior at this developmental stage are likely because humor development builds on the previous stages. Some early humor stimuli remain humorous. The students in the study are most likely to demonstrate the final stages of McGhee's humor development. These stages involve playing with words (riddles and jokes). This study has attempted to

match the developmental stage of language humor of students with the curriculum being taught.

Another researcher in the field of cognitive development of humor is Tamashiro. Based on a review of cognitive development theories and the development of humor, this researcher has decided to align the present study with the stages of humor developed by Tamashiro. Tamashiro's stages are most closely related to the study of humor and education. This study uses Tamashiro's humor stages (1979) to determine the cognitive humor ability level of the students in order to design a lesson that is at the appropriate level. Tamashiro identified five stages of humor development. The first stage, pre-social/ symbiotic, overlaps with Piaget's sensory-motor intelligence stage and occurs when the child is interested in his or her own body, when they are tickled, or when people come within the boundary of where their bodies end and the outside world begins (Tamashiro, 1979).

At the second stage, impulsive processes of the body amuse young children. For example, hiccups, burps, and passing gas -- often draw laughter from youngsters in stage 2, because they are linked to children's preoccupation with bodily processes (Tamashiro, 1979). Typically, this stage is below the level of humor cognition of adult students. As much as teachers may not prefer this type of humor, it is true older students, even young adult students, may still find passing gas humorous.

The next stage, the self-protective stage, roughly overlaps with Piaget's concrete operational period. At this stage the cognitive abilities of the student enable one to set up and plan a practical joke. Then, motivated by the fear of

getting caught, a student may claim, "I didn't do it." Students at this stage also view teasing as funny. Insults and "put-downs" are characteristic of this stage as a means of controlling others. It is likely some students in this study will operate at this level. In later stages, students will recognize this type of humor is hurtful and mean. The teacher should recognize that when teasing occurs it is an example of one student manipulating and trying to control another. Appealing to the moral development of the student, the teacher should direct the student towards a more ethical peer-to-peer treatment. In a position of power, a teacher should not tease or put down a student.

Many students in the study will operate at the fourth stage, the conformist stage. Conformist behaviors include a desire for social acceptance, trying to fit in, and people pleasing. This may include laughing at humor-embedded instruction because they seek teacher approval. Another possible reaction may be "class clowns" joining in on the joke telling to be accepted by the group. As the joke is widely accepted, so is the joke teller. This is approximately the level of humor development of the student in the study. Educators should be aware that racial and ethnic humor is common at this stage, because these types of jokes illustrate who is in the "right" group. Addressing these jokes can be difficult, as the teacher must preserve the dignity of the joke-teller and the victim in a manner that also preserves the unity of the classroom culture.

This study is likely to observe students in Tamashiros' final stage, conscientious. At this stage (later adolescence or adulthood) individuals are able to consider the positive and the negative consequences of their actions on

others. Unlike the previous stage where students may not recognize their off-color jokes may hurt others, even if the teacher explains the hurtful consequences, students at this stage may police each other with facial expressions of disapproval when an offensive joke is told. A comment like "you shouldn't say things like that" or "that's not funny" goes a long way in the social education of a student. Students discover the social boundaries of what may offend or hurt someone else.

It should not be assumed students at a particular level enjoy humor at that one level exclusively. Students may appreciate humor from prior humor development stages, but it is unlikely they will enjoy humor at levels they have yet to reach. "The salient point here is that the stages are sequential and individuals at the earlier stages do not comprehend the forms of humor that emerge at the later stages" (Tamashiro, 1979, p. 73). An adolescent may still enjoy tickling in the appropriate environment. However, in an inappropriate environment, an adolescent may criticize peer-to-peer tickling as juvenile and immature.

Cognitive humor development may affect students with learning disabilities and gifted students differently. Researchers (Semrud-Clikeman & Glass, 2008) tested humor cognition in students with nonverbal learning disabilities. Interestingly, these researchers found that there was no difference in humor comprehension of cartoons between students with nonverbal learning disabilities, students with reading disabilities, and students without learning disabilities. Gifted children present another challenge for humor-embedded instruction. Characteristics of gifted children include large vocabularies and acute

senses of humor (Jewell, 2005). Higher-level humor involves cognitive processes and is appreciated by students with advanced cognitive abilities. The challenge for teachers is reaching the appropriate cognitive level in their use of humor to meet the needs of the students. Humor-embedded instruction should be differentiated to the appropriate social development cognitive levels of each student.

Besides cognitive ability, research finds gender affects humor appreciation and understanding. Gender may affect brain activation from humor stimulus. Azim, Mobbs, Jo, Menon, & Reiss, (2005) found men and women respond to humor in a similar manner: both activate the temporal-occipital junction, temporal lobe, and the inferior frontal lobe in response to humor stimuli. Females activate the left prefrontal cortex more than males, indicating greater language processing. Females also show greater activity in the rewards, mesolimbic regions. Therefore, women demonstrate increased language processing in humor appreciation and experience greater sense of reward in getting the joke.

Table 2.1 Stages of Development and Types of Humor according to Tamashiro

Stage*	**Parallel Cognitive Stage****	**Dominant Concern**	**Type of Humor**
Pre-social/ Symbiotic	Sensory-motor intelligence	Differentiating self from non-self	Tickling, body contact humor
Impulsive	Preoperational thought	Bodily functions, motor control, impulses, language competence	Physical-body functions, nonsense expressions, chanting clowning, slapstick
Self-protective	Concrete operational period	Establishing and defending ego boundary; gaining advantage and control; avoiding trouble	Add: Practical jokes, insults, hostile humor
Conformist		Social acceptance, belonging to social group, pleasing others	Add: Conventional jokes, riddles, word plays, moron jokes, racial-ethnic humors
Conscientious	Formal operational period	Self-defined or self-evaluated, beliefs and values; concern for communication and impact on others	Add: Original, good- natured humor, tongue-in- cheek humor, social satires

*Adapted from Loevinger 1976
**From Piaget 1964
"Add" means "in addition to," or "superseding," the types of humor in the previous stages

Classroom Community and Social Education

Creating community. One benefit of the use of humor in the classroom is the effect of creating a community within the constraints of four walls (Bradford, 1964; Kryston, 1986); it creates an "us" vs. "them" dynamic. "Them" refers to those outside of the four walls of the classroom. When creating an "us" community, the teacher can establish a safe place for students to take risks and explore new ideas. In the classroom, the teacher is a part of the group, not an individual separate from their students because humor is an inclusive force. Humor may also bridge the gap between teacher and pupil, creating an even closer sense of community. Since the age discrepancy can vary greatly between teachers and students in traditional school settings and even between peers in non-traditional settings like on-line or technical schools, the emphasis on working as a team makes the development of a classroom community even more important.

By encouraging humor in the classroom to create a close-knit community, the teacher allows more freedom between himself and the students (Kryston, 1986). Bradford (1964) recalled humor in the classroom as "the way it seemed to shorten the distance between ourselves and others, and how, although it reduced the space we occupied together, it somehow did not make us more crowded" (p. 67). Additionally, laughter and humor are coping tools that help teens and adults deal with their emotions, creating a safety valve for sanity (Aldridge & Roesch, 2008; Davis, 1999; Erickson & Feldstein, 2006; Gadanidis et al., 2005; McMahon, 1999; Weiss, 1981). Students and teachers are under tremendous pressure in this era of accountability and high-stakes testing.

Humor, in the form of funny stories or quips, often helps people refocus. It also helps people engage with others apart from their roles and construct a genuine sense of connection (Cross & Parker, 2004). Learning to laugh with others and to laugh at ourselves enlivens the class, brings students and teachers together, and is often an antidote for burnout.

The dark side of humor. The darker side of humor concerns some critics of humor-embedded instruction in the classroom. Humor is not always used to benefit society. Students respond negatively to humor that can be cruel and oppressive if used for disparaging purposes (Frymier, Wanzer, & Wojtaszczyk, 2006). No one wants to be left out because they do not understand the joke, or worse be the target of the joke.

> Humor can also be used perversely and, indeed, because it is so compellingly attractive, humor is one of the most insidious forms of hostility and destructiveness. Humor can be used to ridicule, discount, and humiliate. Humor can be cruel, it can be mindless, and it can be devastating. (Purpel, 1981, p. 232)

People will be afraid of being laughed at in societies where the main means of social control is shame. Humor used incorrectly can foster cruelty and feelings of inferiority. The bully who taunts his victim uses humor in cruel and oppressive ways to manipulate and control. Bullying is not always peer vs. peer. In the wrong hands, a teacher can harm students' esteem by bullying and demonstrating destructive behavior. Often the joke-teller is superior in a situation. They hold the power because they assume some wisdom to be shared with others. Objects of humor often feel inferior; still others may feel excluded. Outsiders may also feel inferior as they are not "in on" the joke. Humor may also be used as a harsh weapon against outsiders (Purpel, 1981). Humor critics also

are concerned by humor's tendency to be destructive, sexual, debasing, cynical, pompous, and arrogant (Gordon, 1958; Zigler & et al., 1966). Few people have escaped a racist, sexist, or classist joke. This type of humor used by groups reinforces "insider vs. outsider" dynamics and can be destructive to the classroom climate.

Encouraging humor to create a classroom community also benefits the teacher. Sudol says, "To escape that procrustean, draconian setting -- to lighten it up -- I often tell jokes or funny stories" (Sudol, 1981, p.26). Often, it feels at the behest of the preservation of the sanity of the teacher that we incorporate humor into the classroom. For some teachers, a humorous approach is more natural and comfortable approach. "I can show my affection and concern more easily that way, and I think my kids can show their affection more for me as well" Sudol (1981, p.27). Some students may find a humorous approach a more natural way to learn as well. Students may respond to a teacher who teases them and understand the teacher is demonstrating care. Teasing students can be a way of establishing warm relationships with students in a method that is a comfortable way of expressing care (Sudol, 1981). However, teasing by a teacher directed at a student should be considered with caution. The danger of using humor and joking in the classroom is the tone and climate (Frymier et al., 2006; Hellman, 2007). Positive humor can be beneficial, but hurtful humor, like sarcasm, can be destructive (Kryston, 1986). Positive humor does not mean without a critical glance, but rather in an effort to understand others better.

There is a thermometer of the effectiveness of humor. When the temperature gets too hot, humor could escalate anger. "Humor flourishes only

when there is a moderate level of tension between groups. If the tension becomes too high, then humor will not suffice" (Nilsen, 1994, p. 928). Other strategies then need to be used to calm relations. Until that point is reached, humor has a way of cooling off anger and pacifying aggravation. Researcher Jonda (McNair, 2008), who examines racial humor in African American literature, posits teachers tend to avoid teaching sensitive issues, but the use of humor increases engagement and eases tension. Mexican American adolescents self-report humor is a mechanism used to deal with stressors of daily life, including academic stressors (Aldridge & Roesch, 2008).

The human side of humor. Humor in the classroom can establish "us" and "them," those outside our four walls. However, within this collection of individuals there are still "us" and "them" as the differences between individuals bubble up to the surface. Within the four walls of a classroom culture that allows humor, we are able to see ourselves in others, our absurdities and qualities. Bradford (1964) says, "Humor helps us to live with them in the most patient, tolerant way. It helps us, too, to know how we look to others, to understand how sometimes we strain their patience, put them to the test" (p. 69). Learning when and how to laugh, and learning when not to laugh is important to a person's development into a compassionate adult. Within the community there will be jokes that make members feel uncomfortable and jokes that make outsiders uncomfortable. Social education occurs in these spaces of discomfort. Dialogue about beliefs and boundaries take place in these spaces of discomfort. Humor helps give us a larger view of life, starts the motion of wonder and a reverence within the deep self (Bradford, 1964). The benefit of humor extends beyond the

walls of the classroom, as the design of humor is for the betterment of mankind. In the Deweyian paradigm, teaching with humor would serve a greater purpose than to generate laughter; it would be "a vehicle for making readers more socially conscious of human values and the need for improving life on this planet" (Weiss, 1981). Humor raises social consciousness as it views humanity through a unique lens. Humor exposes the incongruities and absurdities in society with the purpose of attempting to create change.

Teaching with Humor

Cautions when teaching with humor. Unfortunately, in many classrooms humor is often discouraged, deemed a disruption to the classroom environment. Jeff Davis, a teacher and humor researcher, writes about a former teacher who did not encourage the use of humor in the classroom. He says, "She lacked humor. She lacked insight, too, for humor in those days provided me with a powerful defense to a world I found increasingly strange, unreliable, and hostile" (Davis, 1999, p. 15). As adolescents develop socially and emotionally, humor can help students cope with feelings of hostility and frustration. Some positive developments of humor in children, like acting silly and making off-color ethnic humor in Tashamiro's conformist stage of adolescence, may not be appropriate in the classroom and may be offensive to the teacher. The teacher should consider how these forms of humor reflect the students' concerns and development before punishing the behavior (Tamashiro, 1979). Further, teachers who censor humor in the classroom may serve in the destruction of classroom community and drive particular forms of humor underground (Nilsen, 1994).

One caveat in teaching with embedded humor is the use of sarcasm, which is widely debated and largely discouraged. Sarcasm can be brutal. It puts the joke-teller in a role of authority and the subject of the joke in the role of the victim. No student should be made to feel stupid at school or bullied. Kryston (1986) fiercely disagrees with the use of sarcasm in the classroom. "Dagger-sharp words, regardless of their wit, puncture self-esteem. Students should be taught what sarcasm is and how to recognize and analyze it, and they should then be sternly counseled to avoid it" (p.20). He notes the etymology of the word: "GK sarkasmos, fr. sarkazein to tear flesh" (Kryston, 1986, p. 20). Kyrston discusses the destruction of classroom culture occurs when the teachers use sarcasm with the students. "Sarcasm, however, mocks and humiliates offenders, which immediately makes them defensive, and the wall created will prove damaging in the teacher-student relationship and would lead to more serious discipline problems" (Kryston, 1986, p. 21). For many educators, sarcasm should never be used under any circumstances as it is designed to "tear at the flesh" of its target and it does nothing to construct positive relations between teachers and students. Some educators disagree about the inherent destructive nature of sarcasm:

> Even more dangerous than teasing is sarcasm. I know, before I begin this discussion, that I'm stomping on crystal-thin ice. Many educators would be appalled to think that a teacher would be deliberately sarcastic to students. Human relations instructors would clutch their chests in horror. Such objections notwithstanding, I maintain that sarcasm can be used effectively if it is handled properly, as one would handle nitroglycerin, with extreme care. As another word of caution, sarcasm should be used only when teacher and student are in good moods and only when they know each other well. (Sudol, 1981, p. 27)

There are two important points: Teachers should handle sarcasm cautiously and know their students. Handling the sarcasm cautiously could mean making the

class chuckle with a sarcastic remark while making a point to a student that an undesired behavior has been noticed without scolding or yelling. Sarcasm is not a positive tool in the teacher's toolbox, but it may be a lesser negative tool one chooses in dealing with a student. It might be the right tool for the right situation. The student may not be cognitively ready for sarcasm. He or she may not understand the teacher means the exact opposite of what is said. Also, if the teacher or the student is in a less than happy mood, sarcasm should never be used. The design of this study does not include the use of sarcasm. The risk of the sarcastic comment being misinterpreted is just too great.

In addition to the misuse of sarcasm in the classroom, humor researchers have discussed additional dangers of humor in the classroom and the culture. (Purpel, 1981) states "As much as I enjoy humor, especially satire, I have to say sadly that humor itself has become one of the most powerful techniques for the preservation of this cultural class and its bag of virtues and vices, and in particular its avoidance of threatening ideas, and of commitment" (p. 234). The destructive qualities of humor are particularly dangerous when class groups make jokes about other classes, reinforcing negative cultural biases. Without challenge from the outside class group, no growth or understanding can be achieved. While this researcher disagrees with the critique of satire, this study does not incorporate satire.

Another danger of the use of humor is the loss of dignity. No one likes to be the subject of a joke because it could easily strip one of their dignity, sense of confidence, and intelligence. No student in school should feel like a "dummy" when his purpose in school is to feel like a learner. "My view is that humor can

and ought to be used to ease pain and that humor can be and ought not be used to promote pain. It is also one of those human characteristics we need to transcend so that we do not have to choose between humor and dignity" (Purpel, 1981, p. 236). In these instances humor must be handled like nitroglycerin. If used improperly, the damage to a student's dignity can be devastating.

Best practices: teaching with humor. Does the teacher have to be funny to incorporate humor into instruction? This study will in part examine whether a teacher's use of humor and ability to be humorous has any effect on the achievement of students. Studies have shown a sense of humor is considered a winsome personality trait in individuals and a valued trait of teachers (Bradford, 1964; Garner, 2007; Wandersee, 1982). Humor is considered such a prized trait in a teacher that one researcher warns "A humorless person should think twice before deciding to be a teacher" (Hall, 1969, p. 5). Donelson (1974) queried students about their opinion of humor in the classroom: students said that teachers and classrooms needed a larger dose of laughter. Students enjoy a teacher's sense of humor and long for humor in the classroom.

How teachers convey humor. Teachers use humor in the classroom in a variety of ways. Some use facial gestures, vocal intonation, jokes and bodily movements to clue students to humor. "The speaker may use stress, pause, raised eyebrows, a smile, a brief aside, or a combination of these" to indicate or alert students to humorous situations (Houghton, 1968, p. 1179). A smile while reading a passage aloud may convey humor to a class more easily than a lengthy explanation. Other teachers make exaggerated movements and mannerisms with

their faces and bodies to communicate humor (Sudol, 1981). Some teachers convey humor more directly through stories and jokes, which may or may not be on topic.

> I punctuate my lectures with anecdotes or comic ditties to relieve the tedium. My thinking is that if I take a few minutes to tell a joke and then retrieve my students' attention for the rest of the class, I'm doing better than if I lecture nonstop and lose them for good after only a few minutes. I may waste ten minutes digressing, but I've got their attentions and that's not bad. (Sudol, 1981, p. 26)

Some researchers believe the few minutes dedicated to humor in instruction will result in an hour of student engagement.

Others have found teachers who are regarded with a good sense of humor "can smile when the joke is on himself and he is apt to smile or chuckle rather than laugh uproariously" (Hall, 1969 p.5). Teachers who are able to laugh at their own follies do so at the risk of losing credibility and not being taken seriously by their students. "Self-incriminating humor can impair the user's credibility and thus make the person's teaching less effective" (Wandersee, 1982, p. 213). The benefit of self-incriminating humor is the teacher levels the balance of power and authoritarianism between teacher and student. Students find teachers more approachable and personable. Studies have found gender makes a difference in the delivery of humor in instruction. Male teachers tend to use more self-disparaging humor than female teachers (Wandersee, 1982). Females use humor less frequently and with more hostile themes than male teachers (Wandersee, 1982). Further studies are needed to explore the difference between gender and styles of teaching humor.

Modern society provides our students with a plethora of stimuli: They are entertained by the Internet as they search for information in a click of .02 of a second; by video games that are lifelike in appearance and physical motion; and by Game Boys, iPods, and cell phones that let them chat with a dozen friends at once. These hyper-stimulated children come to school, sit in rows, read from texts, and listen to lectures (Weitkamp & Burnet, 2007). In competition with the many forms of entertainment, some teachers are disheartened that they are expected to play the role of entertainer in the classroom. Students respond positively when teachers dress up, make jokes, and use props related to the content (Frymier et al., 2006). Other teachers enjoy performing in front of their audience of students. "One of the reasons I do teach is to entertain, and what better audience than a hundred and thirty kids? Moreover, I've always felt teaching and learning should be fun, should leave teacher and students with a pleasant feeling, not with the vapid taste of chalk dust" (Sudol, 1981, p. 26). Humor creates an environment where students are lively and attentive, and "its real purpose is to link the pupils and the teacher through enjoyment" (Wandersee, 1982, p. 213).

Ineffective uses of humor in classrooms. Humor in the classroom becomes ineffective if the teacher cannot direct the class back to the content after a humorous event. Humor and serious work should be in balance in an effective classroom. Sudol (1981) warns when a class becomes too loose and carefree, when no learning takes place the classroom becomes a prison for the teacher. Then the teacher's effort turns to classroom management and control rather than instruction and learning. Humor should serve to relieve tension in the

classroom. However, when humor becomes unconstrained the teacher suffers from added stress as do students in the room who are not participating in the silliness. Warning signs that the students are lost in humor and are not participating in serious study are numerous and obvious. Students joking midway through a lecture indicate humorous instruction is not effective. Sudol (1981) shares his failed experience with this type of instruction: "After recounting an amusing story, I look up to see thirty smiling faces and thirty closed notebooks and texts, I know I'm in trouble" (p. 26). Humor instruction fails when the person at the front of the room is viewed not as an instructor, but as an entertainer. Balance of humor and serious study has been examines in Gilbert Highet's study (1950) when he speculates (based on his own teaching experiences) 55 minutes of classwork and 5 minutes of laughter are worth twice as much as an hour of unvaried work. The reprieve of laughter recharges the batteries of both the teacher and student. It appears teachers should consider a daily dose of humor in their lesson plans as an investment with the potential for paying high dividends (Wandersee, 1982). The reward is alert, interested, and engaged students. Experienced teachers are able to insert humor into instruction with ease then move back into serious topics fluidly.

In order to prevent out-of-control classrooms, teachers who are knowledgeable in the humor and cognitive development of students can redirect undesirable behavior to more positive avenues.

> This viewpoint enables teachers to assess students' developmental concerns and abilities, to better understand some types of children's humor (especially hostile, silly, or caustic humor) that may lead to discipline problems, to decide on instructional and disciplinary measures that are in harmony with the children's developmental stage, and to make the learning environment more

> delightful and developmentally meaningful to students by including humor in the class activities. (Tamashiro, 1979, p. 74)

Teaching with humor requires teachers to be masters of classroom management. Perhaps new teachers with less management experience will require more guidance and training. However, teaching with humor should not be shunned because it appears difficult. It should be embraced because its greatest challenge is harnessing the engagement of the students.

Humor and Student Achievement

The explicit use of humor has the additional benefit of increasing student achievement, motivation, and engagement (Holmes, 2007; Jewell, 2005). In a 1979 study of 270 college students, researchers found 95% of students perceived humor made the presentation of material more effective. Three main reasons for that response were identified: 1) it eases the tension between student and teacher and helps to establish rapport; 2) it maintains attention; and 3) it creates interest in the class (Sudol, 1981; Wandersee, 1982). Humor works to break down the barrier between the teacher and student, creating a positive classroom environment (Uekermann et al., 2007; Weitkamp & Burnet, 2007). Additionally, students reported they paid more attention as humor helped keep their interest. In the past few years, much focus has been placed on student engagement. It appears that humor may be a vehicle to engage students in the classroom so they focus on the content.

Humor is a calming activity as much as it livens up a room. A joke told in a tense moment can be the release valve to ease the stress. A classroom that nurtures humor is a safe place for students to take risks. Consider the tension between two sitting presidents who exchange witty banter during a press

conference before a tense negotiation. In this case, humor provides a safe place to begin conversation. The classroom may be the safest place for students to risk a sarcastic remark if humor, including sarcasm, is understood by all students. "The sarcastic remark keeps them safe with peers as they begin to take risks. Students can use humor to unlock more serious subjects" (Kryston, 1986, p. 19). Humor encourages the young to take risks and assert their independence. If the atmosphere is too rigid, too serious, students will be tense. That leads to unwillingness to take risks and that proves fatal to anything creative (Kryston, 1986). In a classroom, it is expected that a student who raises his hand to answer a question correctly will be rewarded with positive praise from the teacher. However, a child who blurts out a joke is usually not rewarded with praise even if the joke is on topic and correct. The joke-teller's behavior may be viewed as a disruption or annoyance, although the motivations behind both behaviors are the same. The two students are seeking attention and validation for what they have learned. The joke-teller may lose the opportunity to enliven the room, informally check the class for understanding (whether or not the rest of the class got the joke), and the opportunity to regain the interest of the class.

Student perceptions of humor & learning. Students are also motivated to study and create humor. Many students are funny and enjoy the opportunity to display this part of their personality. "One of the most enjoyable and successful uses of humor in my classroom comes not from the great writers, but from students themselves." (McMahon, 1999, p. 71). Listening and cognitive skills are sharpened when students can relate a funny story to their own (Kryston, 1986). However, being funny is a talent and some students will be

more talented than others. Conceivably, the use of humor does give some students more power than others (Purpel, 1981). A teacher who incorporates humor into the classroom must seek activities in which those students will excel as well.

It is important for the teacher to know the personality, mood, and temperament of a student. It is equally important for the teacher to know the cognitive ability of the student when teaching humor-embedded lessons. "The teacher must have an intimate knowledge of the capabilities and limitations of the individual pupils in his class before he can attempt to lead them into unexplored paths in the field of humor" (Nash, 1938, p. 245). The risk of misunderstanding can greatly impact the student's perception of situations, possibly leading to his anger and frustration.

Other teachers believe humor "is an intellectual exercise: the catching of those surprising incongruities in man's actions" (Gordon, 1958, p. 128). Humor requires a high level of cognition because it not only requires making sense of a situation, but seeing the same situation through a lens making it absurd and nonsensical. Humor requires additional intellect to perceive a situation through two lenses. Humor may be found in a situation that is both sober and silly. The term "biosociative" was coined by humor theorist Arthur Koestler for humor when the "meaning of an event perceived in two incompatible associative contexts" (Wandersee, 1982, p. 214). A simplistic example of this can be found in a joke about a student who has been absent from school. For example:

> Teacher: You missed school yesterday, didn't you?
>
> Pupil: Not very much!

This joke requires biosociative cognition because "getting it" means one must recognize the sober and sincere attitude of the teacher questioning the student for being absent and the silly response of the student who did not miss school, meaning he was happy not to be there. This, of course, is a play on words, which is one of the lowest forms of humor. However, cognitively it requires a depth of knowledge and understanding of multiple meanings of a word. In Getzels and Jackson's study (1962), the students recorded that while puns were the lowest form of wit, they enjoyed them anyway (Nash, 1938). Older students will continue to enjoy puns when the word meanings are complex.

Humor at its best makes one think. It challenges perceptions and makes a person more analytical and critical. The true test of humor is thoughtful laughter (Gordon, 1958). "William Davis, an editor of *Punch*, once described humor as that which will make people laugh for five seconds and think for ten minutes" (Nilsen, 1994, p. 931). The absurdities of man should resonate in the mind and cause us to look inward as well as out. Humor not only benefits students' social and emotional education, but it appears that humor and intelligence are interrelated. Students with higher intelligence seem to appreciate humor more than students with low intelligence ratings (Nash, 1938). "Highly creative students participating in a classic study by Getzels and Jackson (1962) were characterized by a strong sense of humor. While high-IQ gifted students ranked this trait last, creative gifted students rated it as one of their most important attributes. (Wandersee, 1982, p. 214).

An additional benefit of humor is the enjoyment derived from "getting" a joke. Like figuring out a puzzle or a "brain twister," there is a satisfaction in the

cognitive activity of recognizing the incongruence of the situation. "Cognition not only mediates the humor process but, as Freud (1960) has noted, contributes to the experienced gratification" (Zigler & et al., 1966, p. 508). In a sense, one earns the laughter because his audience understood it. Zigler et al found the more difficult the joke, the more subtle, the more indirect, and the more we have to work to understand it, the more pleasure is derived from the joke. The Zigler study, which examined the enjoyment of cartoons on children, found cartoons below the cognitive level of the students were found to be less enjoyable than those that matched the cognitive levels (Zigler & et al., 1966).

Summary

Perspectives on humor in the classroom have evolved over time. The definition of humor has changed as our understanding of the physical, social, and emotional reactions to humor has deepened. Current research shows understanding humor requires cognitive processing dependent on a person's cognitive development. "Getting" the humor of a comic situation also requires a certain level of moral development and humor development. This researcher uses the evolution of cognitive, moral, and humor development to base assumptions about what will be considered funny to the students participating in this study. Researchers have consistently shown over time that humor has been used to build communities and social networks in the workplace and classroom. There are cautions to using humor in the classroom. Some warn too much humor is distracting and takes away from the learning environment. Others say, when used incorrectly, humor can be hurtful and destructive. This study operates

under the assumption that explicit and effective uses of humor, such as a joke or facial expression, increase student engagement, motivation, and achievement.

CHAPTER 3: METHODS

Introduction

Previous research has shown that humor encourages students to listen and become engaged in the learning process (Tamblyn, 2003). This study attempts to change the dynamic of the traditional lecture by incorporating humor deliberately into the lesson to affect student achievement, engagement, and memory retention. This study aims to determine whether students who are given a humor-embedded lesson are more engaged and retain material more effectively than students who receive non-humorous instruction.

Research in social education has shown humor feeds the social/emotional brain and brings people together, as it reduces stress (Jensen, 1998). Neuroscience also finds humor encourages creative and critical thinking. When threat is reduced by use of humor, the brain should demonstrate critical and creative thinking, resulting in higher achievement. The gain scores on post-test 1 are used to measure achievement. Neuroscience has shown the stress-free brain, a brain free from threat, will learn more effectively and retain information longer (Jensen, 1998). Students in this study are tested immediately after the instruction then tested again a few weeks later. The gain scores on post-test 2 are used to demonstrate if humor aids in memory retention.

Purpose of study. The purpose of this study is to examine the effects of humor-embedded instruction on a cognitive task and student engagement in a post-secondary classroom. This study explores if there is a significant difference in gain scores between students who do and do not receive humor-embedded instruction**.**

Research suggests students who are engaged during a lesson will demonstrate increased motivation to learn, willingness to participate, and increased comprehension (Minchew & Hopper, 2008). The positive effects of humor – increased achievement, enjoyment, and critical thinking – are consistent across subject matter, including math, science, foreign languages, and English (Gadanidis et al., 2005; McMahon, 1999; Minchew & Hopper, 2008; Pomerantz & Bell, 2007; Weitkamp & Burnet, 2007).

Research questions. How does humor-embedded instruction affect learning in post-secondary classrooms?

- How will students who receive humor-embedded instruction achieve on post-tests that indicate achievement compared to students who do not receive humor-embedded instruction?
- How will students who receive humor-embedded instruction score on post-tests that indicate memory retention compared to students who did not receive humor-embedded instruction?
- What do students self-report concerning humor, achievement, and memory retention on open-ended interview questions?

This researcher hypothesizes that students will self-report humor is an effective teaching strategy. Results show relationship between the pre-test and post-tests after humor-embedded instruction.

Research design and procedures. This study examines the effects of humor-embedded instruction. This study evaluates if humor is a valid teaching technique that can be used to increase student achievement and facilitate memory retention.

A brief overview of the methodology of this study looks at the outcomes of humor-embedded instruction using gain scores in achievement. The humor-embedded lessons focus on age-appropriate and subject-area specific vocabulary and content for a post-secondary technical school class. As most curricula have instructor-led lecture components, this researcher feels the themes of the study, namely the effects of humor, can be generalized across subject areas. This multi-method study incorporates quantitative data from post-tests and descriptive statistics, as well as qualitative group interviews. The study compares the gain scores from the pre-test to post-test 2 to identify memory retention.

A brief overview of the population and sample population shows the subjects of this study will be post-secondary students enrolled in a proprietary school for sound engineering and digital entertainment in a suburb of a major city in the southwestern United States. The out of state residency is 61% of students population. The school has two sites within ten miles of each other in the metropolitan area. One teacher has been chosen from each site. Two teachers, one at each campus, instruct a course that is identical in content. Each teaches a morning and afternoon class, totaling four classes. Each class has approximately twelve students, totaling 48 students in the study. The humor-

embedded instruction occurs once at each campus during a single day. Each teacher will use humor-embedded instruction with one of their classes and non-humor-embedded instruction with the other class. Each teacher will teach one lesson in the morning and one in the afternoon during the school day. The teachers will be equally matched in years of experience, quality of performance, and sense of humor as deemed by a supervising administrator at the school.

The non-humorous instruction will employ a similar type of stimulus to the humorous instruction, such as a visual cue. However, the cue is intentionally humorous for the humor-embedded instruction. Each lesson contains 10 concepts that are measured in identical format on the post-tests for both humor-embedded instruction and non-humor-embedded instruction. Each concept is presented using a technique practiced in differentiated instruction. For example, the teaching stimuli are designed to reach various learning styles: visual, auditory, and linguistic learner. Each concept is explained in a way that employs a technique known to benefit students with a particular learning style for both the humor-embedded instruction and non-humor-embedded instruction (see Appendix A).

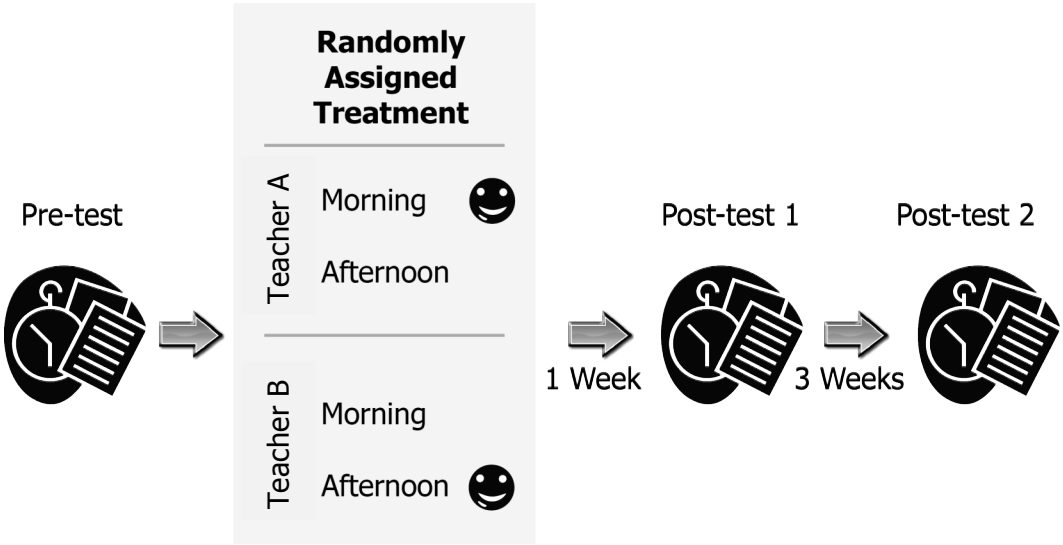
Data collection for this study includes a pre-test, post-test 1, post-test 2, and interview data. Students will be interviewed in small groups after post-test 1 using a prescribed set of questions. Students are asked to self-report the instructional strategies that were beneficial to the lesson.

The pilot of this study tested the logistics of the study, including instruments and procedures. Any concerns that arose during the pilot were addressed before implementation. The pilot employed one teacher from one of

the campuses of the school. This teacher taught two classes; one received humor-embedded instruction and the other did not. The order was randomly selected. The teacher used in the pilot has similar years of teaching experience, quality of service, and sense of humor as the teachers observed in the study. The teacher in the pilot study taught a humor-embedded lesson using differentiated learning stimuli and the data collection methods were the same as those used in the study. Data analysis using descriptive statistics, mean scores, and T-tests were run, in order to determine if any corrections to the methods were needed before the study was conducted.

Figure 3.1 Research Method Flow Chart:

Humor-embedded instruction & comprehension test (quantitative)

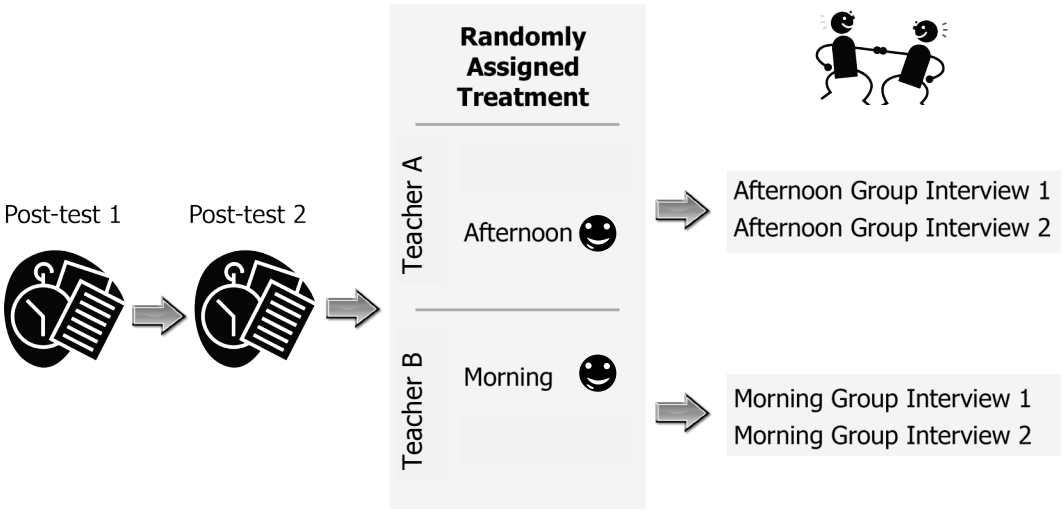


Glossary:
The symbol ☻ designates humor-embedded instruction.
Pre-test is a 10-question multiple-choice quiz.
Post-test 1 and post-test 2 use the 10 questions from the pre-test.

Figure 3.2 Research Method Flow Chart:

Humor-embedded instruction, humor effect, and group interviews

(qualitative)

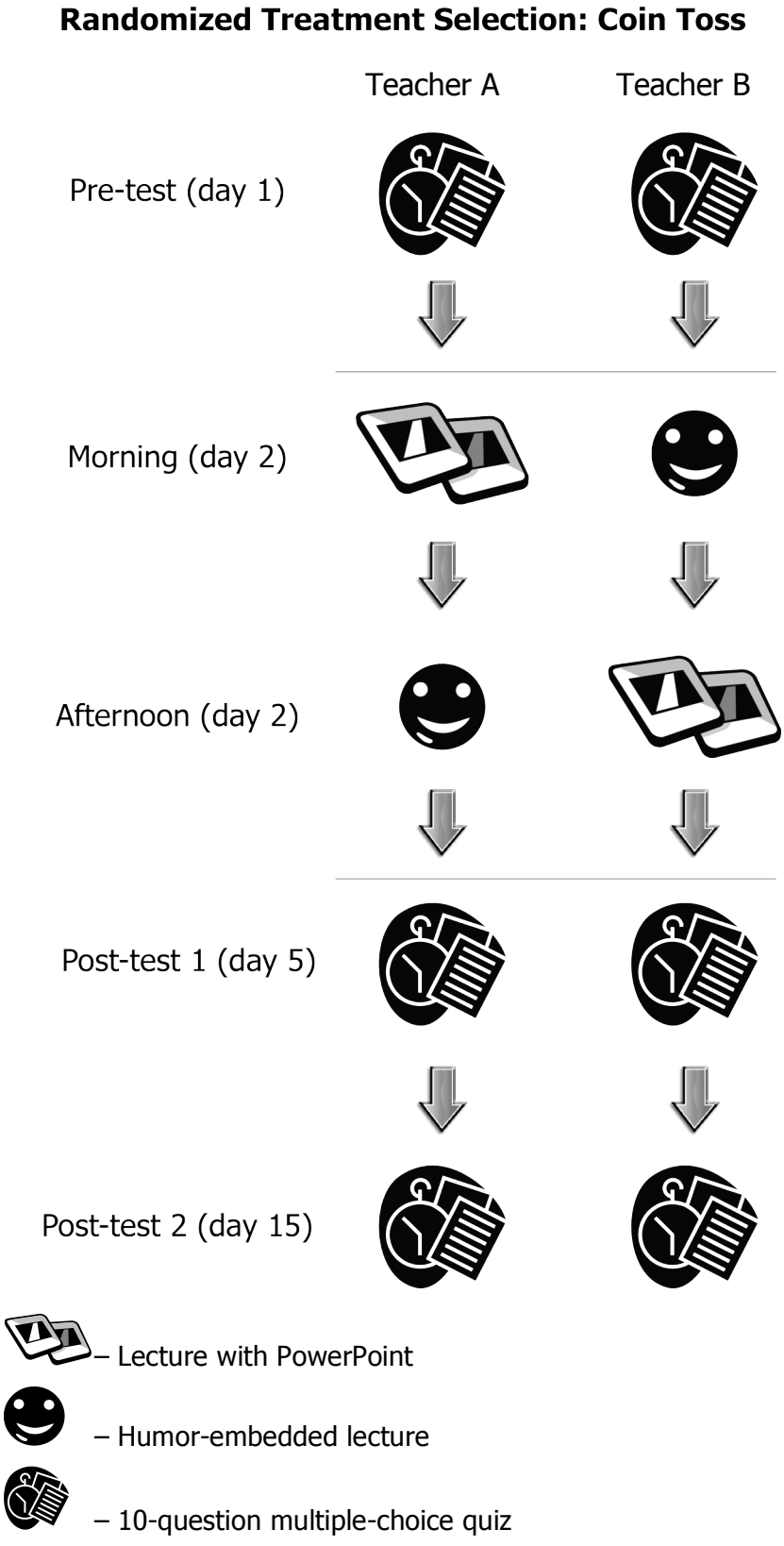


Glossary:

The symbol ☻ designates humor-embedded instruction.

Group interview – After the students have received the treatment and taken post-test 1, the classes were broken into small groups of four to six to investigate the students' understanding of the effects of humor on learning.

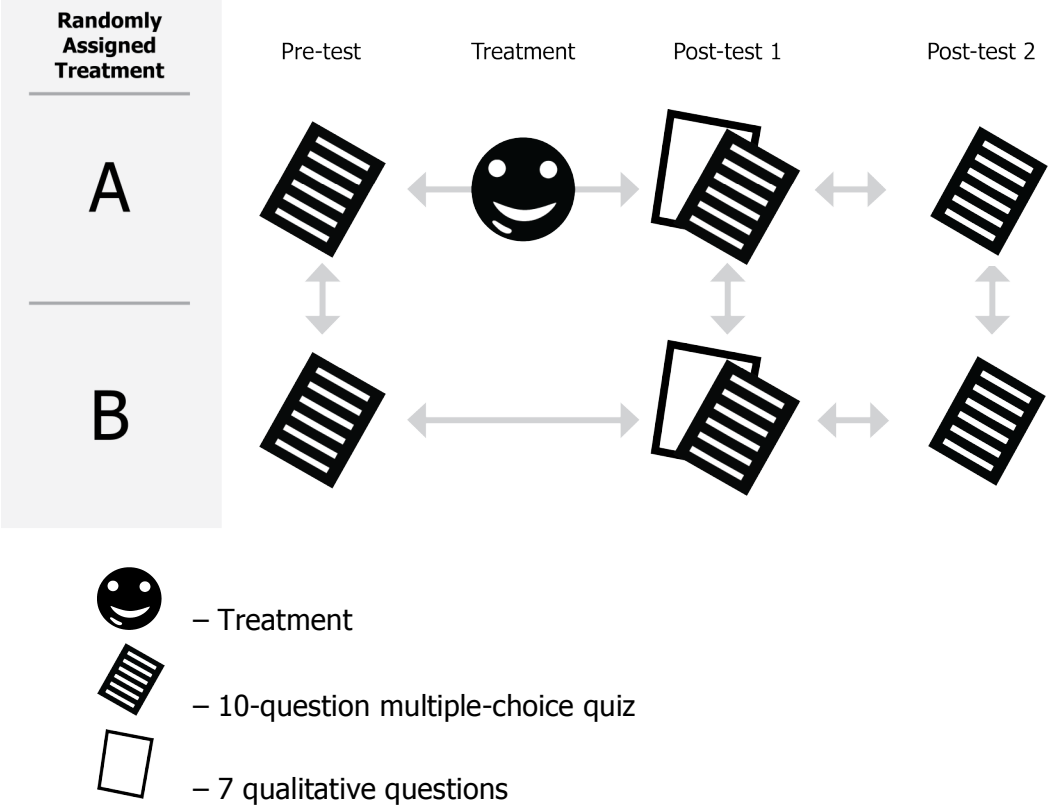
Figure 3.3 Research Design & Procedure



Research Methodology

This study occurs at two sites and uses a mixed-methods design that triangulates qualitative and quantitative data to determine the effects of humor-embedded instruction on students. The design of this study is primarily based on the comparison of pre- and post-tests to measure growth in student achievement. The pre- and post-test design is prevalent in pedagogical research as it determines an effect before and after the treatment. In this study, an additional post-test is used to determine the retention affected by humor-embedded instruction (see Appendix C). Pre-tests are compared across groups to identify potential issues with inequitable grouping (i.e. group A outscores group B in gain scores from the pre-test by a large margin). Potential issues of unequal groups (i.e. group A has greater pre-test knowledge then group B) are addressed by using gain scores. Growth is determined by an increase of scores from the pre-test to the post-test. Growth scores are compared across groups to evaluate humor as a factor for potential growth in achievement.

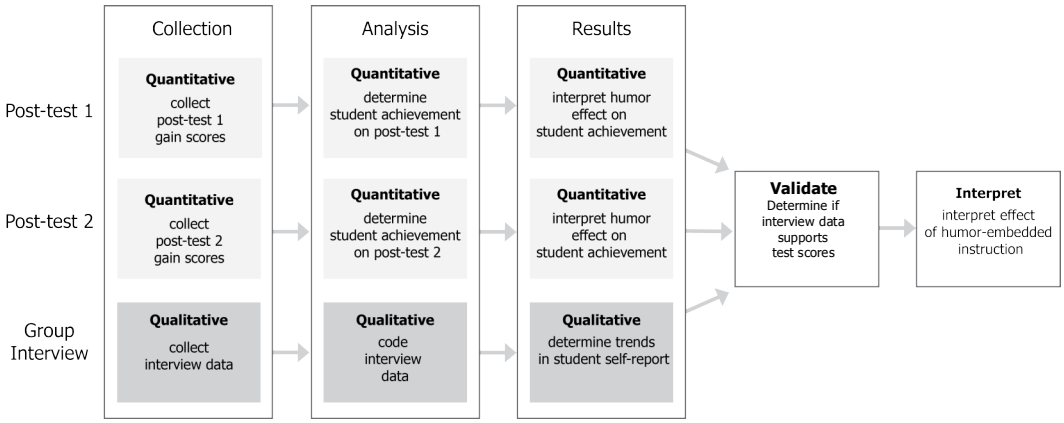
Figure 3.4 Embedded Qualitative Questions in Quantitative Study



This study employs a mixed-method, embedded design (Creswell & Plano Clark, 2007). A third method of data collection is used in this study to triangulate the data. After completing a ten-question, multiple-choice comprehension quiz, students self-report in response to qualitative interview questions about instructional practices (see Appendix D). Students answer these qualitative comprehension questions about the content they have just learned and the instructional presentation they have received in the lesson. These student responses are analyzed for the effect of humor on achievement and memory retention. The open-ended group interview questions are asked after the humor treatment and the ten-question comprehension quiz (post-test 1). The

embedded open-ended interview questions are expected to have a high response rate and provide the opportunity for participants to express their perception and how they feel about the instructional method provided to them (Fowler, 2002). Analysis of these questions includes coding and thematically organizing by threads of connection and relationships (Fowler, 2002; Seidman, 2006). The qualitative, open-ended responses are used to support or refute the findings that humor-embedded instruction increased engagement for the students.

Figure 3.5 Triangulation Validating Quantitative Data



Population & sample. This study is conducted in a suburb of a large U.S. city in the Southwest. According to the U.S. Census Bureau, the city had a population of 1,512,986 in 2006 ("U.S. Census Bureau", 2009). The last two decades have brought tremendous growth to the area. Smaller cities, which were once on the outskirts of the city, have been swallowed up and incorporated into the suburban sprawl. Academically, a major university supports the city, as well as several nationally recognized technical schools and the largest community college system in the nation. Each campus of the school selected for this study is located in a suburb and considered to be within the metropolitan area. One

campus is located in an established part of the city on the corner that abuts a freeway and major street. To enter the campus, one must enter the parking lot passing through an 8ft iron gate, then one must pass through another iron gate to enter the courtyard. As imposing as these gates may seem, they rarely close. The campus is open to students 24 hours a day, 363 days a year, only closing for Thanksgiving and Christmas. At this campus, students can be found gathered around concrete picnic tables in the open-air courtyard. Red brick walls and black metal doors of classrooms surround the courtyard on all four sides. This campus was converted from a non-degree granting medical school in 1993. The other campus, fewer than ten miles away, is strikingly different in its appearance. This campus is located in a newly developed area that has seen 97% growth in the past ten years. This campus is tucked within a business complex and was specifically designed for sound engineering classrooms and recording studios. This campus is enclosed in a two-story 25,000 sq ft building. The walls are covered in framed records and movie posters. Each has a small plaque with the name of the student or instructor who received sound credit on the project. Tucked in corners are conversation pits with oversized leather chairs. The studios and classrooms are designed with optimal sound design in mind. Administrators are aware of the limitations of the converted campus at the other location and carefully design the course schedule so that students who attend the school are assigned classes at both campuses.

The demographics for the student population represent the population of the metropolitan city with some differences. The median income of the area, including urban areas, is $41,200. The poverty level of the metropolitan area is

15.8%. The population is 49.1% female. The ethnicity is largely white (71.2%), followed by African American (5.1%), Native American (2.0%), Asian (2.0%), and Hispanic (34.1%). The area has a high school graduation rate of 76.6%.

ARCS (Audio Recording Conservatory School) was selected because the population, school size, and instructional philosophy meshed with the principles of this study. While the researcher has never worked in or with the school, she is familiar with the administration and teachers, who granted her permission to work with the school and the students. The school hosts students with the average range of ages being 22 - 30. Because the school is open 24 hours a day, for insurance purposes, no student under 18 years old is admitted. Therefore, all participants in the study are adult learners older than 18 years old. The school population is approximately 450 students across both campuses. The student/teacher ratio is 12:1. The school is representative of a middle class demographic. The percent of students who receive loan assistance is 76% percent. The loan default rate was used to determine the level of poverty level of technical school students. Using the school's loan default rate as a measure, ARCS has 5.3% of students who are economically disadvantaged, compared to the Phoenix metropolitan area's poverty level of 15.8% ("Department of Education", 2011).

The gender demographic of the school is 3% female and 97% male. The ethnic makeup of both ARCS campuses combined is 72% white, 9% African American, 3% Native American, 2% Asian and 14% Hispanic. Compared to the metropolitan area, the demographics of the school differ in the following ways: The population of the school has a disproportionate percentage of females

enrolled, the ethnicity of the school is comparatively similar to the area, with the exception of African American and Hispanic students.

Table 3.1 Demographic snapshot of population of state, city, and class.

	Metro Area	**ARCS**	**A AM Class**	**A PM Class**	**B AM Class**	**B PM Class**	**Humor Total**	**Non Humor Total**
General			X_1	X_2	X_2	X_1	X_1	X_2
Population	1,512,986	450	12	11	12	11	23	23
% Female	49.1	3	0	9.09	16.67	9.09	4.35	13.04
% Male	50.9	97	100	90.91	83.33	90.91	96.65	86.96
Ethnicity								
% White	71.2	72	58.33	63.64	58.33	66.67	60.87	65.22
% Black	5.1	9	8.33	0	8.33	8.33	8.70	4.35
%Native American	2.0	3	8.33	0	0	0	4.35	0
%Asian	2.0	2	0	0	0	0	0	0
%Hispanic	34.1	14	0	36.36	16.67	18.18	8.70	26.09
Economic Factors								
Median Income	$41,207		N/A	N/A	N/A	N/A	N/A	N/A
Poverty level	15.8							
Loan Assistance		76	83.33	90.91	83.33	90.01	86.96	86.96
Loan Default	10.9	5.3						
Un-employed	9.3		75	72.73	66.67	54.55	65.22	69.57
Part-time Employee			16.67	9.09	25	36.36	26.09	17.39
Full-time Employee			8.33	18.18	8.33	9.09	8.70	10.87
Academic								
HS Grads	76.6		100	81.82	91.67	90.91	95.65	86.96
GED			0%	18.18%	8.33%	9.09%	4.35%	13.04%

Demographics about each instructor:

Two instructors teach each course taught at ARCS; each group of students receives instruction from both instructors during the 3-week period. The pair of teachers selected by the ACRS administration is evenly matched in content knowledge and instructional style. The course for this study was selected because it is an entry-level course that is historically difficult for students to understand the material, abstract ideas, and concepts of physics. The material requires understanding principles of math, physics, and mechanical operation, as well as memorizing terms and acronyms. The theories of this class are common across many content areas beyond this study, such as mechanical engineering, physics, and music theory/application. A supervising administrator selected the teachers to conduct the instruction and assessment pieces of this study based on the selection criteria.

Selection criteria:

> Similar years of experience (at this school and in education); quality of teaching (determined by evaluations); administrative, peer, and student recommendations; similar dispositions, temperaments, humor; gender.

Teachers for this study are as evenly matched as possible. They share many similarities. Both are former students of ARCS. Teacher A has seven years of experience, and teacher B has six. Both instructors receive consistently high reviews on student surveys and teacher observations. Both instructors are males in their early 30's. Both instructors have been noted for their friendly and open dispositions. Teacher A describes himself as easy-going and has a casual attitude. This is evident

in the classroom. Teacher A could easily be intimidating at more than 6'5" tall with shoulder length hair and eyes mostly obscured by an ARCS baseball cap. However, students find him approachable as he slides and zigzags across the linoleum floor in his rolling chair to answer student questions. Teacher B describes himself as "more intense;" his peers describe him as an entertainer. Teacher B stands in the center of the semicircle of student desks dressed in all black, which is in contrast to his white-blond faux hawk hair cut. Teacher B has a rock n' roll style that is sometimes laced with off-color language and jokes.

Demographics about each class:

Students enter the classroom, jazz is playing and a slideshow flips automatically on the screen. There are images of historically pertinent people, bands and albums clicking across the screen. Desks are arranged in a horseshoe. The walkways are narrow, allowing little room for the instructor and twelve students who are present to move about the room. The room is flanked on three sides by console tables that are polka-dotted with multicolored knobs and levers. One female sits at the horseshoe table with eleven males in the afternoon class with Teacher A. This was consistent with the other population groups of the study; the male population was greater than the female population by 83.6%. Twelve students were present in the each of the morning classes, and eleven students were present in each of the afternoon classes. 67.39% of the students who participated in the study are unemployed, full-time students. 86.96% of the students receive loan assistance. 91.30% of students have received a high school diploma. The students were selected based on their enrollment in the

Introduction to Electrical Theory and Sound Applications course. Students were identified for the following demographics: Students with averages below 70% are not candidates for the study. Because this is the first course in the program, prior grades were not available. Grades on a previous quiz in the class were used to determine candidacy; all students had averages of 70% or better.

The researcher does not know the names or identities of the students. The teachers identify students with a code on all identifying documents; i.e. A-PM-10.

Table 3.2 Demographics by treatment group

		Humor Total	%	Non-Humor Total	%	Total %
	Question					
	Gender					
1	Male	22	95.65%	20	86.96%	91.30%
	Female	1	4.35%	3	13.04%	8.70%
	Employment					
2	Unemployed	15	65.22%	16	69.57%	67.39%
	Part-time Employee	6	26.09%	4	17.39%	21.74%
	Full-time Employee	2	8.70%	3	13.04%	10.87%
	Loan Assistance					
3	Yes- Loan assist	20	86.96%	20	86.96%	86.96%
	No- Loan assist	3	13.04%	3	13.04%	13.04%
	Ethnicity					
4	White	14	60.87%	15	65.22%	63.04%
	Black	2	8.70%	1	4.35%	6.52%
	Asian	0	0.00%	0	0.00%	0.00%
	Native American	1	4.35%	0	0.00%	2.17%
	Hispanic	2	8.70%	6	26.09%	17.39%
	Other	4	17.39%	1	4.35%	10.87%
5	High school degree	22	95.65%	20	86.96%	91.30%

Instrumentation. This section describes the Protocol for assessment.

1. Protocol for Pre-test: (See Appendixes B & C)
    a. The pre-test was administered during orientation before the students had taken their first class to ensure it was an accurate assessment of their prior knowledge.
    b. The pre-test had ten multiple-choice questions representing ten concepts that were taught during the lesson. The pilot pre-test included five additional questions so any questions that are answered correctly at a rate of 60% or higher would be eliminated from the study.
    c. Teachers posted the pre-test to the school's online portal a few days prior to instruction so students were able to take the test. The tests were then graded and students were coded.
2. Protocol for Post-tests: (See Appendixes B & C)

    Immediately following the lesson and after allowing some time for students to ask questions for review, the teacher distributed the ten-question multiple-choice test (post-test 1). The post-test was administered online in the same location as the pre-test. The test was graded electronically. The teacher retrieved the scores, recorded the grades of post-test 1 and applied student identification codes (i.e. A-AM-10) to conceal the student identities to the researcher. The instructor provided the grades to the researcher via a coded spreadsheet.

3. Protocol for open-ended focus group interview questions: The researcher asked the students respond to a prescribed set of open-ended interview questions (see Appendix D). Students responded to open-ended interview questions after completing the post-test 1. The researcher transcribed the student responses during the interview and coded student responses after the interview. A research assistant transcribed the interview conducted concurrently at the other campus and all documentation was given to the primary researcher.

Treatment. This section describes the protocol for treatment.

Protocol for Humor-embedded Instruction:

1. Each teacher used a Keynote slide presentation of the content to be covered in all four classes. The presentation consisted of approximately ten slides. Each slide presented concepts unfamiliar to the students. Both instructors were expected to teach the material on all ten slides. Prior to the teaching date, the instructors and the researchers met to design humor treatment that included differentiated instruction including: visual cues, figural cues, verbal and auditory stimuli. Literal non-humorous stimuli were planned for each concept to match the learning style of the humor treatment. The researcher provided each teacher a lesson plan to prepare for the instruction of both the humorous and non-humorous instruction (see Appendix A). Each teacher was able to preview the lesson plan prior to teaching.
2. The length of the treatment was one class period (4 hours). Both instructors taught all the concepts to both groups.

3. One teacher presented the humor-embedded lecture in the morning; the other presented the non-humorous lecture in the morning. In the afternoon, each teacher taught the method they had not taught. The order of assignments was randomized to reduce the threat of order effect.
4. The treatment included the four types of humor that correspond with dominant learning styles: figural, verbal, visual (physical), and auditory (Slade, 1996). Figural humor includes comics and characters; verbal humor includes puns, riddles, and anecdotes; visual humor includes impressions and slapstick; and auditory humor includes impersonations, noises and sounds.

Table 3.3 Differentiated Instruction: humor devices coded by learning style

Figural	**Verbal**
Comic books Comic strips Political Cartoons Caricature	Jokes Puns Riddles Satire Parody Irony Wit Limerick Anecdote
Visual (physical)	**Auditory**
Impressions Impersonations Pantomime Practical Jokes Pratfalls Slapstick Sight Gags	Impressions Impersonations Noises Sounds

5. The non-humor treatment used a technique or learning device that operates with the same learning style as the humor treatment for each new concept taught in the lesson. For example, instead of a comic and literal drawing was used. Both the humor and non-humor treatments use a visual cue to explain the concept; however humor treatment purposes uses the comic effect in its explanation. For verbal/linguistic learners, a limerick is used to explain a concept in the humor treatment and a literal explanation is used with the non-humor group. To appeal to the humor related to auditory learning styles, one concept is explained by a sound imitation. For the humor group, the imitation is of famous person; the non-humor group will hear a literal imitation of the sound. The lesson is designed so that each learning style is targeted twice (Appendix A).

Table 3.4 Humor treatments by concept and learning style

Concept	Learning Style	Humor lesson	Non-humor lesson
Sound reflection	Visual-Figural	Draw a room with speakers. At the center of the room, draw a student or a familiar person where the sound concludes.	Draw a room with speakers. At the center of the room, draw a stick figure where the sound concludes.
Diffraction	Visual	Mime the actions of a person being overcome by a big wave to show that small objects do not obstruct large sound waves.	Use a book or wallet to show the path of small sound waves around a small object.
Phase Shift	Auditory	Imitate the sound of a nasally, nagging person like Erkle to demonstrate the sound of phase shift.	Make a nasally noise to imitate phase shift.
Phase vs. Polarity	Verbal	Introduce an audio clip that demonstrates out of phase	Explain that students will to hear a demo. of out of phase in the audio clip.

Pilot test procedures. Population: The pilot instructor teaches at the same school, and at both campuses as the instructors in the study. This teacher has four years of teaching experience in Arizona, all at ACRS. This teacher is knowledgeable about the purpose of the study and often uses humor in his lectures. He gave the humor and non-humor instruction to two classes taught during the first cycle of the program. The content of the pilot class varies slightly from the treatment classes, but it was chosen for the pilot because the academic experience of the group of pilot students is representative of the students in the study, as they are also students in the first cycle. The pilot provided the

opportunity to evaluate the logistics of the study, including instruments and measurements. It also allowed the researcher the opportunity to improve data analysis procedures.

Instrument #1: pre-test. Format: The pre-test was an online quiz that contains 15 short-answer questions posted on the school's portal. Some topics covered were: historic moments of recording, types of recording devices and the evolution of recording techniques. The students were familiar with this format of testing.

Content: The questions were based on 15 conceptual ideas presented in the lecture. The format of the questions will be the following: Students generate a short response to the questions presented.

Reference: A complete copy is included in the appendix (see Appendix B).
Pilot test procedures and results: As a result of the pilot study, no students crossed the reliability threshold by answering 60% or more of the questions correctly. High achievement on post-tests was attributed to new learning as a result of the treatment. Due to the computer's grading algorithms, if a student did not answer the question exactly as it was inputed, the student would not get credit for knowing the answer. Typos and spelling errors attributed to this error. In another case, a student answered with the artist and the album when the correct answer was just the album, the student did not receive credit. This functionality issue required the instructor to re-grade the test using subjectivity.

It was decided that the study should use multiple-choice questions where the correct answer will be listed among four possible distracters from which students select the most reasonable answer. This will eliminate subjectivity and increase grading reliability.

Instrument #2: post-test 1. Format: Like the pre-test, post-test 1 is an online quiz contains 10 short-answer questions. Some topics covered are the historic moments of recording, types of recording devices and the evolution of recording techniques. The test is posted online on the school's portal. The students are familiar with this format of testing and received training during orientation.

Content: The content on the post-test is the same as test pre-test except the order of the questions will be electronically randomized to prevent students from remembering the order of the answers.

Reference: The questions used for the pilot post-test 1 are the same as those used in the pretest and can be found in the appendix (see Appendix B & C).
Pilot test procedures and results: The pilot test was intended to include extraneous questions of which students may have prior knowledge. These questions will be eliminated from the study. However, since no students exceeded the reliability threshold, no questions were eliminated.

Instrument #3: open-ended group interview questions. Format: Seven open-ended interview questions were delivered by the instructor and transcribed by the researcher.

Content: Questions were delivered to groups of approximately six students after the post-test. Students self-reflected on the lesson and the instructional practices that they felt were beneficial to them.

Reference: A complete copy of the group interview questions is located in the appendix (See Appendix D).

Pilot test procedures and results: Both classes were interviewed in small groups with the same initial questions. The data harvested from the non-humor group was determined as not useful because it did not provide any insight into the students' perceptions of the humor-embedded lesson. As a result, only students in the humor groups were interviewed.

Instrument #4: post-test 2. Format: Post-test 2 of the pilot contained 10 multiple-choice questions from post-test 1 delivered in the same electronic format, but administered two weeks later.

Content: The content was the same as post-test 1 except the order of the questions was electronically randomized to prevent students from remembering the order of the questions.

Reference: The questions used for the pilot post-test 2 are the same as those used in the pre-test; the pre-test and post-test 2 questions for the study are the same. These can be found in the appendix (see Appendix B & C).

Pilot test procedures and results: The data from post-test 2 was compared to the data from post-test 1. The researcher determined if growth in scores indicated memory retention. As with the result of the pilot study post-test 1, it was determined that the short answers generated by the students were not reliable data. The electronic grading system marked answers that were misspelled as incorrect. Any deviation from the answer inputted into the system was marked as incorrect. Some questions required multiple parts for the answer, but were scored as incorrect if answered only partially were marked. To determine if the student understood the material required additional instructor input and discretion was necessary. Based on this finding, it was determined that multiple-choice questions, where the student is asked to select the correct answer from a list of distracters, would replace the short answer format in the study.

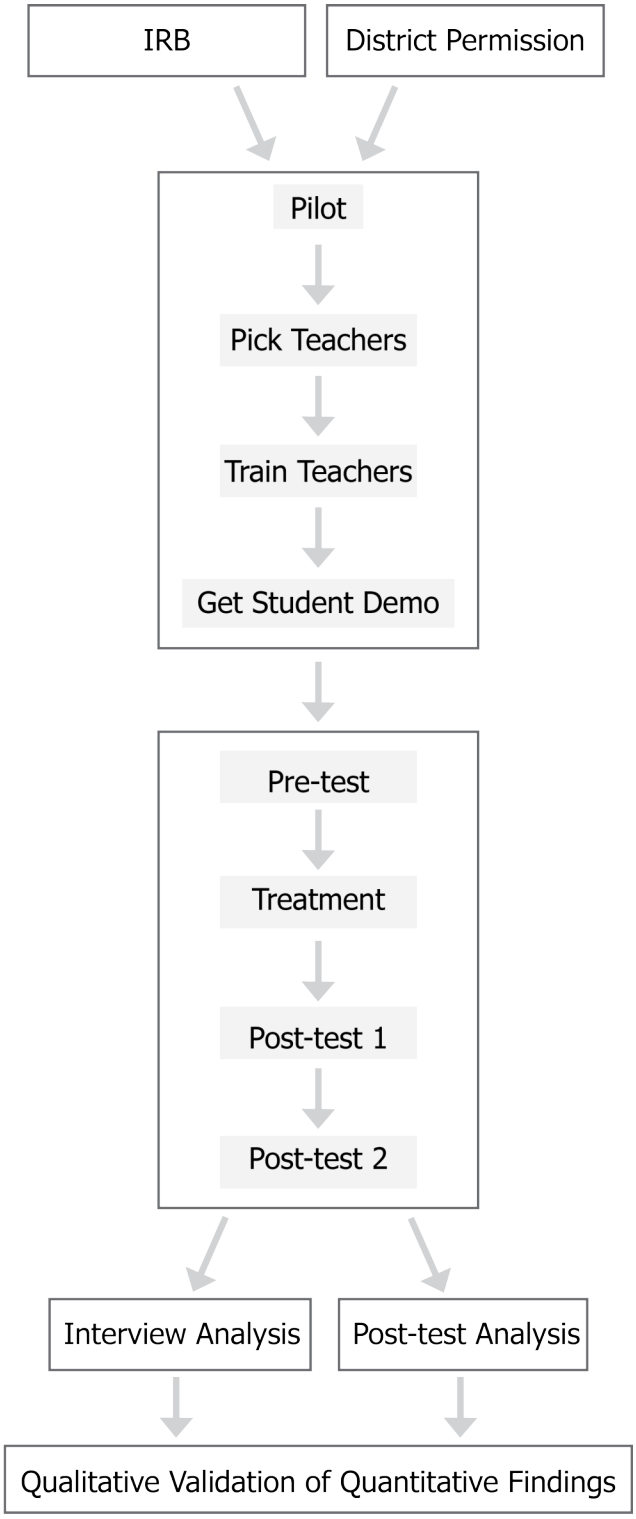
Additional Data: Two questions were built into the study that did not have a humor stimulus to allow further comparative data analysis at the topic level if the humor group showed significant growth. This allows the researcher to be able to

investigate the results of the humor treatment and learning style and/or teaching method for each topic. Because the humor group did not show significant growth and mean scores were 9 out of 10 points, an item analysis was not conducted.

Sources of information. Sources of information include pre-test scores, post-test scores, interview data, and observational data. Additional sources of information were needed for this study from the school administrators, which included loan information, student grades, demographics and test results from the schools online portal.

Materials & equipment. This study requires the preparation of the lesson design through collaboration of instructors and the researcher. To conduct the humor-embedded lecture, teachers need computers with Keynote software and projection capability. The lesson requires access to the online portal to the pre- and post-test data. Additional materials and equipment include balloons for sight gags, stereo and audio equipment for auditory stimuli and a research assistant to transcribe concurrent interviews.

Figure 3.6 Data Collection Procedures



Data analysis procedures. Research Question 1: Will students who receive humor-embedded instruction achieve higher gain scores on post-tests than students who do not receive humor-embedded instruction?

Data is analyzed by observed gain scores between pre- and post-tests. Data for those tests is analyzed for descriptive statistics, averages, mean scores, and T-tests. Results are compared between humorous and non-humorous groups.

Research Question 2: How will students who received humor-embedded instruction scores on post-tests that indicate memory retention compared to students who did not receive humor-embedded instruction?

Data is analyzed by observed gain scores between pre- and post-tests. Data for those tests is analyzed for descriptive statistics, averages, mean scores, and t-squares to determine if there is a significant difference between groups.

Table 3.5 Quantitative Data Analysis Procedures

Research Questions	**Data Source**	**Data Analysis to determine answer to questions**
1) Will students who receive humor-embedded instruction achieve higher gain scores on post-tests than students who do not receive humor-embedded instruction?	Gain Scores on Post-tests	Descriptive Statistics Averages T-tests
2) Will students demonstrate greater memory retention from humor-embedded instruction and achieve higher gain scores on post-tests than students who did not receive humor-embedded instruction?	Gain Scores on Post-tests	Descriptive Statistics Averages T-tests

Research Question 3: What do students self-report concerning humor, achievement, and memory retention on open-ended interview questions?

The data analysis procedure to answer this question requires the coded data from the interview questions be compared to the quantitative data from the post-tests to determine if there are common themes between student responses. Quantitative and qualitative data is compared to determine if the student responses support or refute the findings from the post-test data.

Table 3.6 Qualitative Data Analysis Procedures

Research Questions	**Data Source**	**Data Analysis to determine answer to questions**
3) What do students self-report concerning humor, achievement, and memory retention on open-ended interview questions?	Open-ended Interview Questions	Coding and Thematic threads

Table 3.7 Convergence of Qualitative and Qualitative results

Research Questions	**Quantitative Results**	**Qualitative Results**	**Comparison Convergence**
1) Will students who receive humor-embedded instruction achieve higher gain scores on post-tests than students who do not receive humor-embedded instruction?	Gain Scores on Post-tests Descriptive Statistics Averages T-tests	Coding and Thematic threads	Agreement between qualitative findings and interviews and observations
2) Will students demonstrate greater memory retention from humor-embedded instruction and achieve higher gain scores on post-tests than students who did not receive humor-embedded instruction?	Gain Scores on Post-tests Descriptive Statistics Averages T-tests	Coding and Thematic threads	Agreement between qualitative findings and interviews and observations
3) What do students self-report concerning humor, achievement, and memory retention on open-ended interview questions?	Open-ended Interview Questions	Open-ended interview questions	

Summary

In summary, data collection and analysis for this study is both quantitative and qualitative. The initial data is gathered through quantitative methods then supported, if not explained by, the qualitative methods. Students will explain their experiences and perceptions of humor in the classroom. The student's responses to the interview questions are compared to the students' achievement on tests.

CHAPTER 4: FINDINGS

Introduction

This chapter is intended to present the findings and results of the effects of humor-embedded instruction on student achievement and memory retention. Findings include: descriptive statistics for the humor and non-humor groups, mean (average) gain scores of post-test 1 and post-test 2 for both humor and non-humor groups, and a series of independent sample t-tests to investigate the potential differences between gain scores of humor and non-humor groups for each research question. Finally, small group interview responses were collected from the humor groups. The themes of the interview responses were compared to the findings from the post-test 1 and post- test 2 data.

Findings and Results

Summary descriptive statistics. The number of students who participated in the assessment pieces of the study (pre-test, post-test 1, post-test 2) ranged from as few as n=18 students who took the post-test 2 in the non-humor group to as many as n=22 who took post-test 1 and post-test 2 in the humor group. Students who did not participate in a test when assigned were not permitted to complete the pre- or post-test at a later date.

Inferential statistics: pre-test findings. The total number of students who took the pretest online in both groups was n=43, n=21 in the humor group and n=22 in the non-humor group. The scores for the pre-test for the entire sample ranged from 0 correct answers in the humor group to 9 correct answers in the non-

humor group. The pre-test scores ranged from the minimum of 0 to the maximum of 7 in the humor group. The non-humor group minimum was 0 and the maximum of 9 on the pre-test.

Table 4.1 Humor vs. non-humor group: pre-test mean scores

	Test group	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Error	Std. Deviation Statistic
Pre-test	Humor	21	7	0	7	3.48	.440	2.015
	Non-Humor	22	9	0	9	3.86	.507	2.376

The mean (average) score in the humor group was 3.48 with a standard deviation of 2.015, slightly lower than 3.86 (2.376) in the non-humor group. There were no significant differences between the mean scores of the humor and non-humor groups ($F=0.414$, $p=0.524$) on the pre-test. This indicates that the samples were appropriately matched, despite scores at one campus seeming to be significantly higher (5.05 average) to the other campus (2.23 average) because the mean of the scores was similar between treatment groups.

Subproblem 1. How will students who receive humor-embedded instruction achieve on initial post-tests that indicate achievement compared to students who do not receive humor-embedded instruction?

Procedure#1: Compare gain scores from pre-test to post-test 1 across humor and non-humor groups.

The findings from this study did not show that students in the humor group achieved higher post-test scores than students in the non-humor group.

The scores for post-test 1 in the humor group ranged from 0 to 9. The range in the non-humor group was similar, 1 to 9.

Table 4.2 Humor vs. non-humor group: pre-test to post-test 1 gain scores

	Test group	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Error	Std. Deviation Statistic
Pre-test	Humor	21	7	0	7	3.48	.440	2.015
	Non-Humor	22	9	0	9	3.86	.507	2.376
GAIN pre- to post-test 1	Humor	20	9	0	9	4.30	.539	2.408
	Non-Humor	22	8	1	9	4.86	.452	2.122

The mean gain score between the pre-test and post-test 1 was not higher for the humor group whose gain score was 4.3 points (2.408) compared to the non-humor group whose gain score was 4.86 (2.122 standard deviation). A series of t-tests were run to see if there were statistically significant differences between pre-test and post-test 1 gain scores between groups. The non-humor group showed significantly more growth than the humor group in post-test 1. However, both groups showed highly significant differences between the pre-test and post-test 1 scores ($p < 0.001$). In separate paired t-tests, both groups had a 2-tailed significance value of $p<0.001$ between their own pre-test and post-tests 1 and 2. It can be interpreted from these both groups showed significant improvement between the pre-test and post-test 1.

Table 4.3 One-way ANOVA: Comparison across humor and non-humor groups

		Sum of Squares	df	Mean Square	F	Sig.
Pre-test	Between Groups	88.387	3	29.462	10.164	.000
	Within Groups	113.055	39	2.899		
	Total	201.442	42			
GAIN pre- to post-test 1	Between Groups	57.533	3	19.178	4.839	.006
	Within Groups	150.586	38	3.963		
	Total	208.119	41			

A one-way Analysis of Variance (ANOVA) showed that the gain scores for both groups (humor and non-humor) demonstrated significant growth between the pre-test and post-test ($F=10.164$, $p<0.001$). This indicates that the scores increased as a result of the lesson and both groups showed achievement. Further analyses using a t-test did not reveal a significant difference in gain scores for either group between the pre-test and post-test 1 ($F=0.724$, $p=0.400$). Therefore, the learning that occurred cannot be attributed to humor-embedded instruction.

Procedure#2: Compare gain scores from pre-test to post-test 1 across humor and non-humor groups to open-ended interview responses from the humor group to determine the effect of humor on student achievement.

Students in the humor group did not achieve higher gain scores on post-test 1 than the non-humor group. Students reported that the concepts that they remembered most, immediately following the lesson, were the different types of microphones, the examples of phase, and phantom power. These concepts were taught using teaching devices that appealed strongly to various learning styles.

For example, the instructor taught the examples of phase using an auditory cue. By passing around physical examples of phantom power supply, the instructor appealed to kinesthetic and auditory learners. The instructor appealed to these learners by providing an example of a standing wave. In this example, students experienced the concept by walking around the room listening for dead zones.

Students reported that what they liked best about the lesson was the different types of examples, especially the physical and kinesthetic examples. Students reported that the instructor made the material memorable by "providing examples in multiple ways," using lots of example, and appealing to many learning styles. One student reported that he "put it all together: auditory, visual, verbal, physical." The gain scores showed that all students learned the material using this multi-sensory approach. For the purpose of this study, to determine the effect of humor on student achievement, a singular learning style method, i.e. verbal, may have produced more definitive results. This study compared the overall gain scores between the pre- and post-test 1 to determine

student achievement; it did not examine the gain scores on a per question basis which would have provided insight into the learning style affect, nor did it account for the powerful teaching strategies that were used to explain concepts that were not assessed on the assessment components.

In response to interview questions about the students' experience with humor in the classroom, the students reported humor made instruction better, more interesting, more engaging, and more entertaining. Other students reflected that humor affected their achievement in the classroom because of the psychological effects. Students responses support research that students learn

better when they are more comfortable and less stressed (Jensen, 1998). One student reported that humor "helps me calm down so I can take in more information." Another student corroborated this idea, "Humorous tangents break up the lesson, like coming up for air between concepts." For these students, humor acts as a relief valve, letting out stress as it builds ups to allow student to calm down and absorb more information. Student responses in this study support the current research on the effect of humor-embedded instruction. However, their responses do not support the higher scores in the non-humor group.

Subproblem 2. How will students who received humor-embedded instruction score on post-tests that indicate memory retention compared to students who did not receive humor-embedded instruction?

Procedure#1: Compare gain scores from pre-test to post-test 2 across humor and non-humor groups.

Table 4.4 Humor vs. non-humor groups: pre-test to post-test 2 gain scores

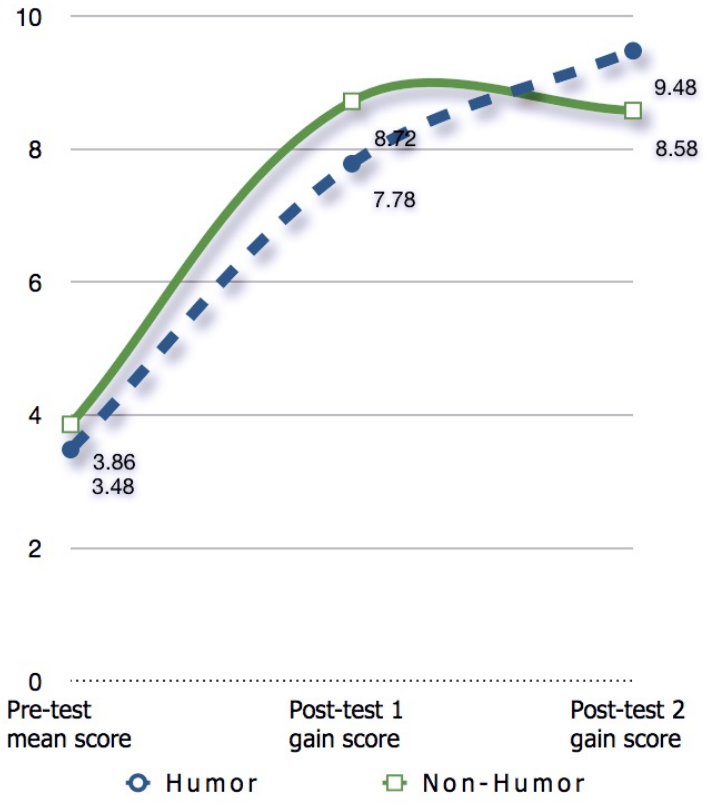
	Test group	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Error	Std. Deviation Statistic
Pre-test	Humor	21	7	0	7	3.48	.440	2.015
	Non-Humor	22	9	0	9	3.86	.507	2.376
GAIN pre-to post-test 2	Humor	20	9	1	10	6.00	.528	2.362
	Non-Humor	18	11	-1	10	4.72	.722	3.064

The findings from this study do support the hypothesis that students demonstrated greater memory retention as a result of receiving a humor component to the treatment than those who received the non-humor treatment. The humor group had slightly higher gain scores; however, there were no significant differences between the gain scores of the between pre-test and post-test 2. The humor group had a higher mean gain score of 6.00 (2.363) compared to the non-humor group, which had a mean gain score of 4.72 (3.064). A t-test between the humor and non-humor group showed a non-significant difference ($p=0.156$) when equal variances were assumed. However, this is greater than the significance threshold ($p<0.001$). An additional one-way ANOVA test between humor and non-humor groups did reveal significance. The humor group showed significant growth between the pre-test and post-test 2 with a two-tailed significance of $p<0.001$, and the non-humor group improved significantly as well ($p<0.001$). These findings indicate that both groups learned the content of the lesson through the treatments and retained the material. However, the humor group indicated that long-term memory is better with humor-embedded instruction.

Table 4.5 One-way ANOVA: Comparison across groups

		Sum of Squares	df	Mean Square	F	Sig.
Pre-test	Between Groups	88.387	3	29.462	10.164	.000
	Within Groups	113.055	39	2.899		
	Total	201.442	42			
GAIN pre- to post-test 2	Between Groups	133.281	3	44.427	10.220	.000
	Within Groups	147.798	34	4.347		
	Total	281.079	37			

Figure 4.1 Post-test gain scores shown with pre-test mean scores.



Procedure#2: Compare gain scores from pre-test to post-test 2 across humor and non-humor groups to open-ended interview responses from the humor group to determine the effect of humor on memory retention.

When asked how humor helps students learn, the humor group responded that humor makes concepts and lessons memorable. Students said that they remembered jokes and that humor helped them find a connection to the material. One students describe the effect on humor on memory like using an acronym, "When humor is relatable, it makes the topic easier to memorize. It's like an acronym. It's a technique that triggers your memory." Another student described the effect on humor similarly. He said that humor is like hanging the information on a hook in your brain so you'll know where to find it later. The jokes and humor creates a memorable experience. One student recalled that the most memorable experience for him was when the instructor drew a character of him on the board. Intended as visual humorous cue for the class, this humor technique created a lasting memory and a personal connection.

When asked how humor helps students remember, the humor group reiterated that humor is calming and allows the brain to remember more easily. This is consistent that humor reduces stress chemicals and triggers the reward centers of the brain. There was no significant difference between the post-test2 scores between the groups, however the means scores were lightly higher for the humor group and the student responses to interview questions support the theory that humor helps in memory retention.

Subproblem 3. What do students self-report concerning humor, achievement, and memory retention on open-ended interview questions?

Procedure: Determine thematic threads in student responses to questions about humor and instructional best practices.

Students were interviewed in groups of 4-6 after a question/answer period at the end of the lesson. The researcher transcribed the answers to the interview questions as the students responded. The questions were delivered and recorded in the following manner: the researcher read the question aloud, waited for a student to respond, recorded the response and recorded hash marks for students who nodded in agreement to the response. The benefit of this style of questioning was that students were able to validate others' responses and expand upon the answer if they agreed or, in some cases, disagree with another student. The researcher feels that this method of brainstorming answers in a small focus group enabled students to respond with a wide variety of responses. Students self-report they have had a positive experience with the humor treatment. Students reported that in the past, humor in the classroom, had not always been successful. Students report that humor is not effective when it is not in good taste or at the cognitive level of the group, or when the humor is off topic or when it is overused. The use of humor should be considered based on the audience and its purpose.

When recalling positive humor experiences, one student recalled that his favorite teacher was funny and another recalled he "learned the most from my

funny teachers." Students generally attribute these positive experiences with humor to the teacher rather than the humorous material. Humor is viewed as part of the teacher's personality rather than a purposeful instructional tool. When asked what did the instructor to present the material in a memorable way, the students responded with comments about his personality the he was "playful and laid back," "not dull," and "his personality has pizzazz." One student responded, "There is character and life in his lecture." This sentiment reflect the ultimate purpose of humor which is to connect the student to the teacher through enjoyment and create an environment that is lively and attentive (Wandersee, 1982). Another student made a direct correlation to this connection when he responded "there wasn't too much space between the students and the teacher." Humor has the ability to build this community and reduce distance between people. When students do not feel the separation of "us" and "them," they are more likely to take risks and be more creative in the classroom.

Simply put, students in this study liked the class because they liked the instructors and the presentation style. They recalled that humor was used frequently throughout the lesson. The teacher is the intermediate step between the curriculum and the student. The humor group reported that they enjoyed the class. They specifically recalled the instructor comedic timing as enjoyable and helpful for learning. The deliberate use of pauses helped students comprehend the material. They reported that this gave them a moment to let the information sink in so they could understand the material.

Summary

This chapter has summarized the findings and results for the study of the effects of humor-embedded instruction. The findings show that humor and non-humor groups were similarly matched. Both groups showed significant growth between the pre-test and the post-test 1; however, the scores of the humor group did not increase significantly more than the non-humor group This shows that the students learned the material through both methods of instruction. Interview responses indicate that students had a positive experience in class and reported that humor is beneficial to learning and memory.

CHAPTER 5: CONCLUSION

Introduction

The impetus for this study was a teacher left speechless in the teacher's lounge draped in a Hawaiian shirt and plastic lei, when a colleague said, "I don't have time for fun in my classes." Questions began to surface for the researcher: What is the role of humor in education? What do we lose if we don't make time for fun and laughter? This study addressed these questions and concludes that humor plays an enormous role. The value of humor, psychologically, cultural, cognitively and socially, cannot be underestimated. This value is gained at not cost of precious instructional time nor does it require more preparation than traditional teaching methods. We lose a lot if we lose our humor. Chapter Five presents the summary, conclusions, recommendations and implications from this study of the effects of humor on student achievement and memory retention.

Summary of Study

As teachers and administrators come under tremendous pressure to get more done with less resources and less time, a straightforward and serious approach to teaching practices has become increasingly more popular. This is at a great disadvantage to students and teachers. The recent trend toward teaching with standardized curricula has limited the creativity of the teachers who teach to the tests and read from prescribed scripts. What is lost is connection with students and understanding of the content. Students lose the social benefits of humor as a coping tool to interact with different people, difficult situations and academic stress if educators chose not to make fun a priority. While research continues to argue whether humor is help or hindrance to the academic growth

of students, this study examined the effect of humor in increasing memory retention and achievement on classroom assessments through humor embedded lessons analyzed using multiple-choice tests. While the quantitative data in this study is inconclusive, the responses from open-ended interview questions with students in this study corroborate the findings of current and previous research on the use of humor in the classroom, its effects on achievement and memory retention, its use as a best teaching practice, its effect on the cognitive development of students, as well as the social and educational benefits.

Summary of Findings and Conclusions

Results of the quantitative data collection procedures were unexpected. It was hypothesized that as a result of the treatment, students in the humor group would show greater achievement of tests. If it is true that using humor-embedded instruction has similar as multi-sensory instructional methods, with the additional social, psychological, and cognitive benefits, the question becomes why aren't more educators using humor in their lesson designs?

The design of the assessment pieces may have limited the students' possibility for growth in gain scores in this study. Further studies may incorporate a greater number of test questions because 10 questions may not have been enough to determine prior knowledge and accurate growth in gain scores. The pre- and post-tests in this study had a maximum possible score of 10 points. Students who scored ~5 on the pre-test were capped at a gain score growth of 5. Students who score ~2 on the pre-test had possible gain score growth of ~8. Mathematically, the number of test questions limited the growth opportunity. A larger data pool may allow for researchers to observe more growth. It is possible

that if there were more test questions on the assessment pieces that the study would have shown even more growth for some students and possibly significantly different gain scores between the two treatment groups.

This study investigated the effect of humor on student achievement. The quantitative data did not show that students who were taught using a humor-embedded lesson achieved higher scores on initial post-tests. However, students in this study corroborate research on humor in education in several ways. They reported in response to interview questions that humor helped them learn because it reduced stress. As much as humor in the lesson calmed the students, it also livened the discussions and helped keep the students' attention throughout the class. In previous research on humor, laughter is said to trigger the reward, or pleasure centers of the brain. The students in the humor group stated that the enjoyed the class for many reasons including the instructor's use of humor. It was observed in this study that when students "got it" they would laugh, nod in affirmation, or participate in the joke telling. Students in both groups showed significant growth and learning. Both the humor treatment and control groups used methods that were effective teaching techniques, but the humor group also reported reduced stress and that class lively.

The second research question asked how humor-embedded instruction affected memory retention. The humor group had statistically, significantly higher scores than the non-humor group three weeks after the lesson was taught. Therefore, it can be concluded that humor does aid in memory retention. During the interview, the students made analogies that humor was like memory hooks to hang the concepts on and acronyms or pneumonic devices

that help trigger memories. At the same time students enjoyed the experience of learning. Therefore, it can be concluded that humor helps students remember information.

The final question asked how students would self-report about their experiences with humor. Overall, students liked it. They enjoyed the lesson and showed growth on post-tests. Therefore, it can be concluded that the humor-embedded lesson was a successful tool for learning, and students agreed with this conclusion.

Further, research that criticizes the use of humor in the classroom includes the theory that humor encourages off-task behavior. The researcher did not observe any off-task behavior as a result of the use of humor in the lesson. Students even added their own content-related jokes to the lesson. Another criticism is that humor is a distraction that wastes time. As a result of this study, this researcher can conclude that humor requires no additional instructional time for planning or delivery. Both instructors taught the same amount of material in the same amount of time. The humor treatment of this study was compared with differentiated, multi-sensory instructional techniques targeted to learning styles. These techniques were powerful and effective. It should be noted that humor scores did not *decrease* in comparison to these techniques; instead humor had statistically insignificant outcomes. Based on mean scores, it can be assumed that the humor treatment and the differentiated multi-sensory instruction had similar results. Humor is not a time waste and is as valuable a teaching technique as those targeted at learning styles, such as visual and auditory cues. Because this study compared the humor treatment against multi-sensory,

differentiated instruction, this may not have been a true comparison of instruction that occurs in most classrooms, where the lecture method is the dominant instructional strategy. Future studies, which focus on the comparison between humor instruction and lecture-style instruction, rather than multi-sensory instruction, may find different results.

Recommendations for further research. Further studies in humor and education may explore the role of gender. Current research shows that there is a difference in the way humor is presented depending upon the gender of the teacher (Wandersee, 1982). However, little research exists which investigate the way humor is received based on gender. This study has no evidence of a difference in the way humor was received between genders due to the population of the students (93% male, 3% female). This study was unable to validate the findings of Azim et al., (2005) that humor activates the reward centers (mesolimbic) of the female brain differently than the male brain. Future humor studies with a larger population of females may have different results than this study. Additional research may explore the effects of humor with lower socioeconomic groups to examine if humor helps bridge achievement gap between classes by minimizing inequalities and level the playing field. Research may explore the effects of humor on lower achieving groups to see if humor has the ability increase engagement to such a degree that achievement is increased.

Recommendations for practice. The implications for this study include the opportunity for teacher training in the methodology of humorous instruction. The emphasis of the training should be teacher presentation skills. It is a

controversial notion that teachers are entertainers. Some teachers do not want to play the clown for the sake of pandering to students. However, in the context of a world where students are marketing targets from many sources, including TV, internet, videogames etc, teachers must be entertaining. If the curriculum is the product we are trying to sell, then we must employ the tricks of a good salesperson. We must be engaging, entertaining, and humorous. Students often attribute humor as a positive trait of a teacher. However, humor should no longer be viewed simply as a personality trait; it is also an instructional tool that can be learned, practiced, and developed. Students in this study reported that comedic timing of the instructor included pauses that allow the information to sink in. Teachers who use humor in the classroom can learn to use pauses as cognitive wait time.

As the delivery of education changes and many schools move towards online learning, educators will need to shift teaching styles to fit the emerging format. Humor translates easily into an electronic format. Humorous images can be inserted in to web design, jokes can be inserted into videotaped lectures, and humor can be incorporated into discussion boards and live online discussions. Other learning strategies, such as kinesthetic techniques may not translate as easily as humor into digital learning.

Recommendations for leadership. In many classrooms, the ideal sound is quiet. Silence is golden. A school leader may walk by a silence classroom and make assumptions like the students are hard at work, they are not distracted or goofing off. They are focused, attentive and above all, learning. However, in the new schemata where humor is valued, the ideal sound

in a classroom is laughter. Laughter is platinum. School leaders may soon come to recognize the value of fun and laughter. Student who are laughing are engaged, relaxed, attentive, and above all learning. Laughing students are engaged and motivated to learn. Leadership should invest in enjoyment and engagement in the classroom, as it is an investment in achievement. The economic investment is minimal. Jokes are free. There are no additional costs to present in a humorous manner. It cost no additional time to deliver humor-embedded instruction. Used correctly, humor incurs no additional off-task behavior than tradition instruction when students are not engaged. Current practice uses literal, straight-forward teaching methods to achieve immediate learning goals on standardized tests. Humor research, including this study, suggests that the goal of learning should be more distance, that learning should be last, be remembered, and used throughout a person's lifetime. The purpose of school is not to learn well enough to bubble in circles and forget the material. The purpose of school is to learn well enough to know and understand the concepts, which are worth teaching.

Implications

The world beyond the school may be dark and grey, clouded with economic, social, political, and emotional strife. Within the four walls of a classroom, the mood is often sober and serious, weighed down by the pressures of testing and accountability. Humor is a useful release valve for teachers and students. The use of humor in instruction can meld a group of individuals into a class that is a safe place to take academic risks. It helps build a community that students may or may not have in the real world. Humor in safe places,

classrooms helps teachers approach sensitive topics with their classes, eases tension, and makes the learning environment more enjoyable for both teacher and student. Students learn from literal, straight-forward teaching methods, especially in the short term. However, students retain information longer if humor is used as a teaching method. Therefore, humor is a powerful and effective tool for learning that is remembered. The miserable student does not learn. The laughing child does not forget.

APPENDIX A

HUMOR/NON-HUMOR LESSON PLAN

Effects of Humor **on Student Achievement and Memory Retention**		Researcher	ASU	
	AM or PM	Teacher A or Teacher B	CRAS	Campus 1 or Campus 2

Topic: Reflection
Humor Type: Figural

Humor	Non-Humor
Draw room where sound concludes at the center of the room draw a caricature of a student or well-known person.	Draw room where sound concludes at the center of the room draw a stick figure.

Topic: Diffraction
Humor Type: Visual

Humor	Non-Humor
Mime the action of being overcome by a giant wave to show that small objects do not obstruct large sound waves.	Use a book or wallet to demonstrate small sound moving around a small object.

Topic: Condenser Microphones
Humor Type: Visual

Humor	Non-Humor
Use a balloon on a person with long hair to show the principles of electrostatic energy.	Explain that electrostatic energy is what you feel after walking on carpet and touching a metal door handle.

Topic: Velocity of Sounds
Humor Type: Figural
Description: Cartoon

Humor	Non-Humor
Draw a cartoon of superman traveling faster than sound around a stage.	Draw a stage with arrows indicating velocity.

Topic: Shift Phase
Humor Type: Auditory
Description: Impression

Humor	Non-Humor
Make a nasally sound imitate shift phase, imitating a nagging person like Erkle.	Make a nasally sound imitate shift phase.

Topic: Phase vs. Polarity
Humor Type: Verbal
Description: Limerick

Humor	Non-Humor
Limerick to introduce audio clip. There once was a man from Nantucket, who couldn't mix crap in a bucket. He farted a bit here, and puns a bit there...The client sighed and said 'Man, you f'd it.	Explain what students can expect to hear in the audio clip.

Effects of Humor on Student Achievement and Memory Retention		Researcher	ASU	
	AM or PM	Teacher A or Teacher B	CRAS	Campus 1 or Campus 2

Topic: Tube Microphone
Humor Type: Verbal

Humor	Non-Humor
Imitate Spicoli from Fast Times at Ridgemont High or a Ninja Turtle to introduce "tubular" microphones	Explain tube microphones literally.

Topic: Dynamic Microphones
Humor Type: Auditory/visual

Humor	Non-Humor
Imitate the other instructor in the study treating a dynamic microphone	Explain how to handle a dynamic microphone literally.

Topic: Amplitude
Humor Type: Visual
Description:

Humor	Non-Humor
	Literal explanation of amplitude using a multi-colored drawing s

Topic: Polarity
Humor Type: Kinesthetic

Humor	Non-Humor
	Describe the properties of polarity literally, and have students walk around to head the "dead zones" of polarity

APPENDIX B

PRE-TEST/POST-TESTS USED IN PILOT STUDY

Question	Answer
1. Who invented the first phonograph?	Edison
2. What album was the first to be recorded, mixed and mastered using all digital gear?	Dire Straights, Brothers in Arms
3. What band put on a concert festival using the hell's angels as security and resulted in several riots?	Rolling Stones
4. What album spent a total of more than 31 years on the Billboard top 200 charts?	Dark Side of the Moon
5. What blues singer/guitar player is known for supposedly selling his soul to the devil?	Robert Johnson- Figural/ Cartoon Devil
6. What was the name of the instrument the Beatles used for the intro to Strawberry Fields Forever?	Mellotron
7. In what year did MTV first go on the air?	1981
8. What song, widely considered to be the beginning of the rap genre, was made from illegal samples of a disco song?	Rappers Delight
9. What was the name of the engineer who first put faders in a console?	Tom Dowd
10. Who was the inventor of the first solid-body electric guitar?	Les Paul
11. Who was the engineer who mixed the Woodstock releases?	Eddie Cramer
12. Besides recording to a phonograph (disc or cylinder), what other method of recording was available in the 1930s?	Optical Recorder
13. During what decade did magnetic tape become a recording medium?	1940's
14. What artist originally recorded the rock and roll anthem "Roll Over Beethoven"?	Chuck Berry
15. What were the first words ever to be recorded and played back?	Mary had a little lamb whose fleece was white as snow.

APPENDIX C

PRE-TEST/POST-TESTS USED IN STUDY

Question	Answer
Question 1 A tube microphone requires phantom power.	a. True b. False
Question 2 Sound has the ability to bend around an object. This property is called:	a. Refraction b. Diffusion c. Reflection d. Diffraction
Question 3 Sound will always reflect off a boundary at:	a. Equal angle, opposite direction b. Greater angle, opposite direction c. Equal angle, same direction d. Lesser angle, opposite direction
Question 4 The amplitude measurement that shows the average amplitude level of a signal is:	a. Peak b. Peak to Peak c. Plasma d. RMS
Question 5 The operating principle of a condenser microphone is:	a. Hydroelectric b. Piezoelectric c. Electromagnetic d. Electrostatic
Question 6 The operating principle of a dynamic microphone is: Choose one answer.	a. Hydroelectric b. Piezoelectric c. Electromagnetic d. Electrostatic
Question 7 Two sine waves with the same frequency and amplitude but out of polarity will:	a. Attenuate b. Do Nothing c. Go Platinum d. Amplify
Question 8 What is the proper method of fixing a phase shift?	a. Adjusting time alignment b. Pushing the polarity button c. Adjusting the amplitude d. Adjusting EQ settings
Question 9 What is the velocity of sound?	a. 1130 ft per second b. 1130 ft per minute c. 3110 ft per minute d. 3110 ft per second
Question 10 What material is ribbon made of in a ribbon microphone?	a. Aluminum b. Gold c. Neodymium d. Copper

APPENDIX D

OPEN-ENDED INTERVIEW QUESTIONS

Interview Questions


Effects of Humor on Student Achievement and Memory Retention


What did you like best about this lesson?

I liked the part about microphones and the explanation of how they work.
I thought the presentation was really good.
The physical examples were good.
He had good delivery with the Ppt.
T was not intimidating, he was friendly.
Some of the material was complicated, but he explained like kindergarten/ freshman could understand.
I enjoyed his was of presenting.
He lighten of the situation
His demeanor is easygoing.
Great pace.
The pace, his teaching style was friendly
Not too much separate between students and teacher
The subject matter

What do you remember most about this lesson? Give an example

Different types of microphones
Line levels- It used to be magic, now I understand the why behind it.
It needs power and level.
Phantom power 2x - I understand now where power came from.
I learned there is only one way to fix phase shift.
I didn't know that there are different types of condenser mikes.
I feel confident about types of mike.
When the teacher drew a picture of me
Examples of phase
Node, and moving around

What did the instructor do to present the material to make it memorable for you?

Put it all together: auditory, visual, verbal, physical.
Learn out of a book-- doesn't work for me
He made it stick.
Lots of example.
He mixed it up for 4-hour class.
The diagrams were easy to follow.
Made it visual and relatable.
Examples in a multiple ways.
We could stop him to explain when we had questions.
He was accommodating and aware of class.
Knowledgeable
Animated
Down to earth
How he gave notes

How was humor used in the lesson? Give an example

Jokes. Life is an RPG and you just leveled up.
Pausing and staring.
His personality has pizzazz.
Not dull.
There is character and life in his lecture.
Switches slide well -- pauses because give you a chance to comprehend what's being said
Playful and laid back
A lot
Often
Frequently
Effective

What is your experience with teachers who use humor in the classroom?

It makes it more interesting.
My favorite teacher was funny.
I learned the most from funny teachers.
Lectures are more interesting. Like an acronym to remember
Learn better, more comfortable.
Not so stressed.
Humor didn't always work.
They told jokes that no one got.
I don't like humor when I'm still in stress mode.
Shouldn't need a dictionary.
Humorous analogy that relate to the topic.
Better, Not boring
Find a connection
Entertaining

How can humor help students learn?

Calms me down to take in more info
Humorous tangents break up the lesson like coming up for air between concepts.
Calming down the brain to allow you to remember. Levity. His demeanor.
When the humor is relatable, is makes it easier on memorized. Like an acronym, it's a technique to help you remember.
Memorable
Remember jokes

When can humor detract from learning?

When it is over used?
It depends on the learning style-Humor is not good those who are more serious.
Over the head or when students are not relate able.
Tasteless, in appropriate or shocking.
If not used (politically) correctly.
Distracting when its off topic
It doesn't

APPENDIX E

STUDENT SCORES ON PRE- AND POST-TESTS

	Pre-test	Post-test 1	Post-test 2	AVERAGE	GAIN pre- to post-test 1	GAIN pre- to post-test 2
A AM						
Student 1	5	8	10	7.67	3	5
Student 2	4	9	9	7.33	5	5
Student 3	4	6	9	6.33	2	5
Student 4	6	9	10	8.33	3	4
Student 5	4	8	10	7.33	4	6
Student 6	3	6	6	5.00	3	3
Student 7	3	8	10	7.00	5	7
Student 8	6	10	10	8.67	4	4
Student 9	3	8	8	6.33	5	5
Student 10	7	7	8	7.33	0	1
Student 11	6	8	10	8.00	2	4
AVERAGE	4.64	7.91	9.09		3.27	4.45
	5.045454545					
A PM						
Student 1	6	10	9	8.33	4	3
Student 2	9	10	8	9.00	1	-1
Student 3	5	10	9	8.00	5	4
Student 4	7	10	7	8.00	3	0
Student 5	6	10	10	8.67	4	4
Student 6	4	5	4	4.33	1	0
Student 7	4	10	10	8.00	6	6
Student 8	3	8	9	6.67	5	6
Student 9	4	10	10	8.00	6	6
Student 10	6	10	10	8.67	4	4
Student 11	6	8	10	8.00	2	4
AVERAGE	5.45	9.18	8.73		3.73	3.27

B AM						
Student 1	1	10	10	7.00	9	9
Student 2	1	6	Null	3.50	5	Null
Student 3	3	8	Null	5.50	5	Null
Student 4	0	6	10	5.33	6	10
Student 5	3	9	9	7.00	6	6
Student 6	1	5	Null	3.00	4	Null
Student 7	1	10	Null	5.50	9	Null
Student 8	4	9	10	7.67	5	6
Student 9	6	10	9	8.33	4	3
Student 10	1	9	10	6.67	8	9
Student 11	4	9	10	7.67	5	6
AVERAGE	2.27	8.27	9.71		6.00	7.00
	2.236363636					
BPM						
Student 1	0	9	10	6.33	9	10
Student 2	4	10	10	8.00	6	6
Student 3	1	8	10	6.33	7	9
Student 4	3	8	10	7.00	5	7
Student 5	1	9	10	6.67	8	9
Student 6	6	6	null	6.00	null	null
Student 7	1	8	10	6.33	7	9
Student 8	1	6	10	5.67	5	9
Student 9	3	6	10	6.33	3	7
Student 10	2	null	7	4.50	null	5
Student 11	null	6	10	8.00	null	null
Student 12	null	7	7	7.00	null	null
AVERAGE	2.20	7.55	9.45		6.25	7.25

APPENDIX F
CONSENT FORMS

Melissa McCartney

Doctoral Student

Mary Lou Fulton Teachers College
Arizona State University
PO Box 37100
Mail Code 3151
Phoenix, AZ 85069-7100

Date 1/19/11

Personal contact information:
23630 N. 38th Ave
Glendale, AZ. 85310
(602) 451-4521
melissa.m.matthews@asu.com

Research Study:

Stimuli-embedded instruction: effects on engagement, achievement and memory retention

CRAS Student Participant,

I am a graduate student under the direction of Professor Dr. Arnold Danzig in the College of Education at Arizona State University. I am conducting a research study to examine the effects of engagement stimuli on student performance.

I am inviting your participation, which will involve participation of two instructors and two classes of students per instructor during a three-week period. Teacher and student participation is completely voluntary. If you choose to participate, the study will involve taking pre-tests and post-test on material covered in the set curriculum. The scores between these tests will be analyzed for achievement growth. Finally, you will be interviewed for about their impressions about the instruction.

Again, instructor and student participation in this study is voluntary. If participants choose not to participate or to withdraw from the study at any time, there will be no penalty. You have the right not to answer any question and to stop the interview any time. Your grades will not be affected by participation in the study. Your name, on tests etc., will remain anonymous to the reviewer. As a participant, you may benefit from the study by participating in discourse about engagement and learning styles. There are no foreseeable risks or discomforts to the your participation.

Confidentiality will be maintained through coding of all materials that include identifiers such as names or ID numbers. Data will be stored on the reseacher's personal computer to help keep all data confidential. The destruction of all student tests, interview recordings and documents with identifiers will help ensure confidentiality. Your individuals' responses will be anonymous to the researcher. The results of this study may be used in reports, presentations, or publications but names be known or used.

I would like to audiotape the student group interview. The interview will not be recorded without student permission. Students can change their minds after the interview start.

If you have any questions concerning the research study, please contact my advisor at: Arnold.Danzig@asu.edu. If you have any questions about the rights of a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

Personal contact information:
23630 N. 38th Ave
Glendale, AZ. 85310
(602) 451-4521
melissa.m.matthews@asu.com

Sincerely yours,

Melissa McCartney

Your signature is considered consent to participate in the study.

_____

CRAS Student

Effects of Humor Study Script

You have been invited to participate in a study through Arizona State University This study is being used by graduate student, Melissa McCartney to obtain a doctoral degree in Education. Participation in this study is voluntary. If participants choose not to participate or to withdraw from the study at any time, there will be no penalty. You have the right not to answer any question any time. Your grades will not be affected by participation in the study. Your name, on tests etc. will remain anonymous to the reviewer.

Please review the information letter. I will be happy to address any questions you might have.

Thank you

ARIZONA STATE UNIVERSITY

Melissa McCartney
Doctoral Student
Mary Lou Fulton Teachers College
Arizona State University
PO Box 37100
Mail Code 3151
Phoenix, AZ 85069-7100

Date 1/2/11

Personal contact information:
23630 N. 38th Ave
Glendale, AZ. 85310
(602) 451-4521
melissa.m.matthews@asu.com

Research Study:

The effects of humor on student achievement, motivation and memory retention.

CRAS Instructors,

I am a graduate student under the direction of Professor Dr. Arnold Danzig in the College of Education at Arizona State University. I am conducting a research study to examine the effects of engagement stimuli on student performance.

I am inviting your participation, which will involve participation of two instructors and two classes of students per instructor during a three-week period. Teacher and student participation is completely voluntary. If students choose to participate, the study will involve taking pretests and posttest on material covered in the set curriculum. The gain scores between these tests will be analyzed for achievement growth. Participating teachers will give two lectures: one with a engagement stimuli treatment; the other without. Finally, participating students will be interviewed for about their impressions about the instruction

Again, instructor and student participation in this study is voluntary. If participants choose not to participate or to withdraw from the study at any time, there will be no penalty. They have the right not to answer any question, and to stop the interview at any time. Students will be informed that their grades will not be affected by participation in the study. The student's names on tests will remain anonymous to the reviewer. The recordings of the interviews will be destroyed upon completion of the study.

Instructors may benefit from the study by developing instructional strategies that increase student performance, achievement, and engagement. Students may benefit from the study by participating in discourse about engagement and learning styles. There are no foreseeable risks or discomforts to the students' participation. The researcher will minimize any discomfort the instructors may have about teaching with unfamiliar instructional practices by preparing and planning with the instructor before the treatment.

Confidentiality will be maintained through coding of all materials that include student identifiers such as names or ID numbers. Data will be stored on my personal computer to help keep all data confidential. The destruction of all student tests, recordings, and documents with student identifiers will help ensure confidentiality. Your individuals' responses will be anonymous to the researcher. The results of this study may be used in reports, presentations, or publications but names will not be known or used.

I would like to audiotape the student group interview. The interview will not be recorded without student permission. Students can change their minds after the interview start.

If you have any questions concerning the research study, please contact my advisor at: Arnold.Danzig@asu.edu. If you have any questions about the rights of a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at: (480) 965-6788. Please let me know if you wish to be part of the study.

Melissa McCartney
Doctoral Student
Mary Lou Fulton Teachers College
Arizona State University
PO Box 37100
Mail Code 3151
Phoenix, AZ 85069-7100

Date 3/28/11

Personal contact information:
23630 N. 38th Ave
Glendale, AZ. 85310
(602) 451-4521
melissa.m.matthews@asu.com

Research Study:

The effects of humor on student achievement, motivation and memory retention.

CRAS Administrators,

I am a graduate student under the direction of Professor Dr. Arnold Danzig in the College of Education at Arizona State University. I am conducting a research study to examine the effects of humor on student performance.

I am inviting your participation, which will involve participation of two teachers from your campuses and four classes of students during a three-week period. Teacher and student participation is completely voluntary. If students choose to participate, the study will involve taking pretests and posttest on material covered in the set curriculum. The gain scores between these tests will be analyzed for achievement growth. Participating teachers will give two lectures: one with a humor treatment; the other without. Finally, participating students will be interviewed for about their impressions about the instruction and use of humor.

Again, Instructor and student participation in this study is voluntary. If participants choose not to participate or to withdraw from the study at any time, there will be no penalty. They have the right not to answer any question at any time. Students will be informed that their grades will not be affected by participation in the study. The student's names on tests will remain anonymous to the reviewer. Any recordings of the interviews will be deleted at the conclusion of the study.

Instructors may benefit from the study by developing instructional strategies that increase student performance, achievement, and engagement. Students may benefit from the study by participating in discourse about humor and learning styles. There are no foreseeable risks or discomforts to the students' participation. The researcher will minimize any discomfort the instructors may have about teaching with unfamiliar instructional practices by preparing and planning with the instructor before the treatment.

Confidentiality will be maintained through coding of all materials that include student identifiers such as names or ID numbers. Data will be stored on my personal computer to help keep all data confidential. The destruction of all student tests, videotapes and documents with student identifiers will help ensure confidentiality. Your responses will be anonymous to the researcher. The results of this study may be used in reports, presentations, or publications but names will not be known or used.

I would like to audiotape the student group interview. The interview will not be recorded without all student permission. Students can change their minds after the interview start.

If you have any questions concerning the research study, please contact my advisor at: Arnold.Danzig@asu.edu. If you have any questions about the rights of a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

APPENDIX G

OBSERVATION NOTES

Effects of Humor on Student Achievement and Memory Retention		Melissa McCartney	ASU	1/21/2011
	AM	Instructor A	ARCS	Campus 1

Topic: Diffraction 7
Humor Type: Visual
Description: Mime

Humor	Non-Humor
Mime the action of being overcome by a giant wave to show that small objects do not obstruct large sound waves.	Use a book or wallet to demonstrate small sound moving around a small object.

Bend around objects around an object. Sound acts like water. Lots of arm movements and flailing as if under a huge wave.
Fishing technique- interesting.

Topic: Shift Phase 3
Humor Type: Auditory
Description: Impression

Humor	Non-Humor
Make a nasally sound imitate shift phase, imitating a nagging person.	Play example of two guitars that cancel out each other's low frequency

Sounds like an ex-girlfriend in your ear or a torture session.

How to fix: I'm worried about this. OOOOH NNNoooooo voical change

Do you have problems in your life? yes. Wanna switch? We haven't solve the problem.

Effects of Humor on Student Achievement and Memory Retention		Melissa McCartney	ASU	1/21/2011
	AM	Instructor A	ARCS	Campus 1

Topic: Condenser Microphones 9
Humor Type: Visual
Description: Sight Gag

Humor	Non-Humor
Use a balloon on a person with long hair to show the principles of electrostatic energy.	Explain that electrostatic energy is what you feel after walking on carpet and touching a metal door handle.

sees electrostatic principle . Rub feet on on the carpet. and touch the orr know 1-10,000V shock.. It's the current and amperage that gets you. 20 amps. is what comes out of the outline.

Keynote presentation operation and components

Phantom power:
Electrostatic charge between you head and balloon bring balloon closer charge increases away from head change dissipates.
Makes fun of himself for doing the demo

Topic: Phase vs. Polarity 4
Humor Type: Verbal
Description: Limerick

Humor	Non-Humor
Limerick to introduce audio clip. There once was a man from Nantucket, who couldn't mix crap in a bucket. He fades a bit here, and pans a bit there...The client sighed and said "Man, you f'd it. ⊞	Explain what students can expect to hear in the audio clip.

Are not the same thing!
Phase is a time relation.
Polarity - the absolute positive and negative peaks of a wave form.
polarity shift doesn't reverse time.

Plays track of song were vocals and music are out of phase.

Limerick
There once was a man from Nantucket, who couldn't mix a song in a bucket. He fades a bit here, and reverses a pans a bit there...The client sighed and said "Man, _____. You suck it. quiet polite giggles

Effects of Humor on Student Achievement and Memory Retention		Melissa McCartney	ASU	1/21/2011
	AM	Teacher A	ARCS	Campus 1

Topic: Reflection 6
Humor Type: Figural
Description: Caricature

Humor	Non-Humor
Draw room where sound concludes at the center of the room draw a caricature of a student or well-known person.	Draw room where sound concludes at the center of the room draw a stick figure.

Who has a studio in your house? Shall we draw your room? Shall I Draw you in your room. Here's you. With glasses. a normal nose. And facial hair "which I I can't Sound came back in the direction that it went out at. Student at the center of the drawing asks direct question - more involvement. 180degrees out of phase added together sounds will cancel out. it's not there cannot turn up. Reference your mix off different sound sources.

Equal to but opposite of angle from angle of incidence - analogy of billiards and mini golf.

Topic: Velocity of Sounds 2
Humor Type: Figural
Description: Cartoon

Humor	Non-Humor
Draw a cartoon of superman traveling faster than sound.	Draw a stage with arrows indicating velocity.

There is no exact # because every thing effects it. Iron man drawing jets on feet and hands chased by fighter jets he went supersonic. He went faster than the speed of sound. Think of Ironman and think of me. 1130. Superman & the Flash. Superman is a bastard. Reaction small giggles form one or two students. Recognition of Ironman movie

More giggles: you need to know algebra The hammer of life falls upon the anvil. V/F.
1130 ft per sec/Hz= 11.3 ft per cycle.

"Man, I just want to make records."-

Effects of Humor on Student Achievement and Memory Retention		Melissa McCartney	ASU	1/21/2011
	AM	Teacher A	ARCS	Campus 1

Topic: Dynamic Microphones 8
Humor Type: Auditory/visual
Description: Impression

Humor	Non-Humor
Imitate the other instructor in the study treating a dynamic microphone	Explain how to handle a dynamic microphone literally.

Use electromagnetic induction. Can need phantom power.. Show example: Suresm57. Very popular and inexpensive
Main factor . Don't do this I am a professional. BANG BANG. student 4 gasps.. Pokes fun of Alan for never taking andy chance with microphone . "Always treat a microphone like Alan Leggiyys lookin' at cha!"
Can you use speakers as microphone.

Dynamic Ribbon--- Does the the treatment mach the question- Question is about the material no the treatment. Keynote presentation operation and components

Topic: Tube Microphone
Humor Type: Verbal
Description: Pun

Humor	Non-Humor
"Tubular" favorite of ninja turtles	Literal explanation of tube mircophone

Explain that there is a vacuum tube inside. Doesn't need phantom power.

Ninja turtle joke.

Makes fun of the peopell who didn't get the joke. for doing the demo

Effects of Humor on Student Achievement and Memory Retention		Melissa McCartney	ASU	1/21/2011
	AM	Teacher A	ARCS	Campus 1

Notes: six tables separated my a center aisle. Instructor sits at the front an white board at the front center of the room. On the left. 6 males 2 at each table 3 white ,3 African American.

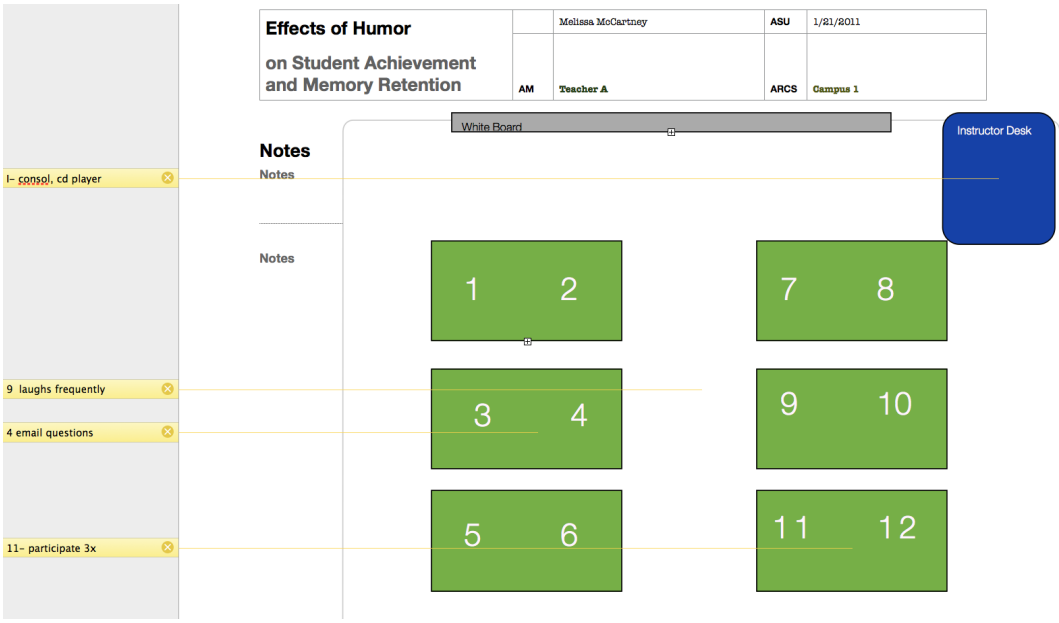
On the right 6 males 2 at each table, 5 white, 1 Hispanic.

Class begins with a quiz. Does this quiz cover wednesday material? Instructor grades the quiz immediately. Instructor goes over the answers o the quiz.

Review waveforms, sinewave, Plays example for a long time Pure tones. Explains that air pressure makes your ears hurt analolgy under water and at a concert. Amplitude, peak amplitude value. No humor., Clipping " Game over" - VOice change auditory CHeck voltage with voltage meter - nice move red and black pens demostrate with drawing on the board. Importance: I just want to make records Audio engineer - elecronic engineering.

Do you know who wired up that outlet? danger to people and gear. Check power at live sound recordings.

Microphone and marker technique. and pop filter!- very cool!



BIOGRAPHICAL SKETCH

Melissa Lee McCartney was born in Renton, Washington on July 20, 1976. She completed her elementary education from Kyrene de la Colina in Ahwatukee, Arizona. Her secondary education was completed at Mountain Pointe High School in 1994. Melissa graduated from the University of Arizona in 1999 with a BA in Creative Writing. She returned to school the following semester to earn a postbaccalaureate teaching certificate with a secondary endorsement. In 2001, Melissa joined the International Honor Society in Education, Kappa Delta Pi. Melissa was a classroom teacher for 7 years during which time she earned a Masters in Curriculum and Instruction concentration on secondary education from Arizona State University in 2004. Melissa was honored with several awards in teaching, including Phoenix district 2, Teacher of the Year. In the spring of 2006, she entered the graduate college at Arizona State University to pursue a doctorate in Educational leadership and Supervision. Melissa believes that humor is an essential aspect of education. Melissa laughs everyday.

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