EXEMPLARY UNDERGRADUATE TEACHING ASSISTANT INSTRUCTIONAL PRACTICES AS FRAMED BY THE ARCS MODEL OF MOTIVATION

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ABSTRACT

The purpose of this study was to examine undergraduate TAs to determine exemplary instructional practices as framed by the ARCS Model of Motivation and the common themes of the development of the exemplary instructional practices. The researcher used a sequential mixed methods approach (Tashakkori & Teddlie, 1998) to examine the undergraduate TAs. A survey was administered and examined quantitatively to select the best-case participants for the qualitative phase of the study.

The researcher identified three best-case undergraduate TAs to study in the qualitative phase. After the data were analyzed, a cross-case analysis of the best-case undergraduate TAs was conducted to determine the exemplary instructional practices and the common themes of the development of the exemplary instructional practices.

Sixteen instructional practices were identified as exemplary based on evidence gathered in the study. Six of the 16 instructional practices were common themes across all three of the best-case undergraduate TAs. The six exemplary instructional practices were informing learners of the objectives, applying concepts to academic situations, applying concepts to life outside of school, applying concepts to situations that may be beneficial in the future, walking around the lab to individually guide students, and teaching concepts that are useful. Ten of the 16 instructional practices were common themes across two of the three best-case undergraduate TAs. The 10 instructional practices were using reminders, topics, humor, familiarity of topics, encourage questions, repetition, giving time to practice during and at the end of lab, reviewing at the beginning
of each lab session, teaching concepts that students were not previously aware of, and accessibility outside of class.

Six common themes of the development of the exemplary instructional practices were identified. Four of the themes were common across all three of the best-case undergraduate TAs. The four common themes were course coordinator/orientation, oral and written reflection, modeling of the undergraduate TA that taught the undergraduate TA as a student, and modeling of the undergraduate TA's supervising TA as an LA. Two common themes emerged across two of the best-case undergraduate TAs. The two common themes were socialization and instructional practices that were developed unintentionally.
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CHAPTER I
INTRODUCTION

In the late 1990’s, approximately 35% of university students were enrolled in large-enrollment introductory courses (Twigg, 1999). Therefore, Twigg (1999) suggested that improving undergraduate education in these courses was vital to undergraduate students’ success in subsequent courses. One recommended solution was increasing the teacher-student ratio with the use of teaching assistants (TAs). Graduate TAs became increasingly more responsible for undergraduate education, as the graduate TAs taught more courses other than solely laboratories for large-enrollment courses (Shannon, Twale, & Moore, 1998). The increasing levels of responsibility were partially due to full-time faculty members focusing on graduate level instruction (Leslie, 2002).

Shannon et al. (1998) studied the effectiveness of graduate TAs, where they found that a degree in education or experience in teaching increased the graduate TA’s teaching effectiveness. However, most graduate TAs were hired based on their content knowledge as opposed to their teaching experience (Hardre, 2005; Marincovich, Prostco, & Stout, 1999). Another factor that affected the graduate TAs’ effectiveness was their cultural background. Many international graduate TAs were hired based on their command of the subject matter (Twale, Shannon, & Moore, 1997). International graduate TAs perceived effective instruction as the type of instruction that they received in their home country. Based on student feedback, the international graduate TAs used teaching strategies that were not effective in the university that they taught at based on differing cultures. This
misperception of effective instruction led to lower levels of student satisfaction when the international graduate TAs believed that they were teaching effectively.

To improve instructional effectiveness, institutions implemented orientation programs to prepare graduate TAs for teaching (Armstrong, Felten, Johnston, & Pingree, 2006). On-going formative assessment was recommended for training, but was costly and was not feasible at many institutions (Shannon et al., 1998). Therefore, most institutions provided a one or two day orientation for each academic year (Twale et al., 1997) due to a lack of funding, as opposed to on-going formative assessment.

Since funding was an issue at many institutions, Eby and Gilbert (2000) suggested a model utilizing undergraduate students as TAs. This model had pedagogical advantages over the use of graduate TAs. Eby and Gilbert (2000) stated that the undergraduate TAs were better prepared for teaching assignments than graduate TAs because they typically successfully completed the course for which they would be a TA. Many graduate TAs either did not take the course for which they were the TA or had taken it many years prior to becoming a TA. The main pedagogical advantage reviewed in the literature was undergraduate TAs’ empathy towards student needs (Diamond, 1972; Eby & Gilbert, 2000; Kohn & Brill, 1981; Linden, James, & Feldhusen, 1977; White & Kolber, 1978; White & Waranch, 1978). Undergraduate TAs were also viewed by students as effective discussion leaders because they could better relate to undergraduate students than could graduate TAs (Boeding & Vattano, 1976; Kohn & Brill, 1981; White & Kolber, 1978). Undergraduate TAs were also perceived as
knowledgeable as graduate TAs by undergraduate students (Fremouw, Millard, & Donahoe, 1979).

Since undergraduate TAs were viewed as empathetic to undergraduate students, they can be in a position to effectively motivate and instruct undergraduate students. However, no research has been conducted to determine exemplary undergraduate TAs’ practices.

**Setting and Researcher Background**

The study was conducted at a Research Extensive institution in the Western United States that has many large-enrollment courses. One course that is classified as large-enrollment is Information and Computer Sciences (ICS) 101, an introductory computer science course required by many majors at the university. Approximately 450-600 students enrolled in ICS 101 each semester. ICS 101 was taught by one instructor, one course coordinator, 12 undergraduate TAs, and four on-line learning assistants.

**Course Instructor**

The course instructor taught at the Research Extensive institution for six years and was a Ph.D. student in Information and Computer Sciences. The instructor’s educational background included two bachelor’s degrees, one in Art and the other in Computer Science. The instructor also held a master’s degree in Computer Science. The instructor had taught ICS 101 for four years.

**Course Coordinator**

The course coordinator had been working in the ICS Department for seven years. The course coordinator spent two years working as an undergraduate TA and five years
as the course coordinator for the course. The course coordinator was responsible for the laboratory curriculum, day-to-day activities of the course, and supervision of TAs and online learning assistants. In this study, the course coordinator was also the researcher. Therefore, there was a potential for bias in the research, as the researcher was the direct supervisor for the TAs. However, the course coordinator did not have authoritative power and could not make decisions for the course. The course coordinator gave recommendations to the course instructor, who made all final decisions. Therefore, the bias was limited to the undergraduate TAs and their perception of the course coordinator. The potential for bias and its refutation are discussed in the methodology section of this study.

Student Assistants

There were a total of 41 undergraduate student assistants who worked for the ICS 101 course. Twelve of the student assistants were undergraduate TAs. The 12 undergraduate TAs were responsible for teaching the laboratory classes (labs) for ICS 101. Each TA instructed one or two labs depending on his or her experience and preference. Four student assistants were on-line learning assistants, who were available for help in an Internet chat room during specified hours to give students synchronous assistance.

Twenty-five students were lab assistants (LA) for the ICS 101 course and were required to assist one lab for the duration of the semester. These students were also required to monitor the open lab, teach one week of lab materials, and write a critique of
their TA. After completion of the teaching internship course, the LAs had the opportunity to apply for an undergraduate TA position.

_The ICS 101 Course_

ICS 101, Tools for the Information Age, was a 16-week hybrid course for over 450-600 undergraduate students at the institution. The course was comprised of 15 sections of approximately 32 students each. Each of the sections was held in a computer laboratory in the Department of Information and Computer Sciences. In addition to learning in the computer laboratory, students were required to listen to lecture podcasts and take on-line quizzes once a week based on the podcast lectures. Podcast lectures are audio files that were available for students to download either to one’s computer, iPod, or other similar media device (Read, 2005). The students also attended a lecture in the lecture hall once a week. Therefore, this hybrid model included face-to-face lecture meetings, podcast lectures, weekly on-line quizzes, and two meetings a week in the computer laboratory with an undergraduate TA. The lecture and the laboratory included complementary course content, but were distinct. Therefore, the TAs taught concepts that were not presented in the lecture portion of the course.

The laboratory portion of the course was led solely by an undergraduate TA. However, the undergraduate TAs were under the direction of the course coordinator. The assignments and curriculum were determined by the course coordinator, but the undergraduate TAs led each lab session. The undergraduate TAs were responsible for developing and instructing lessons based on predetermined objectives, grading assignments and quizzes, and holding office hours. The undergraduate TAs also
participated in weekly meetings with the course coordinator to discuss teaching and learning issues, problems in the laboratories, and updates to the curriculum.

**Laboratory Layout**

The undergraduate TAs taught in one of two computer laboratories. Figure 1 was a graphical representation of Room 318 and Figure 2 was a graphical representation of Room 319. Both laboratories were equipped with a projector screen, projector, and 36 computers.

In Room 318, the undergraduate TA’s computer was located at the front of the room (see Figure 1). The students’ computers were organized into four rows of eight computers and a row of four computers in the back of the room. All of the computers and seats were facing forward. There was walking space between the rows. The projector was located in the middle of the first row of student computers. The undergraduate TAs used the projector to demonstrate tasks. There were two security cameras were located in the front corners of the room and a third camera was located in the back right corner of the room.

In Room 319, the undergraduate TA’s computer was located in the front of the room (see Figure 2). The students’ computers were organized into four rows. All of the computers and seats were facing forward. There was walking space between the rows. The major difference between the two labs was that Room 319 also had walking space down the center of the lab, whereas, Room 318 did not have that walking space. The projector was located in the middle of the second row of student computers. The undergraduate TAs used the projector to demonstrate tasks. There were two security
cameras that were located in the front corners of the room and a third camera was located in the back of the room, which were used to verify the findings of the study.

Figure 1. Illustration of ICS 101 Laboratory Room 318
Figure 2. Illustration of ICS 101 Laboratory Room 319
**Theoretical Framework**

The theoretical framework for this study was the ARCS Model of Motivation. The undergraduate TAs were trained in implementing the ARCS Model of Motivation by the course coordinator at the initial orientation session. The theoretical framework will be discussed in greater detail in the literature review.

**Purpose of the Study**

Even though a body of literature on undergraduate TAs exists, no literature exists on exemplary instructional practices of undergraduate TAs. Since undergraduate TAs were viewed by undergraduate students as empathetic, they were in a position to instruct in a different manner than graduate TAs or instructors at the college level. Therefore, the purpose of this study was to determine what undergraduate TA practices were exemplary as framed by the ARCS Model of Motivation and how the TAs developed the exemplary practices. The researcher posed the following research questions:

1. What are exemplary undergraduate TA instructional practices as framed by the ARCS Model of Motivation?
2. What are the common themes of the development of the undergraduate TAs’ exemplary instructional practices?

**Significance of the Study**

Since approximately 35% of university students were enrolled in large-enrollment introductory courses (Twigg, 1999), the study can have a significant impact on the way that undergraduate students are being taught, especially in courses that utilize
undergraduate TAs if the exemplary practices are identified and replicated. This study
will also add to the body of literature on undergraduate TAs, as literature on their
teaching practices was not available in extant research.
CHAPTER II
LITERATURE REVIEW

In 1999, a group of the country's higher education leaders met to discuss the redesign of learning environments for large-enrollment introductory courses, as less funding was available (Twigg, 1999). Studies have shown that undergraduate enrollments were concentrated in relatively few academic courses. Approximately 35% of university students were enrolled in these large-enrollment courses. Twigg noted that many undergraduate students also lacked motivation in large-enrollment courses due to the typical one-size-fits-all approach to instruction being used, where students met in a lecture hall several times a week. In these meetings, students interacted minimally with instructors and course materials. Students also received minimal feedback. One of the recommendations from the higher education leaders was to use TAs to improve motivation and learning outcomes of students in undergraduate large-enrollment courses while lowering cost (Twigg, 1999). To lower costs, graduate TAs have been used in more direct instruction, as opposed to supplementing lecture material by an instructor. Therefore, the teaching responsibilities of graduate TAs and undergraduate TAs have increased (Shannon et al., 1998).

The purpose of this literature review was to examine TAs in higher education, their instructional effectiveness, and motivation. The review of the literature began with an overview of graduate TAs' effectiveness in higher education, followed by a review of methods used to improve graduate TAs' effectiveness, undergraduate TAs, motivation models in education, and will conclude with a discussion of the ARCS Model of
Motivation. Graduate TAs were included in this literature review because they are similar to undergraduate TAs, except that they hold an undergraduate degree and are perceived differently by undergraduate students.

*Graduate TAs*

*Reasons for Graduate TAs*

Shannon et al. (1998) stated that graduate TAs are becoming more responsible for many undergraduate classes and not solely large-enrollment courses, as many full-time faculty positions are becoming less stable. Many non-tenure instructional faculty positions are either being removed or reassigned. Due to the instability of full-time non-tenure faculty positions, many full-time tenure-track faculty members are solely teaching graduate level courses (Shannon et al., 1998). Many full-time tenure-track faculty members at research institutions have pressure to "publish or perish" (Leslie, 2002).

Many tenure-track faculty members at research institutions view research as a way of being rewarded with tenure and promotion as opposed to exemplary teaching, even though they generally derive their intrinsic rewards from teaching (Leslie, 2002). Due to the perceived reward structure, faculty members at these institutions tend to focus on research as opposed to teaching or mentoring graduate TAs.

*Graduate TA Effectiveness*

Many graduate TAs are hired to teach undergraduate classes based on their content knowledge and not their ability to teach (Hardre, 2005; Marincovich et al., 1999). Therefore, Shannon et al. (1998) examined different factors that led to higher levels of graduate TA effectiveness. They found that graduate TAs with a degree in education
were rated significantly higher by students than those without a degree in education. TAs with prior work experience in teaching were also rated significantly higher than those without teaching experience. However, differences in K-12 and higher education teaching experiences were not examined. Lastly, departmental or university training, which lasted from one day to a few days, was examined. The researchers found that TAs who attended training were rated slightly higher than those who did not attend. Therefore, having training or experience in education produced a positive difference in instructional effectiveness.

Teaching experience in education and degrees in education are not the only factors that affect undergraduate level instruction. Another factor to consider is the graduate TA’s cultural background. Many international students are hired as graduate TAs due to their command of subject matter (Twale et al., 1997). International graduate TAs exist in all disciplines, but are most common in math and science undergraduate courses. However, international graduate students frequently have different perceptions of effective instruction when compared with the perceptions of undergraduate students in the U.S. They perceive effective instruction as the type of instruction that they received in their home country. Therefore, they often prefer to teach in a formal and highly structured manner and do not create an environment that is responsive to student needs. This led to a difference in perceptions of effective instruction on the part of the undergraduate students and international graduate TAs, where the international graduate TAs rated their teaching effectiveness higher than their students. Therefore, Twale et al. (1997) suggested that different programs need to be implemented to ensure international
graduate TAs understand the teaching climate of the university in which they are hired. Both Twale et al. (1997) and Shannon et al. (1998) agreed that graduate TAs’ effectiveness was based on their prior experiences even though both investigated different types of experience.

Methods of Improving TA Effectiveness

Hardre (2005) suggested instructional design as a method of professional development for graduate TAs. Instructional design is a systematic method of designing and developing instruction based on different teaching and learning strategies (Dick, Carey, & Carey, 2001). Hardre (2005) suggested that graduate TAs who employed instructional design strategies could increase their effectiveness based on student ratings, as other studies have shown an increase in teaching effectiveness when instructional design approaches were employed (Hardre, 2002). The strategies employed differed based on discipline and theories used. For example, in industry and military, the focus was on teaching specific job skills (Villalba, 1999). However, in school studies, the focus was typically based on developing instructional strategies for various types of learners. The long-term effects of graduate TAs using instructional design in teaching were not explored; however, most participants in Hardre’s (2002) study did not employ these practices long-term.

Hardre (2005), Shannon et al. (1998), and Twale (1997) agreed that experience and training were needed for graduate TAs. The term training does not refer to a one-day event conducted by the university or department as this type of training is typically an orientation to the teaching environment (Twale et al., 1997). When referring to training,
on-going formative assessment and mentorship were suggested (Shannon et al., 1998). However, funds are typically not readily available for assessment (Twigg, 1999) and many faculty members do not have the time to mentor graduate TAs as they have many other pressures including “publishing or perishing” (Hardre, 2005). Even though funds are not readily available, some universities managed to increase funds available for training and increased the number of days for training (Armstrong et al., 2006).

At Vanderbilt, the administration allocated extra money and more time for TA orientations to account for different challenges. The staff of the center for teaching at Vanderbilt identified the needs of each department and transformed the TA training to account for the needs (Armstrong et al., 2006). The revised orientation did not generate the preferred results, as the assessment showed that the TAs did not leave the orientation with more specific knowledge (Armstrong et al., 2006). However, the researchers were confident that revising the orientation would improve the TAs’ discourse prior to the start of the semester. Armstrong et al. did not suggest having an on-going or formative assessment for the TAs during the semester.

Many colleges and universities use teaching excellence awards to motivate TAs to be exemplary (Willingham-McClain & Pollack, 2006). However, Willingham-McClain et al. (2006) suggested that the awardees could be better utilized to help facilitate teaching excellence among graduate students as 96% of research institutions have teaching awards (Carussetta, 2001). Willingham-McClain et al. (2006) noted that TAs might be motivated to win a teaching award as it may highlight their teaching abilities to future employers. They searched the World Wide Web to determine if a standard existed
for teaching awards. However, they found that the standards varied by institution.

Therefore, they suggested that standards be developed by TAs for TAs to ensure they understand the qualities and practices that exemplify best teaching practices. Willingham-McClain et al. (2006) also suggested that exemplary TAs help in the orientation sessions for TAs.

*Undergraduate TAs*

While Hardre (2005), Shannon et al. (1998), and Twale (1997) focused on experience and training needed for graduate TAs, Eby and Gilbert (2000) suggested an alternate model of instruction. Since many graduate TAs are not well-prepared for their teaching assignments, Eby and Gilbert introduced an undergraduate TA model, where undergraduate students were used as a main point of instruction (Eby & Gilbert, 2000). In this model, the TAs were students who had previously completed the course. These undergraduate students also underwent a stringent review process to ensure that they were committed to being a part of the teaching team. This model accounted for some of the issues with graduate TAs including not being empathetic toward students and having difficulty explaining concepts (Twale et al., 1997).

*Reasons for Utilizing Undergraduate TAs*

With less funding available for instruction of students in higher education (Twigg, 1999), more institutions may look toward using undergraduate students as TAs. As opposed to graduate TAs, undergraduate TAs typically have a mastery of course content because many complete the course prior to becoming a TA (Eby & Gilbert, 2000). In
their model, Eby and Gilbert (2000) ensured undergraduate TAs had mastery of the course content because they utilized students who successfully completed the course.

Undergraduate TAs were empathetic towards students because they had undergone similar experiences (Diamond, 1972; Eby & Gilbert, 2000; Kohn & Brill, 1981; Linden et al., 1977; White & Kolber, 1978; White & Waranch, 1978). Undergraduate TAs were also effective discussion leaders because they could relate to the undergraduate students' experiences (Boeding & Vattano, 1976; Kohn & Brill, 1981; White & Kolber, 1978). When compared with graduate TAs, undergraduate TAs were perceived as being more helpful and empathetic by undergraduate students (Fremouw et al., 1979). Fremouw et al. (1979) also found that undergraduate TAs were not seen as being less knowledgeable than graduate TAs. Therefore, the undergraduate TAs were more successful than graduate TAs.

Mendenhall and Burr (1983) noted that many undergraduate students do not have the opportunity to teach a class or understand how courses work. Therefore, by being an undergraduate TA, they have the opportunity to learn from their experiences and have a better understanding of teaching and learning (Mendenhall & Burr, 1983). Undergraduate TAs also displayed evidence of increased levels of content knowledge based on multiple-choice examinations (Fremouw et al., 1979). Fremouw et al. (1979) found that undergraduate TAs gained much deeper knowledge of the course learning objectives.
Undergraduate TA Responsibilities

Undergraduate TAs’ responsibilities were typically to lead discussions as many professors were hesitant to give them more responsibilities (Mendenhall & Burr, 1983). Undergraduate TAs typically did not have grading or curriculum development responsibilities (Mendenhall & Burr, 1983). Mendenhall and Burr (1983) studied undergraduate TAs with increased levels of responsibility. These undergraduate TAs were required to grade homework assignments, hold office hours, and develop training sessions for other TAs. Mendenhall and Burr (1983) stated that the undergraduate TAs reported increased levels of teaching, self-confidence, counseling abilities, and administrative ability due to the increased responsibilities.

Undergraduate TA Effectiveness

The undergraduate TAs’ empathy toward the students contributed to much of their effectiveness (Mendenhall & Burr, 1983). Other studies identified empathy as a key factor of effective teaching (Diamond, 1972; Eby & Gilbert, 2000; Kohn & Brill, 1981; Linden et al., 1977; White & Kolber, 1978; White & Waranch, 1978). Many studies of undergraduate TAs indicated empathy as a critical factor, whereas, less literature in this area exists for graduate TAs. Therefore, it appears that undergraduate TAs are more empathetic to undergraduate students’ needs due to a closeness in age. As Twale et al. (1997) noted, cultural differences between international and national graduate TAs were factors of the differences in effective instruction. Since the undergraduate TAs cited in this literature review were national, it appears that culture may play a role in the undergraduate TAs’ empathy towards students.
There is a gap in the literature on effective undergraduate TA instructional practices including motivation, as many undergraduate students in large-enrollment courses typically have a low level of motivation (Twigg, 1999). Since undergraduate TAs were utilized in large-enrollment courses, it was important to understand their instructional practices and student motivation. Therefore, the next section will be a discussion on motivation.

Motivation

Theories Related to Motivation

There are numerous theories of motivation. Therefore, the purpose of this section of the literature review is to discuss motivation in general and theories of motivation such as expectancy theory (Vroom, 1964), equity theory (Adams, 1963), reinforcement theory (Skinner, 1969), social learning theory (Bandura, 1977; Rotter, 1954), and achievement theory (Atkinson & Feather, 1974).

Motivation

Motivation is the internal state that causes a person to behave in a manner that ensures accomplishment of a goal (Certo & Certo, 2005). While educators have focused on motivation to facilitate learning and achievement of learning objectives, the concept of motivation led to both scholarly research and debates about its necessity in learning.

Importance of Motivation

Motivation is an important paradigm to consider in teaching and learning, as it increases individuals' interest and effort (Haggis, 2004). Increased motivation in learning also creates a synergistic cycle of factors that promotes expectancy for success,
persistence, achievement, satisfaction, and shared ownership and responsibility (Theall & Franklin, 1999). In Haggis’ study (2004), an individual reported that the motivation and desire to learn more about a subject was the reason for enrollment in higher education. Another individual was motivated to attain a higher education degree to acquire a professional qualification. Therefore, Haggis concluded that motivation was a key factor in students’ future enrollment and success while in college.

Motivation also affected the number of credits students earned while enrolled in college (Bruinsma, 2004). Bruinsma found that a higher level of motivation was positively correlated with the number of credits students earn in their first and second years of college. Motivation was also positively related to deep information processing. However, deep information processing and motivation were negatively related to achievement in terms of test scores. Bruinsma suggested that issues existed with assessments, as they could be measuring surface level concepts (memorization) rather than assessing the students’ conceptual knowledge of the subject.

Pekrun et al. (2002) found that positive emotions linked to high motivation levels such as enjoyment, hope, and pride, predicted high academic achievement (Pekrun, Goetz, Titz, & Perry, 2002). Negative emotions such as hopelessness and boredom predicted low achievement and affected students’ decision to withdraw from courses. Therefore, they suggested that positive experiences and motivation were important to student learning and decreasing attrition.

Ausubel (1968) argued that motivation was not a necessary condition for learning and was less important as students mature and learning becomes easier. He stated that
the desire for knowledge was important in learning as opposed to motivation. Therefore, Ausubel argued that cognitive drive was the most important motivation in classroom learning. Donald (1999) agreed with Ausubel that motivation was not a necessary condition for learning and contended that context and student preparation had a greater effect on student achievement than motivation (Donald, 1999).

Positions ranged from motivation as a critical factor for learning (Bruinsma, 2004; Haggis, 2004; Pekrun et al., 2002) to the notion that motivation is not necessary to learning (Ausubel, 1968; Donald, 1999). Regardless, Ausubel (1968) concluded that motivation was a critical factor in learning.

Applying research on motivation to practice is difficult, as many teachers tend to rely on common sense and intuition to enhance learning (Wlodkowski, 1981). Therefore, it is important to make motivational theories practical for teachers to employ in the classroom, as application of motivation in classrooms is elusive (Keller, 1987; Wlodkowski, 1981).

*Expectancy Theory*

The expectancy theory was based on three concepts: (1) expectancy, which is the perceived belief that an individual’s effort will lead to successful performance; (2) valence, which is the desirability that the individual attributes to the reward at hand; and (3) instrumentality, which is the belief that the successful performance is vital to attaining the reward (Vroom, 1964). An underlying assumption of the expectancy theory is that decisions are associated with psychological events that occur with behavior. Thus, if an individual feels his/her behavior leads to an important personal goal, he/she will tend to
be a high performer. However, if an individual does not believe that a behavior will lead to the personal goal, the individual will tend to be a low performer.

Equity Theory

Equity theory was based on the notion that individuals are likely to reduce their efforts at a task if there is a perceptual discrepancy in the reward received and the effort expended (Adams, 1963). Adams (1963) suggested that individuals were likely to compare their inputs and outputs with others of equal status. If there was a discrepancy and the ratios did not match, the individual would be motivated to reduce effort to create equity. When comparing the expectancy theory with the equity theory, one should note that the expectancy theory is based on maximizing efforts for rewards. However, the equity theory is based on individuals modifying their effort to create equity.

Reinforcement Theory

Reinforcement theory was based on the premise that reinforcement can control an individual's behavior (Skinner, 1969). The three rules that describe the reinforcements for behavior are: (1) positive reinforcement to increase behavior; (2) negative reinforcement to increase a behavior; and (3) punishment to decrease a behavior. Positive reinforcement is presenting a reward after a desired behavior occurs and increases the likelihood of the desired behavior recurring. Negative reinforcement is the removal of a stimulus to increase the likelihood of a behavior occurring. Negative reinforcement leads an individual to a desirable behavior by removing a negative stimulus. Punishment is the presentation of a negative stimulus after an undesirable behavior occurs to decrease the likelihood of an undesirable behavior from occurring.
Social Learning Theory

Social learning theory was based on the choices and decisions people make when faced with multiple ways of behaving (Rotter, 1954). Rotter saw personality as a behavior that was always changeable. Rotter also believed that personality was not set and was always changing based on life experiences. The four main concepts of social learning theory are: (1) behavior potential, which is the likelihood that one will exhibit a behavior in a specific situation; (2) expectancy, which is the probability that a behavior will lead to an expected outcome; (3) reinforcement value, which is the outcome of the behavior and if it reinforces the expected outcome; and (4) the psychological situation, which is the individual’s interpretation of the situation. Therefore, social learning theory is the idea that a behavior will lead to an expected outcome and will be enforced by the actual outcome.

Social learning theory was later modified by Bandura (1977). His extension of social learning theory was based on “modeling,” which was the idea that people learn by observing and emulating others (Bandura, 1977). Bandura stated that modeling is the primary way in which human behavior is learned. Therefore, people have a tendency to watch and learn from others and mentally rehearse what they have seen. Like Rotter, Bandura believed that the understanding of one’s environment was vital to one’s social learning. An important aspect of Bandura’s extension of social learning theory was a focus on one’s cognitive process. Individuals’ responses were based on their own observation, judgment, and response. Therefore, people can reinforce their ideas through observation, which in turn motivates their behaviors.
Achievement Theory

The achievement motivation theory was based on the premise that achievement-oriented behaviors are established on a hope for success and fear of failure (Atkinson & Feather, 1974; McClelland, 1953). Under the achievement motivation theory, individuals are likely to perform tasks if they were previously rewarded. Therefore, if an individual was rewarded in competitive situations, the individual would be more likely to contribute effort in competitive situations than non-competitive situations.

Development of the ARCS Model of Motivation

All of the theories listed in this literature review influenced the ARCS model of motivation (see Figure 3). However, Keller stated that the Expectancy-value Theory was the basis for the Macro Theory of Motivation (Keller, 1979) and the ARCS Model of Motivation (Keller, 1987) (See Figure 4). Therefore, the purpose of this section of the literature review is to discuss the development of the ARCS Model of Motivation.

Expectancy-Value Theory

The expectancy-value theory was based on the premise that motivation is the outcome of expectancies and values (Porter & Lawler, 1968). The first major component of this theory, “expectancy,” refers to the subjective probability of success, which is the perceived likeliness that he/she will accomplish a particular goal. Therefore, expectancy is one’s belief that a goal will be accomplished, which affects one’s effort. The greater the likeliness to accomplish a goal will lead to increased effort.

The second major component, “value,” refers to an individual’s preference to particular outcomes. Individuals place a value on the outcomes, which leads to the
amount of effort that is exerted. Therefore, a higher value placed on an outcome will lead to greater effort exerted.

Figure 3. Major theories and their influence on the ARCS Model of Motivation
Atkinson and Raynor (1974) argued that expectancy and value have a multiplicative relationship. If a zero value is placed on either expectancy or value, an individual would exert no effort. For example, an individual will exert no effort if he/she believes it is not possible to accomplish a goal with a high value. Another example would be if an individual believes that a goal has no value and the likelihood of achieving it was definite, the individual would exert no effort.

Macro Theory of Motivation and Instructional Design

The ARCS Model of Motivation was based upon the macro theory of motivation and instructional design. This theory included four main concepts, interest, relevance, expectancy, and outcomes (see Figure 5). In the original model of the macro theory of motivation and instructional design (Keller, 1979), Keller expanded the "value" category of the expectancy-value theory into two subcategories, interest and relevance. Keller kept the expectancy category and added a fourth category, outcomes. Interest and relevance were separated to make a distinction between curiosity and perceived utility. Therefore, interest referred to attention factors, while relevance referred to the usefulness
Interest Relevance Expectancy Outcomes

Using instructional strategies that make the concept pertinent to the learners

The students' perception of their probability of success during instructional activities

Appropriate application of reinforcement

Figure 5. Macro Theory of Motivation and Instructional Design

of the concepts learned. The third category, expectancy, refers to an individual’s expectation of being successful at a task. Keller further argued that one’s perception of likelihood of success influenced his/her actual degree of success. The fourth category, outcomes, referred to reinforcing value of instruction. Outcomes includes the application of appropriate reinforcement, as explained by the reinforcement theory (Skinner, 1969).

In 1987, this model was transitioned to the ARCS Model of Motivation, where the categories were renamed to Attention, Relevance, Confidence, and Satisfaction to strengthen the central feature of each category.

ARCS Model of Motivation

The ARCS Model of Motivation was developed by John Keller (1987), as a “synthesis of many areas of research that pertain to human motivation, and its purpose is to help answer questions about how to design motivational strategies into instruction that will stimulate or sustain students” (Keller & Suzuki, 1988, p. 402). Various studies have
supported the validity of the ARCS model, which is used in over 20 countries (Keller & Suzuki, 2004; Small & Gluck, 1994; Visser & Keller, 1990). The ARCS Model of motivation was developed with practitioners in mind and was the only motivational model that was based on instructional design.

The ARCS model has four main concepts that are necessary for motivational instruction. The four concepts are *Attention, Relevance, Confidence, and Satisfaction* (see Figure 6).

![Figure 6. ARCS Model of Motivation](image)

**Attention**

Attention refers to gaining and sustaining the learners’ attention (Keller, 1987). The three sub concepts of Attention are perceptual arousal, inquiry arousal, and variability (Keller & Suzuki, 1988). Perceptual arousal is gaining and maintaining attention or interest by presenting content in a striking fashion. However, Keller and Suzuki (1988) caution users to not overuse perceptual arousal strategies as they can take the learners’ concentration away from the content. Inquiry arousal deals with learners’ inquiry or curiosity. Inquiry arousal includes developing a deeper level of curiosity about
content. Variability refers to differentiation in instruction to maintain the learners' attention. Variability includes differences in sequences of instruction as well as different instructional strategies being employed.

Relevance

Relevance refers to using instructional strategies that make the concept relevant to the learners (Keller & Suzuki, 1988). The sub concepts of Relevance are familiarity, goal orientation, and motivation matching (Keller & Suzuki, 1988). Familiarity refers to linking instruction with the learners' previous experiences. An example of familiarity is to obtain student input on lesson topics to ensure they have had previous experience with it. Goal orientation is the objective of instruction and its relevancy to the learners (Keller & Suzuki, 1988). Having a clear understanding of the goals and attaining them assists learners in determining how the objective is relevant to them. Motive matching refers to the teaching strategies employed to match the students' motivation, which includes using strategies with which the learners are familiar and prefer.

Confidence

Confidence refers to the students' perception of their probability of success during instructional activities (Keller & Suzuki, 1988). There is no need for a guarantee of success, but the learners must feel that a challenge is attainable. The sub concepts of Confidence are learning requirements, success opportunities, and personal control (Keller & Suzuki, 1988). Learning requirements refers to students' understanding of their probability of success based on knowledge of the performance criteria (Keller & Suzuki, 1988). Therefore, clear explanations of course and learning requirements are essential.
Success opportunities refer to the challenges that are presented to the learners (Keller & Suzuki, 1988). Keller and Suzuki (1988) recommend using challenges that require a fairly high proficiency level, but are still attainable to ensure the learning is meaningful to the learner. Personal control refers to giving the learner the opportunity to explore while receiving feedback. Keller and Suzuki (1988) suggested giving learners control over their learning as opposed to the teacher having total control over the pace of instruction.

**Satisfaction**

The final concept in the ARCS model is Satisfaction. Satisfaction refers to the outcomes of the learners' efforts being consistent with their expected outcomes (Keller & Suzuki, 1988). This will lead learners to be satisfied in what they learned and remain motivated (Keller & Suzuki, 1988). The sub concepts of Satisfaction are natural consequences, positive consequences, and equity (Keller & Suzuki, 1988). Natural consequences refers to the ability to use the skill or concept learned in a real or simulated setting (Keller & Suzuki, 1988). Therefore, instruction should have real world application and the opportunity for learners to attempt it without assistance. Positive consequences refer to the opportunity for positive feedback and reinforcement that sustain the behavior (Keller & Suzuki, 1988). Equity refers to consistent consequences for behaviors (Keller & Suzuki, 1988). Therefore, learners who feel they receive improper feedback may experience dissatisfaction.

**Summary**

Many higher education institutions use graduate TAs due to limited funds (Twigg, 1999) and the instability of full-time faculty positions (Shannon et al., 1998). Therefore,
graduate TAs' responsibility in undergraduate instruction has increased (Shannon et al., 1998). However, many graduate TAs are hired for their content knowledge as opposed to teaching skill and are not trained to teach in higher education (Marincovich et al., 1999; Shannon et al., 1998). TAs who lacked training and prior experience in teaching, did not teach as effectively as those with a degree in education or those who had prior experience teaching (Shannon et al., 1998). The issue of effective teaching was not solely based on prior experience, as cultural norms also played a role in the effectiveness of the graduate TAs and their perception of effective instruction (Twale et al., 1997). Many international graduate TAs viewed their instruction as effective because it was the manner in which they were educated (Twale et al., 1997). The methods that were employed in their education were not transferable to a different culture. Due to these issues, different approaches were taken to improve training of graduate TAs. One approach discussed was the instructional design approach to developing and delivering instruction (Hardre, 2005). Hardre (2005) found that this approach was conducive to effective instruction, but did not explore this method with TAs for a sustained period of time.

Other innovative approaches, such as using undergraduate TAs, have also been used to decrease cost and improve learning outcomes (Eby & Gilbert, 2000). By using undergraduate TAs, some of the issues related to using graduate TAs were alleviated. These issues included understanding the students' perspective about course content, mastery of the specific course content, and cost. However, the responsibilities of undergraduate TAs were limited, as they were typically used to lead discussions. With decreasing funds, it is possible that undergraduate TAs will also see increased levels of
responsibility (Twigg, 1999). The literature indicated that undergraduate TAs were empathetic to student needs. However, there was a lack of literature regarding undergraduate TA effectiveness and the use of motivational strategies in their instruction.

Therefore, literature on motivation was reviewed to ensure that motivation was important to facilitate learning. While scholars disagree on the necessity of motivation in education, most concur that motivation is critical and facilitates learning. Motivation was consequently viewed as a valuable aspect of education that should be addressed in conjunction with TA-based instruction.

The literature review concluded with the ARCS Model of Motivation, which was chosen for this study because it was developed with practitioners in mind. The review included the development of the ARCS Model of motivation and its components. The ARCS Model of Motivation is a valuable framework to consider in teaching and learning because it was the only motivational model that was based on instructional design, which was deemed critical in improving teaching effectiveness (Hardre, 2005).
CHAPTER III

METHODOLOGY

To answer the research questions, the researcher used a sequential mixed methods design (Tashakkori & Teddlie, 1998). Sequential mixed methods designs include, “a qualitative phase of a study and then a separate quantitative phase, or vice versa” (Tashakkori & Teddlie, 1998, p. 46). The researcher conducted a quantitative phase followed by a qualitative phase to answer the research questions (see Figure 7). An overview of the methods used was described in this section. A full description of the methods was included in subsequent sections of the methodology.

In the quantitative phase of the study, the researcher developed the Instructional Motivation Survey (IMS) by modifying the Instructional Materials Motivation Survey (IMMS), which was originally developed by John Keller (Keller, 1987). After developing the IMS, the researcher piloted the instrument to determine its validity and reliability. The researcher conducted the survey with the students enrolled in ICS 101 in the spring 2007 semester to determine which TAs were the best cases to follow-up with the qualitative phase.

Then the researcher conducted the qualitative phase of the study on the best-case cluster of TAs to determine their exemplary teaching practices as framed by the ARCS Model of Motivation and how the TAs developed the teaching methods. The qualitative phase of the study was conducted on the Spreadsheets unit of instruction, which was three weeks in duration. The Spreadsheets unit of instruction was one of seven units of instruction taught in ICS 101. The methods used included the collection of primary and
Phase I - Quantitative Methods

Create IMS (Part I) → Determine validity and reliability of IMS (Part II) → Conduct IMS and determine best-case cluster (Part III)

Phase II - Qualitative Methods
(Research Question 1)

Primary Sources
- Interview of best-case UGTAs
- Open-ended survey of students

Secondary Sources
- Video of laboratory sessions
- Member Checks
- LA Verification

Phase II cont. - Qualitative Methods
(Research Question 2)

Primary Source
- Follow-up Interview of UGTAs

Secondary Source
- TA reflection logs
- Member Check

Figure 7. Methods
secondary sources. Primary sources are those that had a direct relationship to the phenomena being studied (Cohen, Manion, & Morrison, 2000). Secondary data sources are those that do not bear a direct relationship to the phenomena being studied (Cohen et al., 2000). Therefore, items such as video reproduction and written text would qualify as secondary data sources. The primary data sources used were semi-structured interviews of the best-case undergraduate TAs and an open-ended survey of their students. Semi-structured interviews are interviews that follow schedules, but are also open-ended and allow for the contents to be modified to explore different avenues that are illuminated during the interview process (Cohen et al., 2000). Open-ended surveys are surveys that include open-ended questions to give the researcher access to more data than specific response categories (Cohen et al., 2000). Both the semi-structured interviews and the open-ended surveys were coded using open and axial coding strategies to determine the exemplary teaching practices. Open coding is the process in which the researcher explores the data without making prior assumptions of what he/she might discover (Denzin & Lincoln, 2005). The axial coding process facilitates the building of connections within the codes developed in open-coding (Denzin & Lincoln, 2005). The researcher further triangulated the findings through secondary data sources. The secondary data sources used were videos of the laboratory sessions, member checks, and interviews with LAs. Member checking is the process in which participants are asked to corroborate findings to increase credibility (Lincoln & Guba, 1985).

To answer the second research question, the researcher conducted a follow-up interview with the teaching assistants to determine how they developed their teaching
practices. The researcher reviewed the TAs’ reflection logs and conducted member checks as secondary data sources to triangulate the findings from the follow-up interview.

**Phase I: Quantitative Methods**

The quantitative phase consisted of three parts. In the first part, the researcher developed the IMS instrument. In the second part, the researcher validated the survey instrument by determining its validity and reliability. In the third part of the quantitative phase, the researcher surveyed the ICS 101 students to determine the best-case TAs.

**Part I of the Quantitative Phase: Development of the IMS**

The researcher modified a survey instrument, the IMMS, originally developed by Keller (1987). The survey instrument measured the four parts of the ARCS Model of Motivation separately in terms of materials created for classroom use. The researcher modified the survey instrument to measure the students’ motivation levels in terms of the four parts of the ARCS model based on the TA’s instructional practices. The first modification to the survey included rewording of items to measure TA instructional practices as opposed to instructional materials. Items were also reworded to remove negative statements to ensure participants were not confused by the language. Items were also reordered to group them into each individual construct in the ARCS Model of Motivation. Therefore, the survey was renamed to the Instructional Motivation Survey (see Appendix A). The survey instrument included a total of 36 items, which were measured on a 1-5 Likert scale with one being strongly disagree and five being strongly agree. Twelve items measured Attention, nine items measured Relevance, nine items measured Confidence, and six items measured Satisfaction.
After modifying the survey instrument, the researcher pilot tested the survey in the middle of the fall 2006 semester with 10 undergraduate TAs and 10 students to ensure the wording of the survey was clear. The undergraduate TAs and students all agreed that the 5-point Likert scale was easier to interpret as opposed to scales that were greater than five. After making the modifications suggested by the undergraduate TAs and the students, the researcher pilot tested the survey instrument with 320 students across 11 laboratory sections at the end of the fall 2006 semester to get a holistic view of the students' perceptions of the TAs. The researcher used the SPSS software package to analyze the data collected in this phase.

The researcher analyzed the descriptive statistics for each of four constructs in the ARCS Model of Motivation to determine if there was a variation in data, if all data were within acceptable range, and if the data were normally distributed. The range, mean, and standard deviation were used to determine if there was a variation in data. The skewness and kurtosis were used to determine if the data were normally distributed by being within acceptable range. Although there is no statistical test to determine normal range, researchers use practical guidelines, such as a $\pm 1$ value for skewness and $\pm 2$ range for kurtosis. Therefore, values that are out of the practical guidelines can still be within acceptable ranges. Skewness refers to the symmetry of the normal curve and has an acceptable range of $\pm 1$ (Hildebrand, 1986). If a curve is skewed, the data are not normally distributed and could indicate a poorly designed test item. Kurtosis measures the extent to which the frequency distribution is concentrated around the mean score and
has an acceptable range of ±2 ("SPSS for Windows Rel. 15.0.1," 2006). If the kurtosis is too high, then it would indicate that the data are not normally distributed and that there is little or no variation in data.

The descriptive statistics for the Attention items on the survey are summarized in Table 1. All of the survey items for Attention had a minimum reported value of one and a maximum reported value of five. The range, mean, and standard deviation indicated a variation in the data. The skewness for items A3, A5, A9, A11, and A12 were higher than normal, but within acceptable range. The kurtosis for all items was within acceptable range. Therefore, the skewness and kurtosis indicated that the data were normally distributed.

Table 1.

Descriptive Statistics for Attention

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<th>Item</th>
<th>Minimum Statistic</th>
<th>Maximum Statistic</th>
<th>Mean Statistic</th>
<th>Std. Deviation Statistic</th>
<th>Skewness Statistic</th>
<th>Std. Error</th>
<th>Kurtosis Statistic</th>
<th>Std. Error</th>
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<td>A1</td>
<td>1</td>
<td>5</td>
<td>3.92</td>
<td>.86</td>
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<td>.27</td>
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<td>5</td>
<td>4.02</td>
<td>.83</td>
<td>-1.96</td>
<td>.14</td>
<td>1.62</td>
<td>.27</td>
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<td>5</td>
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<td>.89</td>
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<td>.14</td>
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<td>.27</td>
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<td>-1.58</td>
<td>.14</td>
<td>-1.35</td>
<td>.27</td>
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<td>-1.27</td>
<td>.14</td>
<td>1.73</td>
<td>.27</td>
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<td>.49</td>
<td>.27</td>
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<td>.27</td>
</tr>
<tr>
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<td>5</td>
<td>4.28</td>
<td>.74</td>
<td>-1.02</td>
<td>.14</td>
<td>1.42</td>
<td>.27</td>
</tr>
</tbody>
</table>

The descriptive statistics for the Relevance items on the survey are summarized in Table 2. All of the survey items for Relevance had a minimum reported value of one and
a maximum reported value of five. The range, mean, and standard deviation indicated a variation in data. The skewness for items R15, R17, R18, R19, and R21 were higher than normal, but were within acceptable range. The kurtosis for items R18 and R21 were higher than normal, but were within acceptable range. Therefore, the skewness and kurtosis indicated that the data were normally distributed.

Table 2.

Descriptive Statistics for Relevance

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum Statistic</th>
<th>Maximum Statistic</th>
<th>Mean Statistic</th>
<th>Std. Deviation Statistic</th>
<th>Skewness Statistic</th>
<th>Std. Error</th>
<th>Kurtosis Statistic</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
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<td>5</td>
<td>4.13</td>
<td>.74</td>
<td>-.63</td>
<td>.14</td>
<td>.59</td>
<td>.27</td>
</tr>
<tr>
<td>R14</td>
<td>1</td>
<td>5</td>
<td>4.03</td>
<td>.94</td>
<td>-.99</td>
<td>.14</td>
<td>.85</td>
<td>.27</td>
</tr>
<tr>
<td>R15</td>
<td>1</td>
<td>5</td>
<td>4.19</td>
<td>.91</td>
<td>-1.13</td>
<td>.14</td>
<td>.96</td>
<td>.27</td>
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<tr>
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<td>.94</td>
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<td>.14</td>
<td>.90</td>
<td>.27</td>
</tr>
<tr>
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<td>1</td>
<td>5</td>
<td>4.05</td>
<td>.91</td>
<td>-1.05</td>
<td>.14</td>
<td>1.19</td>
<td>.27</td>
</tr>
<tr>
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<td>5</td>
<td>4.14</td>
<td>.79</td>
<td>-1.12</td>
<td>.14</td>
<td>2.30</td>
<td>.27</td>
</tr>
<tr>
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<td>5</td>
<td>4.08</td>
<td>.92</td>
<td>-1.10</td>
<td>.14</td>
<td>1.32</td>
<td>.27</td>
</tr>
<tr>
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<td>5</td>
<td>4.11</td>
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<td>.14</td>
<td>.54</td>
<td>.27</td>
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<td>5</td>
<td>4.28</td>
<td>.73</td>
<td>-1.20</td>
<td>.14</td>
<td>2.58</td>
<td>.27</td>
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</tbody>
</table>

The descriptive statistics for the Confidence items on the survey are summarized in Table 3. All of the survey items for Confidence had a minimum reported value of one and a maximum reported value of five. The range, mean, and standard deviation indicated that there was a variation in data. The skewness for item C29 was .04 higher than normal range, but was still acceptable. The kurtosis for all survey items were within acceptable range. Therefore, the skewness and kurtosis indicated that the data were normally distributed.
### Table 3.

**Descriptive Statistics for Confidence**

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum Statistic</th>
<th>Maximum Statistic</th>
<th>Mean Statistic</th>
<th>Std. Deviation Statistic</th>
<th>Skewness Statistic</th>
<th>Kurtosis Statistic</th>
<th>Std. Error Statistic</th>
<th>Std. Error Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>C22</td>
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<td>-.40</td>
<td>-.41</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
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<td>5</td>
<td>3.30</td>
<td>1.14</td>
<td>-.28</td>
<td>-.68</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
<td>C24</td>
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<td>5</td>
<td>3.81</td>
<td>.97</td>
<td>-.58</td>
<td>-.22</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
<td>C25</td>
<td>1</td>
<td>5</td>
<td>3.98</td>
<td>.87</td>
<td>-.87</td>
<td>1.13</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
<td>C26</td>
<td>1</td>
<td>5</td>
<td>3.94</td>
<td>.87</td>
<td>-.81</td>
<td>.79</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
<td>C27</td>
<td>1</td>
<td>5</td>
<td>3.98</td>
<td>.90</td>
<td>-.82</td>
<td>.71</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
<td>C28</td>
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<td>5</td>
<td>3.81</td>
<td>.97</td>
<td>-.66</td>
<td>.04</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
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<td>5</td>
<td>4.08</td>
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<td>1.45</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
<td>C30</td>
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<td>5</td>
<td>4.07</td>
<td>.81</td>
<td>-.77</td>
<td>.72</td>
<td>.14</td>
<td>.27</td>
</tr>
</tbody>
</table>

The descriptive statistics for the Satisfaction items on the survey are summarized in Table 4. All of the survey items for Confidence had a minimum reported value of one and a maximum reported value of five. The range, mean, and standard deviation indicated that there was a variation in data. The skewness for items S35 and S36 were higher than normal, but were within acceptable range. The kurtosis for item S36 was high at 4.78. Survey item S36 was, "It was a pleasure to work with the TA." Therefore,

### Table 4.

**Descriptive Statistics for Satisfaction**

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum Statistic</th>
<th>Maximum Statistic</th>
<th>Mean Statistic</th>
<th>Std. Deviation Statistic</th>
<th>Skewness Statistic</th>
<th>Kurtosis Statistic</th>
<th>Std. Error Statistic</th>
<th>Std. Error Statistic</th>
</tr>
</thead>
<tbody>
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<td>-93</td>
<td>.81</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
<td>S32</td>
<td>1</td>
<td>5</td>
<td>3.43</td>
<td>1.14</td>
<td>-.45</td>
<td>-.53</td>
<td>.14</td>
<td>.27</td>
</tr>
<tr>
<td>S33</td>
<td>1</td>
<td>5</td>
<td>3.68</td>
<td>1.06</td>
<td>-.66</td>
<td>.01</td>
<td>.136</td>
<td>.27</td>
</tr>
<tr>
<td>S34</td>
<td>1</td>
<td>5</td>
<td>3.98</td>
<td>.93</td>
<td>-.75</td>
<td>.33</td>
<td>.136</td>
<td>.27</td>
</tr>
<tr>
<td>S35</td>
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<td>4.21</td>
<td>.82</td>
<td>-1.16</td>
<td>1.91</td>
<td>.136</td>
<td>.27</td>
</tr>
<tr>
<td>S36</td>
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<td>4.43</td>
<td>.79</td>
<td>-1.87</td>
<td>4.78</td>
<td>.136</td>
<td>.27</td>
</tr>
</tbody>
</table>

40
the participants in the survey were generally satisfied with working with their TA. Survey item S36 was kept in the survey because there was variation in the data, as indicated in the range, mean, and standard deviation. Overall, the skewness and kurtosis indicated that the data were normally distributed.

**Instructional Motivation Survey Validity and Reliability.** The researcher established construct validity through convergent validity. Construct validity refers to the validation of a survey instrument through the relationships of the construct scores (Leary, 2003). Convergent validity is a method of measuring construct validity, where the researcher develops a correlation matrix based on the survey questions. The survey questions should positively correlate with survey items that are measuring the same construct.

To measure the reliability and validity of the survey, the researcher ran the survey items in a correlation matrix. The twelve Attention items were positively correlated with each other (see Table 5). Therefore, the analysis gave evidence of convergent validity. The researcher used Cronbach’s alpha to determine the reliability of the survey instrument. Cronbach’s alpha indicates the extent to which test items can be treated as measuring the same construct. Since this survey was not a high stakes survey, a reliability of .65 to .85 was needed to ensure the survey instrument was reliable (Cohen et al., 2000). The 12 survey items measured together were reliable, as Cronbach’s alpha was measured at .95.
Table 5.

**Correlation Matrix for Attention**

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>A7</th>
<th>A8</th>
<th>A9</th>
<th>A10</th>
<th>A11</th>
<th>A12</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>1.00</td>
<td>0.73</td>
<td>0.63</td>
<td>0.53</td>
<td>0.65</td>
<td>0.64</td>
<td>0.65</td>
<td>0.54</td>
<td>0.44</td>
<td>0.58</td>
<td>0.65</td>
<td>0.54</td>
</tr>
<tr>
<td>A2</td>
<td>0.73</td>
<td>1.00</td>
<td>0.68</td>
<td>0.52</td>
<td>0.65</td>
<td>0.62</td>
<td>0.63</td>
<td>0.52</td>
<td>0.43</td>
<td>0.56</td>
<td>0.68</td>
<td>0.58</td>
</tr>
<tr>
<td>A3</td>
<td>0.63</td>
<td>0.68</td>
<td>1.00</td>
<td>0.64</td>
<td>0.67</td>
<td>0.68</td>
<td>0.64</td>
<td>0.50</td>
<td>0.35</td>
<td>0.55</td>
<td>0.73</td>
<td>0.63</td>
</tr>
<tr>
<td>A4</td>
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<td>0.52</td>
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<td>0.68</td>
<td>0.60</td>
</tr>
<tr>
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<td>0.65</td>
<td>0.67</td>
<td>0.64</td>
<td>1.00</td>
<td>0.74</td>
<td>0.69</td>
<td>0.54</td>
<td>0.51</td>
<td>0.60</td>
<td>0.72</td>
<td>0.62</td>
</tr>
<tr>
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<td>0.68</td>
<td>0.70</td>
<td>0.74</td>
<td>1.00</td>
<td>0.70</td>
<td>0.61</td>
<td>0.44</td>
<td>0.62</td>
<td>0.74</td>
<td>0.63</td>
</tr>
<tr>
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<td>0.63</td>
<td>0.64</td>
<td>0.61</td>
<td>0.69</td>
<td>0.70</td>
<td>1.00</td>
<td>0.59</td>
<td>0.46</td>
<td>0.63</td>
<td>0.73</td>
<td>0.62</td>
</tr>
<tr>
<td>A8</td>
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<td>0.50</td>
<td>0.53</td>
<td>0.54</td>
<td>0.61</td>
<td>0.59</td>
<td>1.00</td>
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<td>0.59</td>
<td>0.59</td>
<td>0.52</td>
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<tr>
<td>A9</td>
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<td>0.43</td>
<td>0.35</td>
<td>0.37</td>
<td>0.51</td>
<td>0.44</td>
<td>0.46</td>
<td>0.41</td>
<td>1.00</td>
<td>0.50</td>
<td>0.52</td>
<td>0.43</td>
</tr>
<tr>
<td>A10</td>
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<td>0.55</td>
<td>0.51</td>
<td>0.60</td>
<td>0.62</td>
<td>0.63</td>
<td>0.59</td>
<td>0.50</td>
<td>1.00</td>
<td>0.61</td>
<td>0.52</td>
</tr>
<tr>
<td>A11</td>
<td>0.65</td>
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<td>0.68</td>
<td>0.72</td>
<td>0.74</td>
<td>0.73</td>
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</tr>
<tr>
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<td>0.63</td>
<td>0.60</td>
<td>0.62</td>
<td>0.63</td>
<td>0.62</td>
<td>0.52</td>
<td>0.43</td>
<td>0.52</td>
<td>0.74</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The nine Relevance items were positively correlated with each other (see Table 6). Therefore, the nine Relevance survey items gave evidence of convergent validity.

The nine survey items measured together were reliable, as Cronbach’s alpha was

Table 6.

**Correlation Matrix for Relevance**

<table>
<thead>
<tr>
<th></th>
<th>R13</th>
<th>R14</th>
<th>R15</th>
<th>R16</th>
<th>R17</th>
<th>R18</th>
<th>R19</th>
<th>R20</th>
<th>R21</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.46</td>
<td>0.45</td>
<td>0.45</td>
<td>0.56</td>
<td>0.48</td>
<td>0.47</td>
<td>0.46</td>
</tr>
<tr>
<td>R14</td>
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<td>1.00</td>
<td>0.34</td>
<td>0.42</td>
<td>0.69</td>
<td>0.63</td>
<td>0.61</td>
<td>0.48</td>
<td>0.38</td>
</tr>
<tr>
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<td>0.46</td>
<td>0.34</td>
<td>1.00</td>
<td>0.61</td>
<td>0.36</td>
<td>0.49</td>
<td>0.49</td>
<td>0.48</td>
<td>0.51</td>
</tr>
<tr>
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<td>0.45</td>
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<td>0.61</td>
<td>1.00</td>
<td>0.43</td>
<td>0.48</td>
<td>0.53</td>
<td>0.56</td>
<td>0.57</td>
</tr>
<tr>
<td>R17</td>
<td>0.45</td>
<td>0.69</td>
<td>0.36</td>
<td>0.43</td>
<td>1.00</td>
<td>0.64</td>
<td>0.59</td>
<td>0.47</td>
<td>0.39</td>
</tr>
<tr>
<td>R18</td>
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<td>0.49</td>
<td>0.48</td>
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<td>1.00</td>
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<tr>
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<td>0.53</td>
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<td>0.68</td>
<td>1.00</td>
<td>0.54</td>
<td>0.55</td>
</tr>
<tr>
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<td>0.48</td>
<td>0.56</td>
<td>0.47</td>
<td>0.55</td>
<td>0.54</td>
<td>1.00</td>
<td>0.58</td>
</tr>
<tr>
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<td>0.51</td>
<td>0.57</td>
<td>0.39</td>
<td>0.51</td>
<td>0.55</td>
<td>0.58</td>
<td>1.00</td>
</tr>
</tbody>
</table>
measured at .90.

The nine Confidence items were positively correlated with each other (see Table 7). Therefore, the nine Confidence survey items gave evidence of convergent validity. The nine survey items measured together were reliable, as Cronbach’s alpha was measured at .91.

Table 7.

Correlation Matrix for Confidence

<table>
<thead>
<tr>
<th></th>
<th>C22</th>
<th>C23</th>
<th>C24</th>
<th>C25</th>
<th>C26</th>
<th>C27</th>
<th>C28</th>
<th>C29</th>
<th>C30</th>
</tr>
</thead>
<tbody>
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<td>0.41</td>
<td>0.34</td>
<td>0.37</td>
<td>0.36</td>
<td>0.39</td>
<td>0.28</td>
<td>0.30</td>
</tr>
<tr>
<td>C23</td>
<td>0.44</td>
<td>1.00</td>
<td>0.56</td>
<td>0.42</td>
<td>0.50</td>
<td>0.49</td>
<td>0.48</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>C24</td>
<td>0.41</td>
<td>0.56</td>
<td>1.00</td>
<td>0.64</td>
<td>0.55</td>
<td>0.58</td>
<td>0.65</td>
<td>0.58</td>
<td>0.57</td>
</tr>
<tr>
<td>C25</td>
<td>0.34</td>
<td>0.42</td>
<td>0.64</td>
<td>1.00</td>
<td>0.57</td>
<td>0.68</td>
<td>0.62</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>C26</td>
<td>0.37</td>
<td>0.50</td>
<td>0.55</td>
<td>0.57</td>
<td>1.00</td>
<td>0.57</td>
<td>0.67</td>
<td>0.63</td>
<td>0.61</td>
</tr>
<tr>
<td>C27</td>
<td>0.36</td>
<td>0.40</td>
<td>0.58</td>
<td>0.68</td>
<td>0.57</td>
<td>1.00</td>
<td>0.70</td>
<td>0.58</td>
<td>0.72</td>
</tr>
<tr>
<td>C28</td>
<td>0.39</td>
<td>0.49</td>
<td>0.65</td>
<td>0.62</td>
<td>0.67</td>
<td>0.70</td>
<td>1.00</td>
<td>0.68</td>
<td>0.66</td>
</tr>
<tr>
<td>C29</td>
<td>0.28</td>
<td>0.48</td>
<td>0.58</td>
<td>0.62</td>
<td>0.63</td>
<td>0.58</td>
<td>0.68</td>
<td>1.00</td>
<td>0.65</td>
</tr>
<tr>
<td>C30</td>
<td>0.30</td>
<td>0.35</td>
<td>0.57</td>
<td>0.66</td>
<td>0.61</td>
<td>0.72</td>
<td>0.66</td>
<td>0.65</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The six Satisfaction items were positively correlated with each other (see Table 8). Therefore, the six Satisfaction survey gave evidence of convergent validity. The six survey items measured together were also reliable, as Cronbach’s alpha was measured at .87.
Table 8.

Correlation Matrix for Satisfaction

<table>
<thead>
<tr>
<th></th>
<th>S31</th>
<th>S32</th>
<th>S33</th>
<th>S34</th>
<th>S35</th>
<th>S36</th>
</tr>
</thead>
<tbody>
<tr>
<td>S31</td>
<td>1.00</td>
<td>0.59</td>
<td>0.61</td>
<td>0.49</td>
<td>0.59</td>
<td>0.41</td>
</tr>
<tr>
<td>S32</td>
<td>0.59</td>
<td>1.00</td>
<td>0.77</td>
<td>0.53</td>
<td>0.53</td>
<td>0.34</td>
</tr>
<tr>
<td>S33</td>
<td>0.61</td>
<td>0.77</td>
<td>1.00</td>
<td>0.50</td>
<td>0.55</td>
<td>0.40</td>
</tr>
<tr>
<td>S34</td>
<td>0.49</td>
<td>0.53</td>
<td>0.50</td>
<td>1.00</td>
<td>0.48</td>
<td>0.55</td>
</tr>
<tr>
<td>S35</td>
<td>0.59</td>
<td>0.53</td>
<td>0.55</td>
<td>0.48</td>
<td>1.00</td>
<td>0.54</td>
</tr>
<tr>
<td>S36</td>
<td>0.41</td>
<td>0.34</td>
<td>0.40</td>
<td>0.55</td>
<td>0.54</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Instructional Motivation Survey Validity and Reliability. To determine the validity of the survey instrument to the ARCS Model of Motivation, the researcher ran each survey construct in a correlation matrix (see Table 9). Each of the individual constructs was highly correlated, which gave evidence of construct validity, where each of the separate constructs was related in the ARCS Model of Motivation. The correlations were not >.90, which gave evidence that each of the constructs were also distinct. Therefore, the survey instrument was valid. The survey instrument was also reliable, as Cronbach’s alpha was measured at .92.

Table 9.

Correlation Matrix for All ARCS Items

<table>
<thead>
<tr>
<th></th>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>1.00</td>
<td>0.79</td>
<td>0.74</td>
<td>0.76</td>
</tr>
<tr>
<td>Relevance</td>
<td>0.79</td>
<td>1.00</td>
<td>0.71</td>
<td>0.75</td>
</tr>
<tr>
<td>Confidence</td>
<td>0.74</td>
<td>0.71</td>
<td>1.00</td>
<td>0.75</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.76</td>
<td>0.75</td>
<td>0.75</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Part II of the Quantitative Phase: Determining Best-case

Since the researcher found the IMS to be reliable and valid from analysis of the pilot data, the researcher conducted the survey with the ICS 101 students at the end of the spring 2007 semester to ensure the students had a holistic perspective of the TAs. The survey was conducted at the end of the semester to ensure the participants could identify the TAs who had the most exemplary teaching practices as framed by the ARCS Model of Motivation. The survey data was analyzed using the TwoStep cluster analysis. The TwoStep cluster analysis groups data so that records within a group are similar ("SPSS for Windows Rel. 15.0.1," 2006). Therefore, the researcher determined the best-case undergraduate TAs cluster based on the greatest centroid values to conduct the qualitative phase of the study. The centroid values are the means of the cluster groups ("SPSS for Windows Rel. 15.0.1," 2006).

Participant Selection. Using the data collected from the IMS, the researcher used the TwoStep cluster analysis to find similarities and differences in the data based on the four constructs of the ARCS Model of Motivation and the different sections of the ICS 101 course. The TwoStep cluster analysis indicated that there were two profiles that captured the data (see Table 10). The first cluster profile, Cluster 1, had lower centroid scores for all of the constructs of the ARCS Model of motivation. Therefore, undergraduate TAs, who were closely related to Cluster 1 were not teaching in a manner that was as motivating to students as those who were closely related to Cluster 2. The second cluster profile, Cluster 2, had higher centroid scores for all constructs of the ARCS Model of Motivation. The undergraduate TAs who were closely related to Cluster
2 were teaching in a manner that best reflected the ARCS Model of Motivation in this case. Therefore, the qualitative phase of the study was conducted on those most closely related to Cluster 2.

Table 10

Cluster Centroid Scores

<table>
<thead>
<tr>
<th></th>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster 1</td>
<td>3.44</td>
<td>3.63</td>
<td>3.32</td>
<td>3.27</td>
</tr>
<tr>
<td>Cluster 2</td>
<td>4.24</td>
<td>4.29</td>
<td>4.03</td>
<td>4.06</td>
</tr>
</tbody>
</table>

Selecting Best-case. Each of the sections of ICS 101 was analyzed based on its similarity to each cluster group (see Table 11). Based on the data, the researcher selected the cases that were 100 percent representative of Cluster 2 because a 100 percent resemblance would indicate that the undergraduate TA for that section of the course taught in a manner that best reflected the ARCS Model of Motivation. Sections 3, 6, 7, 11, and 14 were 100 percent representative of Cluster 2. However, the undergraduate TA for section 6 graduated in the spring 2007 semester and could not be studied. The course instructor selected the undergraduate TA for section 11 to be an on-line TA for an on-line version of ICS 101. Since the undergraduate TA for section 11 was not a face-to-face TA during the course of the study, he could not be studied. Therefore, the undergraduate TAs that taught sections 3, 7, and 14 were the best-case TAs studied in the fall 2007 semester in the qualitative phase.
Table 11

Sections and Cluster Percentages

<table>
<thead>
<tr>
<th>Section</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster 1</td>
<td>91.30</td>
<td>95.83</td>
<td>0.00</td>
<td>87.10</td>
<td>31.82</td>
<td>0.00</td>
<td>0.00</td>
<td>11.54</td>
<td>40.91</td>
<td>95.45</td>
<td>0.00</td>
<td>82.14</td>
<td>12.50</td>
<td>0.00</td>
<td>25.00</td>
</tr>
<tr>
<td>Cluster 2</td>
<td>8.70</td>
<td>4.17</td>
<td>100.00</td>
<td>12.90</td>
<td>68.18</td>
<td>100.00</td>
<td>100.00</td>
<td>88.46</td>
<td>59.09</td>
<td>4.55</td>
<td>100.00</td>
<td>17.86</td>
<td>87.50</td>
<td>100.00</td>
<td>75.00</td>
</tr>
</tbody>
</table>
**Phase II: Qualitative Methods**

The researcher conducted a qualitative analysis on the cluster group that was determined to be the best-case. The research was naturalistic, as the researcher studied the participants in their natural teaching setting (Patton, 2002). The researcher conducted a case study on each of the best-case TAs followed by a cross case analysis. The cross case analysis was used to determine the common themes across the different TAs. The common themes in all of the case studies were considered exemplary teaching practices because they were the best-practices that existed at this institution. The researcher used the NVivo software package to analyze the qualitative data collected in the second phase of the study. The methods that were used in each case study were explained in the sections that follow.

*Open-ended Survey of Students*

In the middle of the fall 2007 semester, the researcher conducted an open-ended survey of the students (see Appendix B). This survey limited researcher bias, as the survey was anonymous and the feedback received did not impact any of the students’ grades (Cohen et al., 2000). The researcher conducted the survey in the middle of the semester to ensure the students had time to become accustomed to the TA’s method of instruction. Therefore, the survey was given after the Spreadsheets unit of instruction was completed. The Spreadsheets unit of instruction began in the sixth week of instruction and was completed in the ninth week. The survey was focused on the TAs’ practices during the Spreadsheets unit of instruction. Twenty minutes was given during the class session following the Spreadsheets unit to complete the survey. Each TA was
given a script to read regarding the survey to ensure that all students received the same instructions (see Appendix B). The TAs were instructed to repeat instructions from the script if students had questions regarding the survey they completed.

The open-ended survey was piloted with 10 undergraduate students and five undergraduate TAs in the beginning of the spring 2007 semester. After reviewing the comments from the students and TAs, the researcher modified the survey instrument to ensure the wording of the survey was clear. After making the modifications suggested, the researcher pilot tested the survey instrument with 321 students across 15 laboratory sections in the class session following the Spreadsheets unit of instruction. The researcher refined the wording of the survey based on student feedback.

Interviewing of Undergraduate TAs

The researcher interviewed the undergraduate TAs who were classified as best-case based on the TwoStep cluster analysis. The researcher used a semi-structured interview format and followed an interview guide (see Appendix C). The semi-structured interview format and interview guide was used to ensure the same basic line of inquiry was used for all interviewees (Patton, 2002). This format also gave the researcher the ability to build a conversation and elucidate or illuminate different emerging subject areas. The researcher sent the interview guide to the TAs one week prior to the interviews, as the TAs requested the interview guide prior to being interviewed. Each interview was approximately one hour in length. The TAs were interviewed in their offices to ensure they were in a comfortable setting. The interviews were recorded for transcription and coding.
Follow-up Interview of Undergraduate TAs

To reduce the potential bias of interviewing the TAs, the researcher conducted a member check to verify the findings from the initial interview (Lincoln & Guba, 1985). The researcher conducted the member check after the first interview data was coded and analyzed. The member check was conducted during the follow-up interview and followed the semi-structured interview format with an interview guide (see Appendix C). The follow-up interview was used to answer the second research question; "What were the common themes of the development of the undergraduate TAs' exemplary instructional practices?"

The researcher piloted the interview guide with three undergraduate TAs, who graduated at the end of the spring 2007 semester. These undergraduate TAs were selected for the pilot interview because they graduated and were not a part of the study in the fall 2007 semester. After reviewing the interviews and comments from the TAs, the researcher modified the interview guide to ensure the wording of the questions was clear.

Video of Laboratory Sessions

The researcher recorded each laboratory session with video security cameras that existed in the laboratories. However, the video cameras did not have the ability to record sound. Only observable behaviors could be verified. The video collected from the security cameras in the laboratories was used to verify the findings of the study.

Lab Assistant Interview

To verify the findings the best instructional practices of each undergraduate TA, the researcher interviewed the LAs that assisted each of the undergraduate TAs (see
Appendix D). The interviews were based on the findings from the undergraduate TA interviews and open-ended survey of their students. The LA interview was conducted after the follow-up interview of the undergraduate TAs.

**Reflection Logs**

The TAs wrote reflection logs as a part of their current position. The researcher reviewed the logs to verify the findings of the second interview, which focused on how the TAs developed their teaching practices.

**Member Checks**

The researcher conducted member checks of the second interview to validate the themes that emerged for the development of the undergraduate TAs' best instructional practices (see Appendix C). The member checks also served as a method to triangulate the findings of the second research question.

**Triangulation of Findings**

To ensure the data collected were reliable and valid, the researcher triangulated the findings by data and methods (Patton, 2002). Triangulation strengthens a study by combining multiple methods and data sources to increase validity and reliability of findings (Patton, 2002). The researcher coded surveys from all of the students in each laboratory section to ensure that the themes that emerged triangulated across multiple data sources. The researcher compared the findings of the open-ended survey with the findings of the initial TA interview to find the common themes. The researcher also conducted member checks in the follow-up interview to ensure the findings were not misinterpreted. The researcher verified the findings with video collected from each
laboratory session. The lab assistants in each section were interviewed to further validate each of the findings. The TA reflection logs were used to verify the findings from the second research question, “What were the common themes of the development of the undergraduate TAs’ exemplary instructional practices?” The researcher also validated the findings of the second research question with member checks. Therefore, the data collected in the qualitative phase was verified and validated by multiple data sources and methods used.

**Qualitative Data Analysis**

In the qualitative phase of the study, the researcher used open and axial coding strategies to determine the exemplary undergraduate TA instructional practices (see Figure 8). The researcher analyzed the data collected from the TA interviews by using the open coding strategy to find the different instructional practices that the undergraduate TAs used within the ARCS Model of Motivation during the spreadsheets unit of instruction. In the open coding stage, the researcher coded the data into the four aspects of the ARCS Model of motivation. Next, the researcher analyzed the data collected from the open-ended student survey to find the different instructional practices that the undergraduate TAs used within the ARCS Model of Motivation during the spreadsheets unit of instruction. The researcher coded the data into the four aspects of the ARCS Model of Motivation. The researcher used the axial coding strategy to cross analyze the coded data from both the TA interview and the open-ended student survey data to determine each undergraduate TA’s best instructional strategies for Attention,
Relevance, Confidence, and Satisfaction. After the best undergraduate TA instructional practices were determined, the researcher conducted the follow-up interview to conduct member checks for each of the findings. The researcher used the follow-up interview to
verify if different instructional practices took place in lab if the students reported it and the undergraduate TA did not in the interview. The researcher reviewed the video from each lab session to determine the validity of the findings. The researcher also interviewed the lab assistants in each of the labs to further verify the findings. In the follow-up interview, the researcher also collected data regarding the development of each of the instructional practices identified in the cross analysis of the undergraduate TA interview and open-ended student survey. The researcher verified the findings of the follow-up interview by reviewing the undergraduate TAs' reflection logs and conducted a member check for each of the findings. Then the researcher analyzed the data collected from the follow-up interview to determine how each TA developed their best instructional practices.

The researcher conducted a cross-case analysis of the three best-case undergraduate TAs (see Figure 9). The researcher compared the best instructional strategies of each of the undergraduate TAs to find the common themes among them, which were classified as exemplary undergraduate TA instructional practices. The researcher compared the development of the exemplary instructional practices of each of the undergraduate TAs to determine the common themes (see Figure 10).
Figure 9. Determining exemplary undergraduate TA instructional practices

Figure 10. Determining common themes of instructional practices development
Role of the Undergraduate TAs

The researcher included a rich description of the undergraduate TAs’ hiring process and their roles. The undergraduate TAs’ responsibilities are summarized in Table 12. The undergraduate TAs’ responsibilities included teaching one or two labs, preparing teaching materials, grading assignments, holding office hours, answering student questions, assisting the instructor in the face-to-face lecture, and participating in weekly meetings. Detailed explanations of hiring process and responsibilities are included in the sections that follow.

Hiring Process

Students who were hired as undergraduate TAs underwent a stringent review and hiring process (see Figure 11). Students were required to complete the ICS 101
Figure 11. Undergraduate TA Hiring Process

course with an “A” grade. Following successful completion of the course, the ICS 101 students who received an “A” grade were invited to enroll in a teaching internship course, where the students were required to assist an undergraduate TA for a semester prior to applying for the position. The teaching internship course has a maximum enrollment of 25 students. Therefore, all students interested in enrolling in the course were required to take a test that assessed their skills in various applications. This test was used to determine the top 25 students if multiple students had the same grade percentage. In this course, the students were referred to as LAs. The LAs were also required to meet once a week with the course instructor to learn about ethical issues in teaching and technology.

For the teaching internship portion of this course, the students were required to assist a lab throughout the semester, monitor the open lab three hours a week, teach one week of lab materials, and write a critique of their TA. After completion of the teaching internship course, the LAs could apply to be an undergraduate TA. The course coordinator advised the instructor regarding the hiring of new TAs, however, the instructor made the final decisions.
Undergraduate TA Responsibilities

Undergraduate TAs were required to teach one or two labs. New undergraduate teaching assistants were responsible for one lab, while others with at least one semester of experience could teach one or two labs based on preference and instructor support. The undergraduate TAs were given the predetermined objectives prior to each unit of instruction. Therefore, the undergraduate TAs were required to develop their own teaching materials and practices based on these predetermined objectives. Undergraduate TAs were also responsible for the assessment of all assignments completed by the students enrolled in ICS 101. Six undergraduate TAs assisted the course instructor in the face-to-face lecture. They assisted the instructor by setting up the lecture hall, passing out and collecting assignments, and answering student questions. The undergraduate TAs also participated in weekly meetings with the course coordinator. The weekly meetings are discussed in detail in the following section.

Role of the Researcher

Since the researcher was also the course coordinator for the ICS 101 course, he included a rich description of his responsibilities. The course coordinator's responsibilities are summarized in Table 13. The course coordinator’s responsibilities included orientation/training of undergraduate TAs, lab curriculum design and development, supervision of undergraduate TAs, leading of weekly meetings with undergraduate TAs, individual counseling, and on-going formative assessment of undergraduate TAs.
Table 13

*Role of the researcher*

<table>
<thead>
<tr>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Orientation/Training of undergraduate TAs</td>
</tr>
<tr>
<td>• Lab curriculum design and development</td>
</tr>
<tr>
<td>• Supervision of undergraduate TAs</td>
</tr>
<tr>
<td>• Weekly meetings with undergraduate TAs</td>
</tr>
<tr>
<td>• Individual counseling</td>
</tr>
<tr>
<td>• On-going formative assessment of undergraduate TAs</td>
</tr>
</tbody>
</table>

*Orientation/Training of Undergraduate TAs*

The course coordinator was responsible for developing and administering a two-day orientation for all undergraduate TAs for the ICS 101 course. Newly hired undergraduate TAs were required to attend a session with the course coordinator to be oriented to the system and logistics of being an undergraduate TA. The orientation session for all undergraduate TAs included lab assignments, open lab hours assignments, review of the course syllabus, teaching and learning pedagogy, updates from previous course curriculum, training sessions for new applications being taught, and time to meet the LAs.

The focus for teaching and learning pedagogy was motivation. The undergraduate TAs, course coordinator, and instructor identified motivation as a critical factor for teaching in a large-enrollment setting. The course coordinator and instructor also reviewed literature to support their intuition that motivation is an important aspect of large-enrollment instruction. The course coordinator led an information session on different motivation theories, including the ARCS Model of Motivation. Therefore, the
orientation session ensured that the undergraduate TAs all had a similar knowledge base for motivation in teaching.

The course coordinator also worked with the undergraduate TAs to develop the orientation session. Therefore, the undergraduate TAs worked together and were responsible for different aspects of the training under the direction of the course coordinator. For example, the undergraduate TAs were assigned to groups by expertise to lead the training sessions for new applications.

*Lab Curriculum Design and Development*

The course coordinator was also responsible for the design and development of the lab curriculum. The course coordinator worked with the undergraduate TAs during weekly meetings to determine the needs of the students in different areas of study to ensure that the material being taught was current and met the needs of the students. Since the technologies taught in the course changed at a fast rate, the curriculum was updated either once or twice a year to account for those needs. Therefore, the undergraduate TAs were also involved in the design and development of the lab curriculum.

*Supervision of Undergraduate TAs and LAs*

The course coordinator supervised the undergraduate TAs and LAs. The course coordinator was the first point of contact for all TAs and LAs when different issues arose in the labs. The course coordinator disseminated teaching objectives for each unit of instruction one week prior to the start of each unit. The course coordinator was responsible for the LAs, but they worked more directly with their undergraduate TA.
Since the course coordinator supervised the undergraduate TAs, a power difference existed. Therefore, a potential for bias existed in the study, which was addressed with multiple methods of triangulation.

Weekly Meetings with Undergraduate TAs

The course coordinator led weekly meetings with the undergraduate TAs. In these meetings, the course coordinator developed meeting agendas, which were sent two days prior to each meeting to ensure all undergraduate TAs could come to the meeting prepared to discuss different aspects of the course. Much of the meeting time was used to discuss the different issues that arose and solve problems in the labs globally to ensure implemented solutions were consistent across all labs.

The weekly meetings included the topics such as content for lab and instructional approaches, teaching and learning issues, problems in the laboratories, assignment of projects, and updates to the curriculum. In most cases, the TAs worked with the course coordinator to create the agenda, as many sent emails regarding issues in the lab prior to the meeting. Undergraduate TAs also requested specific teaching and learning pedagogy to be discussed in the meeting to expand their knowledge about specific teaching strategies.

Individual Counseling

The course coordinator counseled individual undergraduate TAs. In most cases, the undergraduate TAs wanted to learn more about teaching and learning in the lab environment. In other cases, the undergraduate TAs wanted help with specific issues that arose in their lab(s) that they felt were not issues across all labs. The undergraduate TAs
also sought advice from the course coordinator about their own schooling, graduate school options, and future employment opportunities.

*On-going Formative Assessment of Undergraduate TAs*

The course coordinator also conducted on-going formative assessment with all undergraduate TAs. The course coordinator provided on-going formative assessment for the undergraduate TAs by observing their teaching for one week in the semester and providing feedback on how they have improved and what they could consider for further development of their teaching practices.

*Limitations*

The first limitation of the study was that several undergraduate TAs graduate each semester. In this study, one of the best-case undergraduate TAs fell in the best-case cluster and could not be studied. Therefore, the researcher studied the best-case TAs who were available during the course of the study.

The second limitation of the study is that one best-case undergraduate TA was selected by the instructor as the on-line TA and could not be studied. The researcher studied the best-case TAs who were available during the course of the study.

The third limitation of the study was that a small sample size was used for the qualitative phase of the study. Therefore, the researcher was not able to generalize the findings of the study to a larger population. The study created a basis for future studies on undergraduate TA teaching practices.

The fourth limitation was one university was used to sample undergraduate TAs. Therefore, generalizability is further limited to this specific case.
The fifth limitation was that qualitative data were collected during one unit of instruction over a three-week period. Therefore, the individual unit of instruction over three weeks might not be a representation of the entire semester and the best practices of undergraduate TAs throughout the semester.

The sixth limitation of the study was the use of the ARCS Model of Motivation as the framework for the study. Since the study was framed by the ARCS Model of Motivation, instructional practices that did not fall within the ARCS Model of Motivation may not have been discovered.

The last limitation of the study was the use of the researcher as the research instrument. Since this study was qualitative in nature, the researcher's interpretations were used to analyze data. However, the researcher used multiple methods of triangulation to minimize bias.

Summary

The researcher used a sequential mixed methods approach to answer the research questions, which included a quantitative phase followed by a qualitative phase. In the quantitative phase of the study, the researcher developed the IMS, determined its validity and reliability, and used a TwoStep cluster analysis to identify the best-case undergraduate TAs to study in the qualitative phase.

In the qualitative phase of the study, the researcher collected primary data through semi-structured interviews of the best-case undergraduate TAs and an open-ended survey of their students. The researcher used the open and axial coding strategies to identify the best practices of each of the undergraduate TAs using the primary data sources. The
findings were triangulated through the secondary data sources, which included video of the laboratory sessions, member checks, and interviews of the LAs.

To answer the second research question, the researcher conducted a follow-up interview of each of the best-case undergraduate TAs. After identifying how the undergraduate TAs developed their best instructional practices, the researcher validated the findings through the TA reflection logs and member checks.

The researcher also discussed the role of the undergraduate TAs and the role of the researcher. The role of the undergraduate TAs included teaching one or two labs, preparing teaching materials, grading assignments, holding office hours, answering students' questions, assisting the instructor in the face-to-face lecture, and participating in weekly meetings. The role of the researcher included orientation/training of undergraduate TAs, lab curriculum design and development, supervision of undergraduate TAs, leading weekly meetings with undergraduate TAs, individual counseling, and on-going formative assessment of undergraduate TAs.

Seven limitations were identified in the study. The seven limitations were a best-case undergraduate TA graduated at the end of the quantitative phase and could not be studied, a best-case undergraduate TA changed job positions and could not be studied, a small sample size was used in the qualitative phase of the study, one institution was studied, the qualitative data were collected during one unit of instruction over a three week period, the use of a theoretical framework for the study, and the researcher was used as the research instrument.
CHAPTER IV

FINDINGS

Case 1

The first undergraduate TA (UGTA 1) was a female who was born and raised locally and graduated from a public high school. She was a fourth-year student at the Research Extensive University majoring in Travel Industry Management. Prior to becoming an ICS 101 TA, she had no teaching background. During the study, UGTA 1 was in her third semester teaching as an ICS 101 TA and taught one lab each semester of her employment. UGTA 1 indicated that she became an ICS 101 TA because she had a positive experience as a LA and enjoyed teaching undergraduate students. During the course of the study, UGTA 1 taught in Room 319.

UGTA 1 Interview: Open-coding of Instructional Practices as ARCS

In the open-coding stage of the data analysis, the researcher coded the different instructional practices that UGTA 1 discussed in the interview into the four constructs of the ARCS Model of Motivation (see Table 14). The researcher included an “Other” section for instructional practices that were identified but did not fall within the ARCS Model of Motivation framework.

The researcher coded four instructional practices in the Attention category. The first instructional practice was reminding students of due dates and upcoming events for the course. UGTA 1 indicated that the reminders helped her students to remember when the different assignments were due. The second instructional practice that UGTA 1 used was informing her students of the objectives for the day. She reported, “I type out
Table 14

*UGTA 1 Instructional Practices Coded into ARCS*

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders</td>
<td>• Apply concepts to academic situations</td>
<td>• Walk around the lab to ensure students can ask for help individually</td>
<td>• Positive feedback</td>
<td>• Visibility outside of class</td>
</tr>
<tr>
<td>• Informing learners of objectives</td>
<td>• Apply concepts to situations that may be beneficial in the future</td>
<td>• Review at the beginning of each lab session</td>
<td>• Teaching concepts that are useful</td>
<td></td>
</tr>
<tr>
<td>• Humor</td>
<td>• Reminders for them on notepad and project them.</td>
<td>• Encourage questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Aesthetically pleasing documents</td>
<td></td>
<td>• Anecdotes about previous students</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Encouraging questions</td>
<td>• Small talk with students inside/outside of class</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Allow students to make mistakes and fix them before helping them</td>
<td>• Small talk with students inside/outside of class</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Positive feedback</td>
<td>• Positive feedback</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

reminders for them on notepad and project them.” She further explained, “I would just [um] summarize what we were going to do what we were going to learning so they know what to expect.” UGTA 1 projected the objectives for the day prior to explaining them. She felt that projecting and explaining the objectives helped the students to have a better understanding of the concepts they learned each day. The third instructional practice that UGTA 1 used was humor. She indicated that her humor was not directly related to the content, but it helped to maintain her students' attention throughout the class sessions.

The fourth instructional practice was developing aesthetically pleasing documents. She stated, “... cause it (color on the screen) is a lot better than staring at black and white and seeing many words all over the screen. The color organizes your screen. So, I think it
will help them understand.” She felt that using appropriate colors only helped to gain students’ attention.

The researcher coded two instructional practices in the Relevance category. The first instructional practice that was coded in the Relevance category was applying concepts to academic situations. UGTA 1 felt that her anecdotes helped to make concepts relevant to students. She further explained that she completed several Business and Travel Industry Management courses and found the content to be critical to successful completion of those courses. The second instructional practice was applying concepts to situations that students may encounter in the future. UGTA 1 stated, “I think letting them know how useful it is to them in the future will increase their interest in learning about it. When you bring out the thought about buying a house or buying a car or like putting a down payment down for a car and a house.” She further explained that students appeared to enjoy learning about the different concepts that were applicable to their life after they finish college.

The researcher coded six instructional practices in the Confidence category. The first instructional practice that was coded in the Confidence category was walking around the lab while teaching to ensure the students could ask questions individually. UGTA 1 stated, “If you are right next to them, it is easier for them to stop you without inconveniencing others.” She further explained that she noticed that more students asked her for assistance when she walked around during teaching, as opposed to the previous semester where she only stood in the front of the class. The second instructional practice was reviewing concepts learned in previous class sessions. UGTA 1 stated, “We start
with the review and then we move on so that they know where we left off. I think having
them review and having them figure out how to do it increases their confidence so they
are ready to learn the next lesson.” The third instructional practice was encouraging
questions. She indicated that students became more forthcoming with answers the more
she encouraged questions. The fourth instructional practice was presenting anecdotes of
previous students’ success. She reported, “I always tell them that previous students got
intimidated by this and they think this is the hardest part of Excel. But, if you just take
the time to realize that it’s not that hard and it is just the numbers that can look
intimidating.” She further explained that her students feel more confident, especially
after completing the lesson. The fifth instructional practice was speaking to students
individually about different topics that related to ICS 101 or their life as a student.
UGTA 1 stated, “I think a lot of the things I’ve been through are similar to those they are
about to or already have been through. So, there is a lot we can relate to. I have small
talk a lot with my students so it’s like we’re friends too.” She felt that speaking to her
students individually in and outside of class helped them to become more comfortable
with her and more confident to ask questions. The sixth instructional practice was
allowing students to fix their own problems when they make mistakes as opposed to
immediately giving answers. UGTA 1 explained, “I would have them try and figure out
how to do things because I think that when you try to figure it out, and you hit a dead end
or make a wrong turn, learning how to fix the problem helps you to learn and remember
how to do it right the next time.” Therefore, she felt that students became more confident
in their skills when they learn from their mistakes.
The researcher coded two instructional practices in the Satisfaction category. The first instructional practice was giving students positive feedback. UOTA 1 indicated that positive feedback helped students to be more satisfied because they were recognized for their achievements. She further explained, “Professors have so many students that it is kind of hard for them to go and give each individual student feedback and I think that having a more personal comment made can be motivating.” The second instructional practice was teaching concepts in a manner that students perceived as useful and relevant. UOTA 1 stated, “They are going be satisfied if they know the material they learned will benefit them.” She felt that students also needed to be confident in the skills they found relevant to be satisfied with their learning.

One item was coded in the Other category. The item that was coded was her visibility outside of class. UOTA 1 stated, “They see me around campus and going to class, so it’s just like I am one of them.” The researcher coded this item in the other category because UOTA 1 did not interact with the students, but her visibility may have affected the students’ perception of her while in class. She felt that visibility increased comfort levels while in class, which could increase their confidence.

**TA Instructional Practices Motivation Survey UGTA 1: Instructional Practices Open Coded as ARCS**

Thirty students completed the TA Instructional Practices Motivation Survey of UGTA 1. In the open-coding stage of the data analysis, the researcher coded the different instructional practices UGTA 1’s students identified in the TA Instructional Practices Motivation Survey into the four constructs of the ARCS Model of Motivation (see Table 69).
The researcher included an Other section for items that were identified but did not fall within the ARCS Model of Motivation framework.

Two themes emerged in the Attention construct. The first instructional practice was informing the learners of the objectives for each lab session, which was reported in Table 15.

### UGTA 1 Instructional Practices from the Students’ Perspective Coded into ARCS

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Informing learning of objectives (7 instances)</td>
<td>• Apply concepts to academic situations (13 instances)</td>
<td>• Walk around the lab to ensure students can ask for help individually (19 instances)</td>
<td>• Learned concepts that are useful (6 instances)</td>
<td>• Learned something new (7 instances)</td>
</tr>
<tr>
<td>• Enthusiasm (9 instances)</td>
<td>• Apply concepts to life outside of school (11 instances)</td>
<td>• Encourage questions (11 instances)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Apply different concepts to situations that may be beneficial in the future (14 instances)</td>
<td>• Review at the beginning of each lab session (10 instances)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Allow students to make mistakes and fix them before helping them (4 instances)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

by seven students. One student commented, “She did get my attention, but it's hard not to when the instructions are up on the board, and attention giving is pretty much one of them.” Informing the learners of the objectives also helped to maintain the students’ attention. One student commented, “She would let us know generally what we would learn each day, however, I was not able to pay attention to her the whole time because I already knew some parts of the excel lessons, but I knew when I didn't know something, I paid more attention then.” This student indicated that being informed of the objectives
ensured he/she knew if he had to give attention due to his/her previous experience with Excel. The second instructional practice was the undergraduate TA’s enthusiasm, which was reported by nine students. One student responded to the question regarding how the undergraduate TA gained attention, “... very much so, she was animated, and enthusiastic about the subject.” It appeared that the students enjoyed UGTA 1’s enthusiasm for teaching Excel and felt that it gained and maintained their attention throughout the lessons.

Three themes emerged in the Relevance construct. The first instructional practice was using examples that were applicable to current academic endeavors, which was reported by 13 students. The students reported that UGTA 1 taught using examples that they felt were pertinent to their life as a student. One student stated, “It was interesting because a lot of the things that we covered in lab relate to me and were able to help me out not only in this class but other classes.” Another student commented, “At first I didn’t know why we needed to know how to use Excel, but after all of the lessons I now know that Excel will benefit me in many ways for my future. My plan is to go into communications and knowing how to use this type of database will be beneficial to me when the time comes. So yes, this lesson was very interesting to me.” Students’ perception of their academic work and the topic’s applicability to their major appeared to be an important aspect of determining relevant instructional examples. The second instructional practice was teaching with examples that were applicable to the students’ current life outside of academics, which was reported by 11 students. UGTA 1 taught using examples that were pertinent to situations that occur in students’ lives. One student
reported, “The Excel lessons were interesting to me because I learned how to use it with real life situations. It made it easier to calculate many numbers and how to calculate payments. It also showed me how to be more organized in a creative way (graphs, colors).” Another student reported, “I feel confident in putting it on my resume.” This comment indicated the students’ perception that the skills learned were pertinent to his/her current work life outside of academics. The third instructional practice was the use of examples that were pertinent to the students’ future, which was reported by 14 students. A student summed it up best by stating, “I may use this program in the future. It may be for classes, work, or just keeping organized. It is a nice tool to learn and it is a very efficient program.” This student indicated the program’s utility in many different situations that could be useful in the future.

Four themes emerged in the Confidence construct. The first instructional practice was walking around the lab during instruction to give individual guidance to students, which was reported by 19 students. One of her lab assistants completed the tasks on the demonstration computer while she led the lab assistant and her class through her exercises. During this time, she gave the students the opportunity to ask for clarification and gave them feedback on their learning. A student summed it up best by stating, “Throughout the lesson she would stop and walk around making sure that we were all up to date and knew what we were learning. Falling behind in this course is very crucial and I feel that UGTA 1 will not allow that to happen.” Another student reported, “She’s just really good with giving you really good help, and doing it quickly, so the class doesn’t slow down too much.” UGTA 1 was able to give her students individual assistance
throughout the lessons and was able to ensure that students did not fall behind. The second instructional practice was encouraging questions to increase their confidence, which was reported by 11 students. The students commented that being encouraged to ask questions in lab helped them to feel more comfortable to ask questions. One student reported, “She encouraged questions, and taught us in an amiable manner that allowed an increase in confidence.” The third instructional practice was reviewing material from previous class sessions, which was reported by 10 students. The students indicated that they felt an increase in confidence when UGTA 1 reviewed material from the previous class session because they could ensure they understood the material they learned before moving to new material. The students also felt that they were able to complete tasks before moving on to new concepts. One student commented, “She made it easy by going over the each part and having a review of it the next class session and by explaining how to do the functions.” The fourth instructional practice was allowing students to fix their mistakes, as opposed to immediately giving answers, which was reported by four students. UGTA 1 walked around the lab to ensure students felt confident to ask questions, but also gave them the opportunity to fix their mistakes while she was next to them. One student stated, “She did however let us make mistakes and try to learn from our own and only aided us when we needed help. This is the kind of teaching I like where we make our own mistakes and learn from it.” Another student stated, “… letting us make mistakes and learn from it. Only aiding us when we ask. I believe learning from ones mistake helps us retain it in the long run.”
Two themes emerged in the Satisfaction construct. The first instructional practice was learning concepts that were useful, which was reported by six students. The six students who reported this instructional practice were satisfied when they felt that they learned how to apply the concepts they learned in lab to their life. One student reported, “I've actually used everything I learned from Excel in the real world.” Another student stated, “I was satisfied because now I know a little more than I did, and I can truly say I have basic skills on Excel when applying for a job.” Therefore, the students felt that applicability to their life was critical in their satisfaction with learning. The second instructional practice was teaching concepts that students previously did not know existed, which was reported by seven students. The seven students felt satisfied when they knew that they learned concepts that they did not know existed. When asked about satisfaction, one student stated, “Some things, like the amortization table and the pivot table, I had not seen before. Those were interesting.”

Axial Coding of UGTA 1 and Students' Perspectives

In the axial coding stage, the researcher cross-analyzed the codes developed from UGTA 1’s interview and the TA Instructional Practices Motivation Survey. The researcher analyzed the themes that existed to determine the best practices of the undergraduate TA. The researcher analyzed the data by finding the common themes that existed. However, the researcher maintained the codes that existed in the TA Instructional Practices Motivation Survey and not in the interview. The researcher used the follow-up interview to verify these themes, as the students perceived them as
beneficial to their motivation as framed by the ARCS Model of Motivation. The common themes that emerged are summarized in Table 16.

**Table 16**

*Common Themes of UGTA 1 Interview Codes and Open-ended Survey codes*

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Informing learning of objectives</td>
<td>• Apply concepts to academic situations</td>
<td>• Walk around the lab to ensure students can ask for help individually</td>
<td>• Teaching concepts that are useful</td>
<td>• Teaching new concepts (did not emerge in initial interview)</td>
</tr>
<tr>
<td>• Being enthusiastic about topic (did not emerge in initial interview)</td>
<td>• Apply concepts to situations that may be beneficial in the future</td>
<td>• Encourage questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Apply concepts to life outside of school (did not emerge in initial interview)</td>
<td>• Review at the beginning of each lab session</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>• Allow students to make mistakes and fix them before helping them</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The researcher found that both UGTA 1 and the students reported that informing the learners of the objectives helped to gain and maintain the students' attention.

Teaching with examples that were pertinent to the students' academic situations and situations that were perceived to have a future benefit increased the level of relevancy to the students. UGTA 1 increased the students' confidence by walking around the lab to guide the students and be available for individual questions. Another instructional practice that increased the students' confidence was consistently encouraging questions. UGTA 1 also increased her students' confidence by reviewing concepts learned in the previous lab session and allowed students to make mistakes and learn from them.

Students were satisfied with their learning when they felt that they learned concepts that were new and when the concepts were useful in their lives.
Follow-up Interview of UGTA 1: Member Check

In the follow-up interview with UGTA 1, the researcher conducted member checks for the common themes in Table 16. UGTA 1 verified all of the instructional practices listed in Table 16. Following the member check, the researcher interviewed UGTA 1 regarding the themes that emerged from the open-ended survey of the students that did not transpire in the first interview. UGTA 1 verified that all of the instructional practices that emerged from the open-ended student survey occurred in the laboratory.

The students felt that her enthusiasm for the topic also helped to gain and maintain their attention, which did not transpire in the initial interview. This finding was verified in the follow-up interview of UGTA 1. UGTA 1 stated, “I think it’s (enthusiasm while teaching) not just because of the topic but it’s just the way I am. So, it’s not something that I try to do. It just it never occurred to me.”

Applying concepts to life outside of school was also verified in the follow-up interview of UGTA 1. UGTA 1 stated, “Well, I guess I was just lucky in that case. Um, I guess it never really occurred to me that I assume based on my own experience that [um] like right now, I am really focused in school and my objective is to pass all my classes and do good in them.” UGTA 1 further explained, “I think I used my own [um] experience as a basis, so I never really thought a lot about work even though it part of my life and I used those examples.” Therefore, she naturally used examples from her work experience while teaching in lab.
Students were satisfied when they learned concepts that they did not know existed. UGTA 1 indicated that she could not control what students did or did not know prior to her instruction.

**UGTA 1 Lab Assistant Member-Check**

UGTA 1 had two lab assistants in her section of ICS 101. The researcher interviewed both lab assistants separately to verify the findings listed in Table 16. Both lab assistants independently verified all of the instructional practices listed in Table 16. The lab assistant member-check further triangulated the findings.

**Video Verification of Findings**

The researcher verified two findings using the video. The researcher verified informing learners of the objectives because UGTA 1 projected the objectives prior to discussing them with her students. The researcher also verified walking around to ensure students could ask for help individually.

**Follow-up Interview of UGTA 1: Development of Instructional Practices**

The researcher coded the follow-up interview to determine how UGTA 1 developed her best instructional practices. The themes that emerged from the coding process were reflection, modeling from the undergraduate TA that taught UGTA 1, modeling from the undergraduate TA that UGTA 1 assisted as an LA, modeling of other professors, and instructional practices that were unintentional (see Table 17).
Table 17

Development of Instructional Practices for UGTA 1

<table>
<thead>
<tr>
<th>Reflection</th>
<th>Modeling of TA as a student</th>
<th>Modeling of TA as a L.A</th>
<th>Modeling of other Professors</th>
<th>Unintentional</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Informing learning of objectives</td>
<td>• Apply concepts to situations that may be beneficial in the future</td>
<td>• Walk around the lab to ensure students can ask for help individually</td>
<td>• Review at the beginning of each lab session (Confidence)</td>
<td>• Being enthusiastic about topic (Attention)</td>
</tr>
<tr>
<td>(Attention)</td>
<td>(Relevance)</td>
<td>(Confidence)</td>
<td></td>
<td>• Apply concepts to life outside of school (Relevance)</td>
</tr>
<tr>
<td>• Apply concepts to academic situations</td>
<td></td>
<td></td>
<td></td>
<td>• Teaching new concepts (Satisfaction)</td>
</tr>
<tr>
<td>(Relevance)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Encouraging questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Confidence)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Allow students to make mistakes and fix them before helping them</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Confidence)</td>
<td></td>
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</tbody>
</table>

Reflection. The first theme, oral and written reflection, was the basis for one Attention, one Relevance, and three Confidence instructional practices. However, UGTA 1 indicated that the course coordinator played an important role in her reflection process. She stated,

When I first started my TA job, I thought that the first orientation we had was really important because like that’s when you brought out the ARCS Model. It didn’t really stick out to me before. But, after you brought it out, I thought it made a lot of sense. And you always followed up with me about it and what I thought. It was obvious you had to get their attention, but applying Relevance and Confidence to their teaching. When I first heard about that, it kinda made me realize like oh, that’s right, you have to be confident when learning something and you have to have it be relevant to you to want to keep on wanting to learn it. So, I think that that [um] it helped me a lot in how I would teach my lab and reflect.

It appears that the course coordinator and the orientation session had an impact on UGTA 1’s reflection process.
The first instructional practice that UGTA 1 developed through reflection was informing her learners of the objectives by projecting them on the screen while the students completed the daily quiz, which was an instructional strategy to gain and maintain the students’ attention. After the students completed the quiz, she reviewed the objectives for the day. UGTA 1 stated,

I think because of the quizzes they have to take. They finish at different times, so I can’t really speak to them while some are and some aren’t taking the quiz. So, I also noticed that a lot of them are waiting around so I thought I would put it up there. So, everyone can read at their own pace. Then, when the 10 minutes are up or when everyone is finished with their quiz, I would just read over it.

UGTA 1 also indicated that the students would turn their attention over to other things like reading their e-mail or watching videos online. Therefore, she felt that informing the learners of the objectives for the day would ensure that she could gain and maintain their attention after they completed the daily quiz.

The second instructional practice that UGTA 1 developed through reflection was applying concepts to academic situations, which was a Relevance instructional practice. She stated, “Well, I think well, it (applying concepts to academic situations) is based on how I felt. Like I said before, I am in my college years, and I trying to think oh how can I use everything I am learning now for my next class or how can I use it for this class. So, it’s kinda based on what I wish I would know for my academics.”

The third instructional practice that UGTA 1 developed through reflection was encouraging questions, which was a Confidence instructional practice. UGTA 1 indicated that she thought about encouraging questions in her teaching throughout her three semesters of teaching. She also stated,
Hmm, I think I didn’t really do that my first semester. But after that as I kept going, I noticed that when I asked questions. At first, I didn’t ask questions because no one would respond. And then, I noticed that as they got more comfortable and I asked more questions, more students would respond. I would reassure them that if they have questions, it is most likely that someone else was stuck on the same thing so just ask away and don’t be shame about it. I think that it helped them to talk and speak up more and I noticed that now when I do ask questions, there are certain students who will always raise their hand and let me know.

UGTA 1 felt that it took a lot of time and encouragement to increase her students’ confidence to ask questions in lab.

The fourth instructional practice that UGTA 1 developed through reflection was allowing students to make mistakes and fix them on their own before providing assistance. UGTA 1 stated,

Actually, like I think I learned from Secure Shell. With Secure Shell, you can’t really see your mistakes until after it is already done. I mean you don’t really know that you are making a mistake until after when you when you’re learning. Like when I was learning it, I didn’t know I made a mistake until after like you look at it and don’t know where a folder is because I renamed it instead of moving it. Having to go back and fix my mistake; from then on, that is what stuck in my head in terms of what I had to pay attention to in Secure Shell. So, I just applied that to Excel.

UGTA 1 felt that she developed this instructional practice through reflection of her own learning experiences in ICS 101. She felt that she learned from her mistakes, which helped concepts to “stick” in her head. She applied what she learned about herself to other aspects of her teaching, like Excel.

Modeling of TA. The second theme, modeling of the undergraduate TA that taught UGTA 1, was the basis for one Relevance instructional practice. UGTA 1 applied concepts to situations that may be beneficial in the future, which was a Relevance instructional practice. She felt that she learned this practice from the undergraduate TA.
when she was an ICS 101 student. She stated, "When he (UGTA 1’s TA as a student) taught me amortization, he said it was useful for the future. It kinda did make me pay attention to it more, so I did it (relate concepts to future situations too)." UGTA 1 felt that this instructional practice was useful in teaching and applied it in her own teaching practice.

**Modeling as LA.** The third theme, modeling of the undergraduate TA that supervised UGTA 1 when she was a LA, was the basis for one Confidence instructional practice. UGTA 1 walked around lab to ensure students could ask for help individually, which was a Confidence instructional strategy. UGTA 1 stated, "When I was an LA, I remember seeing my TA walk around and I thought it was a good idea. Like when you are teaching, you need to see if your students are following and walking around would allow you to see their screen and how they are doing." She felt that the TA walking around the lab during instruction worked well, which she implemented in her teaching.

**Modeling of other Professors.** The fourth theme, modeling of other professors, was the basis for one Confidence and one Satisfaction instructional strategy. The first instructional practice that UGTA 1 developed through modeling of other professors was reviewing material from previous lab sessions, which was a Confidence instructional strategy. She stated, "I know that [um] because from what my professors taught me or like trying to drill into my head. You should preview, go to class, and then review the material. So, their preview is the simulation, then I teach them stuff in class. Then the review helps them to seal it up. So, I think it helps to kinda set it in their heads." She
also indicated that her professors helped students to get a “better feel” for the material by reviewing material from previous sessions.

The second instructional practice that UGTA 1 developed through modeling of other professors in college was teaching concepts that are useful, which was a Satisfaction instructional practice. UGTA 1 stated,

More in college because in high school, I was too buried into the material itself so I didn’t really recognize like why I was learning it if that makes sense. Like I learned that O2 was oxygen, but I didn’t really like know why; I just learned the material without really knowing how to apply it. In college, my professors made more things more useful in life; maybe cause I’m closer to a real job now.

She felt that her college professors had an impact on how concepts that she learned could be more useful in her life than when she learned concepts in high school.

Unintentional Instructional Practices. The fifth theme, unintentional instructional practices, was the basis for one Attention, one Relevance, and one Satisfaction instructional practices. The first instructional practice that UGTA 1 developed unintentionally was being enthusiastic about teaching Excel, which was an Attention instructional practice. She stated, “That just comes with being me. It’s not something I try to do. I mean, I try not to be not enthusiastic, but I don’t try to be enthusiastic.”

The second instructional practice that UGTA 1 developed unintentionally was applying concepts to life outside of school, which was a Relevance instructional practice. She stated, “I think it (applying concepts to life outside of school) was just on accident. I would like to say that I purposely did that, but I never really like put much thought into it. It just happened.”
The third instructional practice that UGTA 1 developed unintentionally was teaching concepts that the students were not aware of, which was a Satisfaction instructional practice. She stated, “It (learning concepts that are new) is curriculum oriented. I don’t really control it cause if they don’t know it, it’s new stuff.”

Member Check of Development Themes

The researcher conducted a member check to verify the findings in Table 17. UGTA 1 verified all of the themes and the instructional practices associated with each theme.

Reflection Logs Verification of Instructional Development Findings

The researcher reviewed UGTA 1’s reflection logs to verify the development of the instructional practices. Using the reflection logs, the researcher was able to verify two of the instructional practices that were developed based on reflection, as the TA wrote about them in her reflection log. The researcher was able to verify applying concepts to academic situation and allowing students to make mistakes and attempt to fix them before helping them.

Case 1: Summary

The researcher summarized the findings of case 1 in Table 18. The researcher included a legend to indicate how each instructional method was developed and how each instructional practice was verified.
Table 18

Summary of Findings for UGTA 1

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Informing</td>
<td>• Apply concepts to academic situations (1, M, L, R)</td>
<td>• Walk around the lab to ensure students can ask for help individually (3, M, L, V)</td>
<td>• Teaching concepts that are useful (4, M, L)</td>
<td>• Teaching new concepts (5, M, L)</td>
</tr>
<tr>
<td>learning of objectives (1, M, L, V)</td>
<td>• Apply concepts to life outside of school (5, M, L)</td>
<td>• Encourage Questions (1, M, L)</td>
<td>• Review at the beginning of each lab session (4, M, L)</td>
<td></td>
</tr>
<tr>
<td>• Being enthusiastic</td>
<td>• Apply concepts to situations that may be beneficial in the future (2, M, L)</td>
<td>• Allow students to make mistakes and fix them before helping them (1, M, L, R)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>about topic (5, M, L)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend

1 - Reflection
2 - Modeling from UGTA 1’s undergraduate TA
3 - Modeling from UGTA 1’s supervising TA as an LA
4 - Other Professors
5 - Unintentional
M - Member check verified
L - Lab assistant verified
V - Video verified
R - Reflection log verified

Case 2

The second undergraduate TA (UGTA 2) was a male who was born and raised locally and graduated from a public high school. He was a fourth-year student at the Research Extensive University double majoring in Finance and Accounting with a minor in Economics. Prior to becoming an ICS 101 TA, he had no teaching background.
During the study, UGTA 2 was in his fifth semester teaching as an ICS 101 TA and taught two labs for one of his five semesters. He taught one lab for the other four semesters as an undergraduate TA. During the study, UGTA 2 taught one lab due to other obligations including an internship and club obligations. UGTA 2 indicated that he became an ICS 101 TA because he felt that the experience would be beneficial and improve his public speaking skills. During the course of the study, UGTA 2 taught in Room 318.

**UGTA 2 Interview: Open-coding of Instructional Practices as ARCS**

In the second case, the researcher open-coded the instructional practices that UGTA 2 discussed in the interview into the four constructs of the ARCS Model of Motivation (see Table 19). The researcher included an Other category for instructional practices that were identified but did not fall within the ARCS Model of Motivation framework.

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**Table 19**

**UGTA 2 Instructional Practices Coded into ARCS**

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders</td>
<td>• Apply concepts to academic situations</td>
<td>• Walk around the lab to ensure students can ask for help individually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Humor</td>
<td>• Apply concepts to life outside of school</td>
<td>• Give students time to practice during and at the end of class sessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Anecdotes with experiences with Excel</td>
<td>• Apply concepts to situations that may be beneficial in the future</td>
<td>• Encourage questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Topics</td>
<td></td>
<td></td>
<td>• Positive feedback</td>
<td>• Accessibility outside of class</td>
</tr>
<tr>
<td>• Aesthetically pleasing documents</td>
<td></td>
<td></td>
<td>• Teaching concepts that are useful</td>
<td></td>
</tr>
<tr>
<td>• Ask questions</td>
<td></td>
<td></td>
<td>• Accessibility outside of class</td>
<td></td>
</tr>
</tbody>
</table>

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85
The researcher coded six instructional practices in the Attention category. The first instructional practice was reminding students of due dates and upcoming events for the course. UGTA 2 stated, “I might make some announcements, like the things that are due or the things they should have done and the upcoming events and assignments.” The second instructional practice that UGTA 2 used was humor. He said, “I would try to say something funny like maybe something I did the past weekend and or something interesting that I saw in a movie or something in recent news.” He further explained, I made some kind of table regarding one of my LAs and it was based on her expenses. So I asked her in class about her expenses. And I asked her, “So, what kind of things do you typically spend money on during the week?” First thing she said was “Natto.” Most people like if they grow up on it, they love it. But as soon as she told me that, I don’t think I did this on purpose, but I made a kinda disgusting face. My class thought it was funny and they laughed. And I think that brought back their attention. Therefore, UGTA 2 used humor to gain and maintain his students’ attention. The third instructional practice was using anecdotes regarding his experiences with Excel. UGTA 2 stated, “How I used Excel like for school, for work, [um] maybe I was a little bit of biased towards Business because I am in the college, but that is where most of my experiences are. You know like I will tell them what classes they will need it for, how it’s useful, how they can impress their professors with it.” Therefore, he explained how he used Excel and how it was useful to him. He further expounded, “I told them about the job offer I had cause money usually gets people’s attention and $25 an hour is pretty good for college students. A lot looked surprised at that one and looked like they wanted to learn it.” UGTA 2 indicated that many of his students were interested in learning this program due to its perceived immediate benefit. The fourth instructional practice was
discussing a topic for the lab session. UGTA 2 indicated that he used topics during lab sessions to gain and maintain his students’ attention. He explained, “I used files that were based on the theme was Harry Potter. I told them how my girlfriend saw me doing it and she was laughing at me and so was the rest of my friends cause they believe that Harry Potter is for little kids. So she called me a dork and I don’t really care. I know well I’m a Harry Potter fan and hopefully my students took to it.” The fifth instructional practice was developing aesthetically pleasing documents. He stated, “I think it (nice pictures) helps to get attention because they made comments and laughed. And like making it organized so that they can look back on it cause if the files are unorganized, people don’t really care to look at it.” UGTA 2 felt that including images in his documents helped to gain his students’ attention. He also believed that developing files that were organized and aesthetically pleasing helped to maintain the students’ attention. The sixth instructional practice was asking students questions in class to maintain their attention throughout the lab sessions. He explained, “I do call them by first name, or I will like be more direct and look directly at them and ask them a question like, ‘You, how do you do this?’ Which like keeps them on their toes a little.”

The researcher coded three instructional practices in the Relevance category. The first instructional practice was applying concepts to academic situations. UGTA 2 stated, “Excel is useful for manipulating any kind of data whether it is business related or not.” He further explained, “I showed them how it can be useful for their homework in other classes. Um, I especially talked about like Business 311 the same thing. I told them about other students who had horror stories about their Business 311 teachers. You know
like they had to similar things, but theirs was much more advanced. Maybe not advanced but maybe more complicated. So they need this as a background.” This quote was an example of how UGTA 2 indicated that the material learned was useful to subsequent coursework. The second instructional practice was applying concepts to situations that students encounter outside of academics. UGTA 2 stated,

I got students to understand the process of a loan, so I explained general concepts of a loan so I told them about my expenses. Like I went in for my car loan and I actually made an amortization schedule before I went to see how much I should be paying. Actually, when I went in, I don’t know how they did it but they made some kind of a mistake and my payment according to them was higher than I calculated. I didn’t get it at first so I came back with my spreadsheet and I showed them and they apparently input some number wrong and it saved me money.

This example of an anecdote demonstrated how this aspect of Excel could be useful to many of the students. The third instructional practice was applying concepts to situations that students may encounter in the future. UGTA 2 created a mortgage payment schedule in class to demonstrate the total cost of a house including interest payments. He stated,

“They were really surprised when they saw mortgage interest payments were more than the principal. I remember how shocked I was when I learned that. So I wanted to let them know how much interest they are actually paying.”

The researcher coded three instructional practices in the Confidence category. The first instructional practice was walking around the lab while teaching to ensure the students could ask questions individually. UGTA 2 stated, “If they need help when I am walking around, they are more likely to ask rather than asking in front of the whole class.” He further explained, “Before I didn’t do that (walk around), but I realized that some students are shy like that and making the first move can really help them.”
that it’s my job to really help them and I try to do that.” The second instructional practice was including time during and at the end of each lab session to practice the concepts learned. UGTA 2 stated, “To make sure they are confident in doing what they are taught, I usually use a little time afterwards for them to try it on their own.” He further explained, “The ones that needed help could get more help here.” The third instructional practice was encouraging questions. UGTA 2 felt that this allowed students who had questions regarding content to ask them. He stated, “I constantly ask my students you know, are you sure you understand this? Are you sure it makes sense? It’s okay to ask questions. I don’t mind going over it again.”

The researcher coded two instructional practices in the Satisfaction category. The first instructional practice was giving the students positive feedback. UGTA 2 reported, Like this semester, I told the whole class that I was impressed because they picked up things really quickly. In the beginning it was a lot faster than any class that I had seen before. I let them know that I was shocked like I couldn’t believe that you guys picked it up so fast. I think they liked that.

The second instructional practice was teaching concepts that were perceived as useful. UGTA 2 stated, “I think that students are satisfied when they learn that things that are useful to them and they can use it either now or later.” He further explained, “It (Satisfaction) seems similar to Relevance in my opinion.”

One item was coded in the Other category. The item was UGTA 2’s accessibility outside of class. UGTA 2 stated, “I leave it (UGTA 2’s accessibility) open to whenever cause I have my e-mail sent to my phone and I let my students know that I do that. You know, so if they have questions, no matter where I am, I will do my best to answer it.”
This item was coded in the Other category because it was not an instructional practice and could not be observed. However, UGTA 2 felt that this item could have increased his students' confidence while in class.

**TA Instructional Practices Motivation Survey UGTA 2: Instructional Practices Open Coded as ARCS**

Twenty-nine students completed the TA Instructional Practices Motivation Survey of UGTA 2. In the open-coding stage of the data analysis, the researcher coded the different instructional practices UGTA 2's students identified in the open-ended survey into the four constructs of the ARCS Model of Motivation (see Table 20). The

**Table 20**

**UGTA 2 Instructional Practices from the Students' Perspective Coded into ARCS**

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders (3 instances)</td>
<td>• Apply concepts to academic situations (7 instances)</td>
<td>• Walk around the lab to ensure students can ask for help individually (9 instances)</td>
<td>• Learned concepts that are useful (6 instances)</td>
<td>• Accessibility outside of class (8 instances)</td>
</tr>
<tr>
<td>• Humor (4 instances)</td>
<td>• Apply concepts to life outside of school (19 instances)</td>
<td>• Give time to practice during and at the end of class sessions (5 instances)</td>
<td>• Learned something new (12 instances)</td>
<td></td>
</tr>
<tr>
<td>• Discuss topic for the lab session (4 instances)</td>
<td>• Apply concepts to situations that may be beneficial in the future (12 instances)</td>
<td>• Encourage questions (8 instances)</td>
<td>• Familiarity of topics (5 instances)</td>
<td></td>
</tr>
<tr>
<td>• Encourage questions (6 instances)</td>
<td>• Familiarity of topics (8 instances)</td>
<td>• Repetition (7 instances)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Informing Learners of the Objectives (13 instances)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

researcher included an Other section for instructional practices that were identified but did not fall within the ARCS Model of Motivation framework. Five themes emerged in the Attention construct. The first instructional practice was reminding students of due
dates and upcoming events for the course, which was reported by three students. One student said, “He always reviews what we should be expecting within the next couple of days, so that we do not forget to do things and know what to accomplish.” It appears that students gave their attention to UGTA 2 because the course had many assignments and due dates. The second instructional practice was using humor to gain the students’ attention, which was reported by four students. UGTA 2 began each lab session with an interesting comment or joke that occurred recently to gain the attention of his students. A student reported, “UGTA 2 always started class off with a funny or interesting comment that caught our attention.” The third instructional practice was the use of topics for lab sessions, which was reported by four students. A student stated, “They (the lessons) were pretty appealing. One reason was because it always seemed to be about one of the TA’s in our lab or something creative like Harry Potter.” The fourth instructional practice was encouraging questions to maintain the students’ attention, which was reported by six students. UGTA 2 often encouraged questions in his lab, which helped to maintain his students’ attention. A student responded to the question regarding how the undergraduate TA maintained his/her attention by stating, “Yes, he would always ask if anyone had any questions and if someone did, he would go over it again slower so that it could be understood.” The fifth instructional practice was informing the learners of the objectives for the day, which was reported by 13 students. At the beginning of each class session, UGTA 2 informed the learners of objectives that they would learn each day. A student reported, “He gave us an insight of what he was going to teach in the beginning of every class, that was an attention grabber and also prepared me for the lab.” Another student
reported, “My TA would start the lesson by telling us what we were going to cover for the day.”

Four themes emerged in the Relevance construct. The first instructional practice was applying concepts to academic situations, which was reported by seven students. A student reported, “Yes, he showed us ways it can be useful in the business world as well, since this is my major it was very relevant to me.” UGTA 2 also applied concepts to other academic majors, as another student reported, “Sure, I am a chemistry major but excel would be a good way to sort data etc.” UGTA 2 used examples that were relevant to students in multiple disciplines. The second instructional practice was applying concepts to situations that students encounter outside of academics, which 19 students reported. One student stated, “He would give examples of when he has/had used the function. This gave me an idea of where it would be used in everyday life.” Another student commented, “Sometimes at my campus job I have to use Excel, and now with the tools and information he gave me, it is much easier to do my job efficiently.” Therefore, the students reported knowing when information would likely be applicable to their lives and when it was used. The third instructional practice was applying concepts to situations that students may encounter in the future, which was reported by 12 students. A student reported, “He presented material based on buying a car or a house. In the future, I would like to purchase both of them.” This example was specific to situations that may occur later in the students’ life. Another student commented, “Yes, I learned a lot. I didn’t like Excel at first but now I know how to use functions, formulas, absolute and relative references, I feel like Excel will be useful later in my life.” This student’s
comment gave insight into the potential usefulness of learning the application and the student’s change in perception after he/she understood the concepts. The fourth instructional practice was teaching with topics that were familiar to students. When asked how UGTA 2 made the lessons relevant, a student responded, “He made Excel much more interesting to learn, by using Harry Potter and finding interesting materials that could apply to us.” Therefore, using familiarity helped to make the lessons more relevant to the students.

Four themes emerged in the Confidence category. The first instructional practice was walking around the lab while teaching to ensure the students could ask questions individually, which was reported by nine students. UGTA 2 walked around the class while teaching the Excel lessons to ensure the students could ask him questions. One student said, “He would walk around and help us if we were stuck and then after everyone was done he would go to the big screen and do it for everyone to see.” The second instructional practice was including extra practice examples for students to complete during and at the end of the class sessions, which was reported by five students. One student stated, “After he had taught us how to use a formula or something else he may give us a problem and then have us see if we were able to work out what to do to get the answer ourselves. This, I liked, as it gave some challenge and helped me learn how to use it.” Another student reported, “… after I checked my formula with his, I gained confidence that I'm on the right spot.” These quotes indicated how the extra practice increased the students’ confidence. The third instructional practice was encouraging questions, which eight students reported. When asked how UGTA 2 increased the
students’ confidence, one student stated, “He covered many different things but he always made sure to ask if we were following.” Another student responded, “He asked several times if we had any questions before moving on to the next skill.” Because UGTA 2 encouraged questions, the students felt more confident to ask questions prior to learning new skills and concepts. The fourth instructional practice was repetition of difficult concepts. UGTA 2 repeated concepts that students felt were difficult multiple times to ensure the students understood them. A student reported, “Yes. He went over many times until we understood. (we’ve tried making amortization table for more than 4 times.)” Another student stated, “Also, if we were struggling on something in particular, he would review it and go over the same thing multiple times until we fully understood.”

Three themes emerged in the Satisfaction category. The first instructional practice was teaching skills that were perceived as useful, which was reported by six students. When asked about satisfaction, a student reported, “Yes. I learned a lot of functions useful in the real world. Sometimes, I feel overwhelmed when I learn new materials. But he taught only the important and useful materials.” Another student responded, “Yes, the material that was introduced was easy to follow and I could apply it toward my life as well as my future career.” The second instructional practice was teaching concepts that students were not aware of, which 12 students reported. One student, who was already familiar with Excel stated, “I had some experience with Excel before so I would say about 50% of it was review. However I have not worked with some of other functions that were worked on in the class (vlookup, pmt, etc) and those were interesting to learn.” Another student stated, “Yes. It satisfied me because I have
never used Excel before so anything new was worth it.” These two individuals indicated how learning new concepts was both a point of Satisfaction for students who had and did not have prior experience with the application. The third instructional practice was teaching the students with topics that they are familiar with, which five students reported. The students felt that they were satisfied when they had “fun” learning with familiar topics. A student that summed this instructional practice well stated, “Because I love to watch TV, and go to the movies. So when one practice session was about Harry Potter, it was quite enjoyable. The Quiz on Excel was even more interesting when it was all about Spongebob Squarepants.”

One theme emerged in the Other category. The item that was coded in the Other category was UGTA 2’s accessibility outside of class. UGTA 2’s accessibility outside of class was coded in the Other category because it was not an instructional practice and could not be observed. A student commented, “He always took time out to help me and even when I emailed him for stuff, he would always respond very quickly.” Another student stated, “He always responded to my e-mail, when I was stuck and whenever I needed help, he was always there to help.” Therefore, UGTA 2’s accessibility increased the students’ motivation in lab even though it did not occur in lab.

Axial Coding of UGTA 2 and Students’ Perspectives

In the axial coding stage, the researcher cross-analyzed the codes developed from UGTA 2’s interview and the TA Instructional Practices Motivation Survey. The researcher analyzed the themes that existed to determine the best practices of UGTA 2. The researcher analyzed the data by finding the common themes that existed. However,
the researcher maintained the codes that existed in the TA Instructional Practices Survey and not in the interview. The researcher used the follow-up interview to verify these themes, as the students perceived them as beneficial to their motivation as framed by the ARCS Model of Motivation. The common themes that existed are summarized in Table 21.

Table 21
Common Themes of UGTA 2 Interview Codes and Open-ended Survey Codes

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders</td>
<td>• Apply concepts to academic situations</td>
<td>• Walk around the lab to ensure students can ask for help individually</td>
<td>• Teaching concepts that are useful</td>
<td>• Accessibility outside of class</td>
</tr>
<tr>
<td>• Humor</td>
<td>• Apply concepts to life outside of school</td>
<td>• Give time to practice during and at the end of class sessions</td>
<td>• Teaching new concepts (did not emerge in initial interview)</td>
<td></td>
</tr>
<tr>
<td>• Topics</td>
<td>• Apply concepts to situations that may be beneficial in the future</td>
<td>• Encourage questions</td>
<td>• Familiarity of topics (did not emerge in initial interview)</td>
<td></td>
</tr>
<tr>
<td>• Encourage questions (did not emerge in the initial interview)</td>
<td>• Familiarity of topics</td>
<td>• Repetition (did not emerge in initial interview)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Informing Learners of the Objectives (did not emerge in initial interview)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The researcher found that both UGTA 2 and the students reported that reminding students about due dates for the course, using humor, discussing the topic for the lab session, and informing learners of objectives helped to gain the students' attention. UGTA 2 originally identified encouraging questions as a Confidence instructional strategy; however, his students identified it as both an Attention and Confidence instructional strategy. Using familiar topics and encouraging questions were useful strategies in maintaining the students' attention. Teaching with examples that were pertinent to the students' academic situations, life outside of school, and future life
increased the level of relevance for students. Teaching with topics was originally identified as an Attention instructional practice by UGTA 2. However, UGTA 2’s students indicated that it was a Relevance instructional practice. Both UGTA 2 and his students felt that walking around the lab while teaching, giving extra time at the end of class to practice concepts, and encouraging questions regarding their understanding of content were useful strategies to increase the learners’ confidence. Both UGTA 2 and his students felt that teaching concepts that are useful increased students’ level of satisfaction with the undergraduate TA.

Follow-up Interview of UGTA 2: Member Check

In the follow-up interview with UGTA 2, the researcher conducted member checks for all of the common themes in Table 21. UGTA 2 verified all of the instructional practices listed in Table 21. Following the member check, the researcher interviewed UGTA 2 regarding the themes that emerged from the open-ended survey of the students that did not transpire in the first interview. UGTA 2 verified that all of the instructional practices that emerged from the open-ended student survey occurred in the laboratory.

Informing the learners of the objectives for the day did not transpire in the first interview, but was verified in the follow-up interview. UGTA 2 stated, “I didn’t realize I was doing it. Like you know it was real basic, I would cover in the beginning like today we are going to cover Excel, we are going to review this again, this is real important so you should try to understand it. So, um, now that I think about it I know I did that.” He felt that this instructional practice was not one that he did consciously.
The students believed that having repetition of difficult concepts was also useful in increasing their confidence. UGTA 2 verified this finding in the follow-up interview. The researcher believes that this finding is a parent theme to giving time to practice during and at the end of lab sessions. However, UGTA 2 indicated that students also had a lot of repetition with guided practice, where he led them through concepts multiple times. He also stated, “I guess, well, the things I repeated were the things that I thought were hard.”

UGTA 2’s students felt that learning new concepts and learning with familiar topics to them led them to be satisfied with the undergraduate TA. UGTA 2 stated, I guess when it came time to teaching certain programs like Excel, for one, a lot of people didn’t know exactly what they were doing like what they thought they did. A lot of people they know how to use a spreadsheet, but they didn’t know how to use all the functions. They didn’t know about cell referencing and AutoFilling and all those kinds of things. They looked pretty happy when they got it.

Therefore, UGTA 2’s students were satisfied when they learned concepts that they did not know existed.

*UGTA 2 Lab Assistant Verification*

UGTA 2 had two lab assistants in his section of ICS 101. The researcher interviewed both lab assistants separately to verify the findings listed in Table 21. Both lab assistants independently verified all of the instructional practices listed in Table 21. The lab assistant member-check further triangulated the findings.

*Video Verification of Findings*

The researcher verified two themes using the video. The researcher verified topics because UGTA 2 projected them on the screen, which made them viewable. The
researcher also verified walking around to ensure students could ask for help individually.

Follow-up Interview of UGTA 2: Development of Instructional Practices

The researcher coded the follow-up interview to determine how UGTA 2 developed his best instructional practices. The themes that emerged from the coding process were reflection, modeling from the undergraduate TA that taught UGTA 2, modeling from the undergraduate TA that UGTA 2 assisted as an LA, socialization, course coordinator, and instructional practices that were unintentional (see Table 22).

Table 22

Development of Instructional Practices for UGTA 2

<table>
<thead>
<tr>
<th>Reflection</th>
<th>Modeling of TA as a student</th>
<th>Modeling of TA as a LA</th>
<th>Peer socialization</th>
<th>Counseling with course coordinator</th>
<th>Unintentional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humor (Attention)</td>
<td>Encourage questions (Attention, Confidence)</td>
<td>Reminders (Attention)</td>
<td>Repetition (Confidence)</td>
<td>Informing learners of the objectives (Attention)</td>
<td>Teaching new concepts (Satisfaction)</td>
</tr>
<tr>
<td>Topics (Attention, Relevance, Satisfaction)</td>
<td>Give time to practice during and at the end of class sessions (Confidence)</td>
<td>Apply concepts to academic situations (Relevance)</td>
<td>Availability outside of class (Other)</td>
<td>Apply concepts to life outside of school (Relevance)</td>
<td></td>
</tr>
<tr>
<td>Apply concepts to situations that may be beneficial in the future (Relevance)</td>
<td>Walk around the lab to ensure students can ask for help individually (Confidence)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reflection. The first theme, oral and written reflection, was the basis for one Attention, one Attention/Relevance/Satisfaction, and one Relevance instructional practices. UGTA 2 used humor in lab sessions, which was an instructional strategy to gain and maintain the students' attention. UGTA 2 stated, "When I was in lab like taking
the class, sometimes I was a bit bored. And, I guess when I was up there teaching, I
didn’t want my students to be bored and I wanted them to respond to me.” By reflecting
on his experience as a student, UGTA 2 felt that humor was an effective method of
keeping students’ attention.

The second instructional practice that UGTA 2 developed through reflection was
using topics in lab, which was an Attention, Relevance, and Satisfaction instructional
practice. UGTA 2 stated, “You know how all the old practicals had themes like M&Ms
and Jamba Juice and Spongebob Squarepants. I thought it was kind of fun, so I came up
with the idea for Harry Potter.”

The third instructional practice that UGTA 2 developed through reflection was
applying concepts to situations that may be beneficial in the future, which was a
Relevance instructional practice. UGTA 2 stated, “That (applying concepts to future
situations) stemmed off how I thought about how it would be useful for academics and
from there, I thought about other ways it might be useful. It branched off to the future.”
Through reflection, he was able to take an instructional practice that he already knew and
developed another instructional practice.

*Modeling of TA.* The second theme, modeling from the undergraduate TA that
taught UGTA 2, was the basis for one Attention/Confidence and one Confidence
instructional practices. UGTA 2 encouraged questions, which was an Attention and
Confidence instructional practice. He stated, “I can remember my TA when I took 101.
My TA asked a lot of questions in lab to make sure we understood stuff, so I think I
developed it from her.”
The second instructional practice that UGTA 2 developed through modeling of the undergraduate TA that taught UGTA 2, was giving students time to practice during and at the end of class sessions, which was a Confidence instructional strategy. UGTA 2 reported, "When I took my TA's (who taught UGTA 2 in ICS 101) class. It was a while ago, but she made us practice a lot. After that, I was like maybe this would work for other things too. Like a lot of the topics in Excel, I did I tried to let them do stuff on their own." As a student, UGTA 2 noticed an instructional practice that he felt worked and implemented it into his own teaching practice.

*Modeling as LA.* The third theme, modeling of the undergraduate TA that supervised UGTA 2 when he was a LA, was the basis for one Attention, one Relevance, and one Confidence instructional practices. UGTA 2 announced reminders at the beginning of each lab session, which was an Attention strategy. He stated, "I think that my previous TAs that I assisted did the same, which I felt helped with the due dates." Since UGTA 2 felt that reminders helped him while he was an LA, he integrated it into his teaching practices.

The second instructional practice that UGTA 2 developed through modeling as a LA was applying concepts to academic situations, which was a Relevance instructional strategy. UGTA 2 stated, "I think it was from my TA when I was an LA. He was a business major and he did a lot of the things that I do now." Therefore, UGTA 2 felt that the TA that supervised him as an LA taught using examples that were relevant to business majors, which he replicated in his teaching.
The third instructional practice that UGTA 2 developed through modeling as an LA was walking around the lab to ensure the students could ask for help individually. When asked how he developed this instructional practice, UGTA 2 replied, "Definitely the TA that supervised me as an LA. He is the only TA that I know did that before." Since he felt that walking around in lab promoted an active learning environment, UGTA 2 implemented this instructional practice into his teaching.

Socialization. The fourth theme, socialization with other undergraduate TAs, was the basis for one Confidence and one Other instructional practices. UGTA 2 used repetition in lab to ensure students could become confident in their ability to complete ICS 101 work. UGTA 2 stated,

I think my first semester teaching, I would talk with other TAs like UGTA to see how they taught. They usually taught before me so I would try to get input from them. And one thing she said was that she was starting amortization early because like I think that you split it up and then it is on the second to the last day. And like I didn’t think about doing it multiple times. She was like I am going to do this on the second day and teach it every day till the end. I was like it sounds pretty good. I guess that's where I first got the idea.

The second instructional practice that UGTA 2 developed through socializing with other undergraduate TAs was his accessibility outside of class, which was classified in the Other category. UGTA 2 stated, "I think it was because I saw UGTA do it a lot. So, often when we were in here, her students would come by and she let them know that she would be in a lot so if they stopped by during certain times, she would be there."

Course Coordinator. The fifth theme, learning from the course coordinator, was the basis for one Attention, one Relevance, and one Satisfaction instructional practices. UGTA 2 informed the students of the objectives for the day to gain his
students’ attention at the beginning of the lab session. UGTA 2 stated, “I think it came from the ARCS Model and speaking with you.” He further explained, “I think I got it from our orientation when we discussed a typical day in lab and the ARCS Model.” Therefore, it appears that the orientation session led by the course coordinator helped UGTA 2 to develop this instructional practice.

The second instructional practice that UGTA 2 developed with the course coordinator’s assistance was applying concepts to life outside of school, which was a Relevance instructional strategy. UGTA 2 stated, “I think I got that from talking with you.” He further explained,

Like every now and then, once in a while, we would have like talks about teaching and you also told me about how in a sense we are not actually teaching how to use specific programs. We are, but it all comes down to teaching them how to use a computer for their life, so this semester I tried to emphasize on intuitive useful features of programs.

The course coordinator was able to assist UGTA 2 in the development of his instructional practice through individual counseling.

The third instructional practice that UGTA 2 developed with the course coordinator was teaching concepts that are useful, which was a Satisfaction instructional practice. UGTA 2 stated, “Um, probably from ARCS. I thought about Relevance; how I could make it relevant. So it came from the you and the orientation.” UGTA 2 gave further evidence of the usefulness of the orientation session and the individual counseling provided by the course coordinator.

*Unintentional Instructional Practices.* The sixth theme, unintentional instructional practices, was the basis for one Satisfaction instructional strategy. The Satisfaction instructional strategy was teaching concepts that the students did not know
existed. He stated, “That’s just following the curriculum, the objectives you [the course coordinator] send, and if there is something else I see. But I can’t really control that.”

*Member Check of Development Themes*

The researcher conducted a member check to verify the findings in Table 22. UGTA 2 verified all of the themes and the instructional practices associated with each theme.

*Reflection Logs Verification of Instructional Development Findings*

The researcher reviewed UGTA 2’s reflection logs to verify the development of the instructional practices. Using the reflection logs, the researcher was able to verify one instructional practice. The practice that the researcher verified with the reflection logs was using humor in the lab.

*Case 2: Summary*

The researcher summarized the findings of case 2 in Table 23. The researcher included a legend to indicate how each instructional method was developed and how each instructional practice was verified.
Table 23

Summary of Findings for UGTA 2

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders (3, M, L)</td>
<td>• Apply concepts to academic situations (3, M, L)</td>
<td>• Walk around the lab to ensure students can ask for help individually (3, M, L)</td>
<td>• Teaching concepts that are useful (5, M, L)</td>
<td>• Availability outside of class (5, M, L)</td>
</tr>
<tr>
<td>• Humor (1, M, L, R)</td>
<td>• Apply concepts to life outside of school (5, M, L)</td>
<td>• Give time to practice during and at the end of class sessions (2, M, L)</td>
<td>• Teaching new concepts (6, M, L)</td>
<td></td>
</tr>
<tr>
<td>• Topics (1, M, L, V)</td>
<td>• Apply concepts to situations that may be beneficial in the future (1, M, L)</td>
<td>• Encourage questions (2, M, L)</td>
<td>• Familiarity of topics (1, M, L, V)</td>
<td></td>
</tr>
<tr>
<td>• Encourage questions (2, M, L)</td>
<td>• Familiarity of topics (1, M, L, V)</td>
<td>• Repetition (4, M, L)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend

1 - Reflection
2 - Modeling from UGTA 2's undergraduate TA
3 - Modeling from UGTA 2's supervising as an LA
4 - Socialization
5 - Course Coordinator
6 - Unintentional
M - Member check verified
L - Lab assistant verified
V - Video verified
R - Reflection log verified

Case 3

The third undergraduate TA (UGTA 3) was a male who was born and raised locally and graduated from a public high school. He was a third-year student at the Research Extensive University double majoring in Finance and Human Resources Management. Prior to becoming an ICS 101 TA, he had no teaching background.

During the study, UGTA 3 was in his second semester teaching as an ICS 101 TA and taught one lab in his first semester as an ICS 101 TA. He taught two labs during the
course of the study. UGTA 3 indicated that he became an ICS 101 TA because he felt that the experience would be beneficial for law school. During the course of the study, UGTA 3 taught both labs in Room 318.

**UGTA 3 Interview: Open-coding of Instructional Practices as ARCS**

In the third case, the researcher open-coded the instructional practices that UGTA 3 discussed in the interview into the four constructs of the ARCS Model of Motivation (see Table 24). The researcher included an Other category for instructional practices that were identified but did not fall within the ARCS Model of Motivation framework.

**Table 24**

**UGTA 3 Instructional Practices Coded into ARCS**

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders</td>
<td>• Apply concepts to academic situations</td>
<td>• Anecdotes of previous students’ experiences</td>
<td>• Individual assistance</td>
<td>• Accessibility outside of class</td>
</tr>
<tr>
<td>• Topics</td>
<td>• Apply concepts to life outside of school</td>
<td>• Give time to practice during and at the end of class sessions</td>
<td>• Teaching concepts that are useful</td>
<td></td>
</tr>
<tr>
<td>• Anecdotes</td>
<td>• Apply concepts to situations that may be beneficial in the future</td>
<td>• Walk around the lab to ensure students can ask for help individually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Aesthetically pleasing documents</td>
<td>• Anecdotes about current events</td>
<td>• Repetition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Walk around the lab</td>
<td>• Linking learning to prior knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The researcher coded five instructional practices in the Attention category. The first instructional practice was reminding students of due dates and upcoming events for the course. UGTA 3 stated, “I’ll start off with a general announcement that kinda grabs
their attention and inform them what we will be doing that day and what I expect of them that week.” He further explained,

I would always remind them about simulations. For some reason, even though there was a simulation due pretty much every day they forget. I always remind them that because I remember when I was a student, even though I knew the weekly quiz was always due Thursday, it would sometimes just slip my mind if I was really busy.

This comment exhibited UGTA 3’s thoughts that the students might overlook due dates in the course. He felt that reminders were pertinent to his students’ learning. The second instructional practice was discussing a topic for the lab session. UGTA 3 used two different types of topics for the files that he used while teaching his lab. The two types of topics were current events and topics that were pertinent to students. UGTA 3 stated, “I would usually have a theme usually about current events or something that’s going to happen, or something that I find useful.” He further explained his usage of current event topics by stating, “Gore did his movie about Global warming and won an Emmy or Oscar or something like that and he gained a lot of weight. I would get cheap laughs from that.” He felt that current events helped to gain his students’ attention because they were real life events. UGTA 3’s use of pertinent topics included developing lessons that he felt met the needs of current students. He explained, “So like um, my story about how I check how much I spend each day.” Therefore, his topics were based on current events or topics he felt were useful to him. The third instructional practice was the use of anecdotes to gain and maintain the students’ attention. UGTA 3 explained, “I definitely receive more attention when my intonation changes than when and when they know that I am about to tell a story. So, I think that definitely the little side stories definitely bring
back their attention.” His stories included both informative anecdotes that were not related directly to the content and anecdotes that were related to previous students who were enrolled in a lab he previously taught. UOTA 3 further expounded,

I will mix in informative stories along with stories of my past students because some of my students really do enjoy my off the topic stories to get random information. And I know some of my students really are just focused on the grade. So, I hope that I get like some of the attention by telling my off topic stories and for the one’s that just want a grade I tell them how to study or how people in the past have dealt with these different things. So, I try to cater to those who are just inclined towards getting a grade and to those who enjoy class.

He used these two different types of anecdotes to ensure he could reach the different members of his class. UOTA 3 felt that his students sustained their attention when they heard an anecdote that was either interesting or gave insight into methods of attaining the highest possible grade. The fourth instructional practice was the use of aesthetically pleasing documents. He stated, “I like to use complementary colors, so I use my color wheel and since I actually was a formally trained artist, I always use complementary colors.” UOTA 3 further explained,

I noticed that if it is really too contrasting, then, like they’ll pretty much just go through the motions. But, if it has a nice color scheme, [um] for the amortization one, I had a nice blue and yellow or something like that. When they went to that sheet, it kinda had that sense of sophistication, it looks like an actual financial advisor could have used it and not like so kiddie.

He felt that if the files included colors that were distracting, the students would not sustain their attention. The fifth instructional practice was walking around the lab to maintain the students’ attention. He stated, “I guess if I walk around, um, that kinda makes them pay more attention because they know that I am going to come around and
see what they are looking at.” UOTA 3 felt that walking around the lab while teaching ensured students would maintain their attention.

The researcher coded five instructional practices in the Relevance category. The first instructional practice was applying concepts to situations that students encounter outside of academics. UOTA 3 stated, “... keeping track of how much they spent every day. It was something I started to do every day last year. Like keep track of how much I earned and how much I spent.” He further explained, “I think especially with young people, I think they don’t realize how much they spend.” He also used examples that were based on tracking an individual’s health and fitness. The second instructional practice was applying different concepts to academic situations. He felt that students would find academic examples relevant because the students were all enrolled in the university. UOTA 3 focused on the concepts that were relevant to all students. However, some examples were more applicable to those who expected to attain a degree from the Business College. He taught his students how to calculate grades using spreadsheets. For students majoring in business, he assured them that they would use all of the concepts learned in their future coursework. UOTA 3 stated, “So how especially if they are business majors and how they can use it for business BUS 310 [and BUS] 311 so what they have to look forward to.” The third instructional practice was applying concepts to situations that students may encounter in the future. He used different types of loans to demonstrate how the information learned can be useful in the future. UOTA 3 stated, “For everyone, everyone will eventually take out a car loan or a mortgage.” The fourth
instructional practice was using anecdotes about current events. UGTA 3 felt that current events were relevant to each of his students. He stated,

In earlier days, when Gore won the Nobel peace prize, I had a sheet about that so I just mentioned it. I like to mention current topics and news because it seems like everybody doesn’t keep track of that enough. So, I like to have my side information to or even when. I had my whole thing where Al Gore won a Nobel Peace Prize and I have them have [un] a function about who was the greatest Nobel Peace Prize winner of all time. So like I had the Dalai Lama and then it just so happened the next week, the Dalai Lama won the congressional award. And then, I had another thing about that. So I like to keep them up-to-date on current news.

UGTA 3 felt that students found this knowledge applicable to their enrichment, which made it relevant to their learning. The fifth instructional practice was linking current knowledge to prior knowledge. UGTA 3 linked some of the concepts he taught to concepts that students learning earlier. He felt that by linking the new concepts to previously taught concepts, students could see a greater relevance for what they are learning.

The researcher coded four instructional practices in the Confidence category. The first instructional practice was presenting anecdotes of previous students’ success. One example that UGTA 3 gave was,

So, like I told them a story about how one of my students we did the same thing for like 5 or 6 days of amortization and [um] she told me beforehand that she really didn’t grow up with computers and she grew up in a town of like 2000 people. And then, she like eventually was able to do amortization by buckling down and practicing it on her own. So, even though it seemed difficult at the time, she, [like] with a little practice and persistence, everyone is able to get it even if they are not really technologically inclined.

UGTA 3 felt that this story really helped his students to feel more confident that they would be able to complete the more difficult tasks. The second instructional practice was
giving students time at the end of lab sessions to practice what they learned on their own. UGTA 3 felt that the extra time allowed students, who were not able to come in for help during office hours, to ask for assistance immediately. The third instructional practice was walking around the lab while teaching to ensure students could ask questions individually. UGTA 3 stated, “If I do walk around, um, it makes them more comfortable to ask questions.” He further explained, “I will walk around to see what they are doing or are having trouble. If I am closer, they definitely feel more comfortable to ask how to do something or to get more clarification.” Therefore, UGTA 3’s proximity to the students increased their confidence to ask questions during lab sessions. The fourth instructional practice was repetition. UGTA 3 stated, “If they do it enough times, I hope that their confidence or at least it forces them to kinda know what they should be doing and [um] at least they’ll be more comfortable with it.” He gave his labs multiple opportunities to practice the concepts that he felt were the most difficult spreadsheets concepts.

The researcher coded two instructional practices in the Satisfaction category. The first instructional practice was giving students individual assistance when possible. UGTA 3 felt that receiving individual attention increased students’ satisfaction because they felt that the undergraduate TA cared about their learning. He reported that several of his students had trouble grasping concepts and felt satisfied when they met with him for individual assistance. The second instructional practice was teaching concepts in a manner that students perceived as useful and relevant. UGTA 3 stated, “Um, well their satisfaction ties in with relevancy; they won’t be satisfied if I teach them something that
is not relevant to them.” He felt that his students were not satisfied when they learned concepts that they felt would only be useful for a test.

One item was coded in the Other category. The item was UGTA 3’s accessibility outside of class. UGTA 3 stated, “So, like if I know they are going to come in to lab (during open lab hours) because they need extra help, I will try to make it to that time so I can try to work with them because they will probably feel more comfortable with me than someone else they don’t know at all.” He believes that he can increase his students’ confidence by being accessible to his students outside of his normal availability periods. UGTA 3 also reported that his availability helped to improve their comfort level with him as an undergraduate TA. UGTA 3 also provided his students with extra materials, which included a short tutorial of all of the concepts learned and explanations of how to complete each task. He felt that this remediation helped his students to become more confident in their skills because some students prefer not to ask for help if it is for one or two items. UGTA 3 believed that this was another method to get help to the students without them asking for it.

TA Instructional Practices Motivation Survey UGTA 3 Section 1: Instructional Practices Coded as ARCS

Twenty-nine students completed the TA Instructional Practices Motivation Survey of UGTA 2 in the first section he taught. In the open-coding stage of the data analysis, the researcher coded the different instructional practices UGTA 3’s students identified in the open-ended survey into the four aspects of the ARCS Model of Motivation (see Table 25). The researcher included an Other section for instructional
Table 25

UGTA 3 Instructional Practices from the Students’ Perspective Section 1 Coded into ARCS

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Inform learners of the objectives (9 instances)</td>
<td>• Apply concepts to academic situations (6 instances)</td>
<td>• Encourage questions (12 instances)</td>
<td>• Learned concepts that are useful (4 instances)</td>
<td>• Accessibility outside of class (review sheet, e-mail, office hours) (5 instances)</td>
</tr>
<tr>
<td>• Humor (8 instances)</td>
<td>• Apply concepts to life outside of school (12 instances)</td>
<td>• Walk around the lab to ensure students can ask for help individually (15 instances)</td>
<td>• Familiarity of topics (4 instances)</td>
<td></td>
</tr>
<tr>
<td>• Enthusiasm (9 instances)</td>
<td>• Apply concepts to situations that may be beneficial in the future (5 instances)</td>
<td>• Give time to practice during and at the end of class sessions (9 instances)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Topics (5 instances)</td>
<td>• Familiarity of topics (11 instances)</td>
<td>• Review at the beginning of each lab session (4 instances)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Repetition (12 instances)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

practices that were identified but did not fall within the ARCS Model of Motivation framework. Four themes emerged in the Attention construct. The first instructional practice was informing his students of the objectives for the lab session, which was reported by nine students. A student stated, “He made it clear what we were going to do in the beginning of a class so I paid attention listening to him.” Another commented, “The TA was able to gain my attention at the beginning of each lab. The TA announced the class lesson before beginning.” Therefore, informing the learners of the objectives for the day helped UGTA 3 to gain his students’ attention. The second instructional practice was UGTA 3’s use of humor, which was reported by eight students. One student stated, “The TA always has something interesting to say along with a funny comment to
Another student reported, “He teaches really well, and he tells funny jokes to make a class interesting.” The third instructional practice was the undergraduate TA’s enthusiasm, which was reported by nine students. A comment that summarized UGTA 3’s enthusiasm was,

UGTA 3 always has good energy when he teaches the class. He doesn’t sound like he is bored too and every time he teaches a lesson, he puts a lot of energy and effort into it. He is great at explaining things and teaching students how to do a particular thing. He is doing a great job teaching the students ICS material, and as a former TI [teaching intern] myself, I know it’s not easy teaching a group of students.

This comment was an indicator of UGTA 3’s enthusiasm while teaching the Excel unit. The fourth instructional practice was the use of topics for lab sessions, which was reported by six students. A student indicated, “The situations for the practice problems were interesting.” Another student explained, “He chose funny topics or something we can relate to like Spongebob in the Excel lessons so it maintained our attention.”

The researcher coded four instructional practices in the Relevance construct. The first instructional practice was using examples that were relevant to current academic endeavors, which was reported by six students. A student reported, “I actually used Excel to do homework for my Economics class. I wouldn’t have known how to do it if I hadn’t learned the difference between mixed, absolute, and relative references.” Another student stated, “I found the Excel portion of the course very interesting and I learned a lot of useful skills that I can use for other classes.” The second instructional practice was teaching with examples that were applicable to the students’ life outside of academics, which was reported by 12 students. One student stated, “He moved at a good pace and he used things that were related to our daily lives such as car payments, loans and different
other daily costs as examples for Excel.” Another student commented, “The TA also used situations that we could relate to, like recording how much money we spent on food, clothes, etc and then calculating the totals and subtotals. He also used car payments to explain amortization.” The third instructional practice was teaching with examples that were pertinent to the students’ future, which was reported by five students. One student stated, “I guess it was good to learn for future reference for example...AutoFilling and amortization may help with house payments and AutoFilling can help with multiple items on Excel.” Another student commented, “The TA always presented the lessons with information on how it could apply to the business world later in our lives.” The types of examples used helped the students to determine how the concepts would be relevant to their future lives. The fourth instructional practice was teaching with topics that were familiar to students, which was reported by 11 students. A student reported, “He used examples like Spongebob Squarepants in the practical in order to help us get more into the material because it is pretty boring to learn otherwise.” Another student commented on a specific aspect of the topics, the aesthetics. The student stated, “They were interesting for me because they had very unique pictures that were a part of the lesson, weird funny pictures.” It appeared that students who did not find the material to be relevant to their academic, current life, or future life found relevancy in familiar topics.

Five themes emerged in the Confidence construct. The first instructional practice was asking students if they had any questions throughout the lab sessions, which was reported by five students. The students indicated that UGTA 3 encouraged questions. When asked how the undergraduate TA increased confidence, a student
reported, "He would ask if we had any questions after he finished explaining a topic."

The second instructional practice was walking around the lab during instruction to give individual guidance to students, which was reported by 15 students. One student reported, "I liked that he would walk around and readily go over material again if even one person didn't understand. It helped others too because it cemented in the information. He never put anybody down for not understanding and let us know that it was okay if we didn't understand because Excel is a difficult program to learn." Another student commented, "UGTA 3 is always helpful with everything we need to know. He doesn't let anyone fall behind." The third instructional practice was having extra practice examples that students could complete on their own in lab, which nine students reported. One student stated, "He got straight to the point and went over anything we didn't more than once... no time was wasted for example... amortization loan we went over first with an example and then soon after we had to do it on our own... it was good for learning." Another student commented, "After he taught us something such as amortization, he would ask us to complete it on our own as our ticket to leave." It appeared that the students became more confident in their abilities when they had time to complete tasks on their own and had the undergraduate TA to help them if assistance was needed. The fourth instructional practice was reviewing material from previous class sessions, which was reported by four students. UGTA 3 reviewed material learned in previous class sessions each day to ensure his students learned the material and could have extra practice. One student commented, "Class began with a review of the previous class. UGTA 3 would answer any questions or problems." Another student reported, "He
would prepare an Excel document before class with instructions and data on it already. Then he would ask us to do what we can, and if we needed help he would demonstrate what we needed to do after.” The extra practice examples and the review at the beginning of the lab session appeared to be a part of the fifth instructional practice, repetition, which was reported by 12 students. One student reported, “The TA was able to do this by reviewing material over and over, allowing me to practice and understand the material.” It appeared that the repetition, whether it was from review or practice examples helped to increase the students’ confidence to learn material in lab.

Two themes emerged in the Satisfaction construct. The first instructional practice was learning concepts that were useful, which was reported by four students. One student stated, “I found the Excel portion of the course very interesting and I learned a lot of useful skills that I can use for other classes and even in my own time.” When asked about satisfaction, another student reported, “Yes, he did. This is because he related everything to real life situations.” The usefulness of the concepts learned appeared to lead to student satisfaction with learning, as opposed to applicability of the concepts. The second instructional practice was teaching the students with topics that they are familiar with, which four students reported. A student summed it up best by stating, “Overall, my TA made every lesson fun with themes so it didn't really seem like learning or work.”

One theme was coded into the Other category. The item that was categorized in the Other category was his accessibility outside of class, which was reported by five students. Outside of class, UGTA 3 e-mailed his students a review sheet, answered e-mails, and had office hours. This item was coded in the Other category because it was
not an instructional practice that occurred in class. Students indicated that the out of class assistance increased their levels of confidence. A student reported, “The thing that is the best is giving us the review sheet and solutions so we could practice it. That helped me understand everything I did not understand.” Another student stated, “He helped me when I asked questions and always answered any questions that I emailed him with.”

*TA Instructional Practices Motivation Survey UGTA 3 Section 2: Instructional Practices Coded as ARCS*

In the second section that UGTA 3 taught, twenty-eight students completed the TA Instructional Practices Motivation Survey. In the open-coding stage of the data analysis, the researcher coded the different instructional practices UGTA 3’s students identified in the open-ended survey into the four aspects of the ARCS Model of Motivation (see Table 26). The researcher included an Other section for instructional practices that were identified but did not fall within the ARCS Model of Motivation framework. Five themes emerged in the Attention construct. The first instructional practice was reminding the students of due dates and upcoming events for the course, which was reported by three students. One student stated, “He would go over what was due in the near future (e.g., checklists, practicals, deadlines, etc.).” Another student commented, “He always reminds us of what is due when. It’s hard to keep track of it all and it is really useful to be reminded all the time.” The students felt that the reminders helped them to understand the due dates and upcoming events for the course. The second
Table 26

UGTA 3 Instructional Practices from the Students' Perspective Section 2 Coded into ARCS

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders (3 instances)</td>
<td>• Apply concepts to academic situations (15 instances)</td>
<td>• Encourage questions (7 instances)</td>
<td>• Learned concepts that are useful (9 instances)</td>
<td>• Accessibility outside of class (review sheet, e-mail, office hours) (3 instances)</td>
</tr>
<tr>
<td>• Inform learners of the objectives (5 instances)</td>
<td>• Apply concepts to life outside of school (22 instances)</td>
<td>• Walk around the lab to ensure students can ask for help individually (19 instances)</td>
<td>• Learned something new (6 instances)</td>
<td></td>
</tr>
<tr>
<td>• Anecdotes (6 instances)</td>
<td>• Apply concepts to situations that may be beneficial in the future (6 instances)</td>
<td>• Give time to practice during and at the end of class sessions (20 instances)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Humor (14 instances)</td>
<td>• Familiarity of topics (8 instances)</td>
<td>• Review at the beginning of each lab session (4 instances)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Topics (9 instances)</td>
<td></td>
<td>• Repetition (25 instances)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

instructional practice was informing the learners of the objectives for each lab session, which was reported by five students. When asked how UGTA 3 gained the students’ attention, a student commented, “He outlines it pretty well and is very helpful.” Other students indicated that he outlined the lesson and informed them which sections were more difficult. The third instructional practice was the use of anecdotes to gain and maintain the students’ attention, which was reported by six students. A student commented, “Sometimes he makes up little stories to go with the tasks that we are doing so it makes it more goofy and attention getting.” Another student stated, “…TA very helpful not boring kept things interesting with stories and examples relevant to us and did not just talk and talk and talk us to death. Got to the point for teaching and helped out a
lot.” It appeared that the students felt that the stories that UGTA 3 kept each class interesting. The fourth instructional practice was using humor to gain the students’ attention, which was reported by 14 students. A student reported, “UGTA 3 would make us laugh and could also get our attention really easily if he didn’t already have it.” Another student commented, “He would use jokes related to the topics and it would make us laugh.” It appears that humor helped to gain and maintain the students’ attention. The fifth instructional practice was the use of topics for lab sessions, which was reported by nine students. A student stated, “He was able to maintain my attention with the topics that were on the Excel lessons.” Another student stated, “He had unique examples, pictures, and stories that went along with each lesson and applied it to the information we needed to know for the day.”

Four themes emerged in the Relevance category. The first instructional practice was using examples that were relevant to current academic endeavors, which was reported by 15 students. A student reported, “I’m a business major and he covered a lot of aspects that are necessary in the field of business (e.g. amortization).” Another student stated, “Some of the stuff was fairly interesting, especially since I’m a business major and some of that is stuff I’ll need in later classes.” A third comment by a student was, “It was especially appealing because I was able to use it many new functions at work the next week. The amortization chart also helped me with my accounting homework.” This comment also included aspects of the second instructional practice, teaching with examples that were applicable to the students’ life outside of academics, which was reported by 22 students. A student reported, “It helped me how to calculate some
problem that very useful so I can use it in life.” Another student stated, “He used examples which included balancing checking accounts, which I need to do more often. He also showed us how to use functions to allocate costs. This is relevant to me because I give my parents a monthly expense list.” The third instructional practice was teaching with examples that were pertinent to the students’ future, which was reported by six students. A student reported, “I think he presented the material in a manner that was relevant to everybody. For the amortization, he used examples that had to do with taking out a loan for a car or a house, and I think that was a good choice because that’s the kind of things that college students think about.” Another student stated, “The lab and the TA teach, what I feel, are very important things that we cannot get from the lectures, and can help encourage us to use what we learned more in the future.” The students felt that UGTA 3 taught with examples that were applicable to their perceived future needs. The students also felt that UGTA 3 encouraged them to use concepts learned in the future. The fourth instructional practice was teaching with topics that were familiar to students, which was reported by eight students. A student reported, “The TA did present the material on Excel in a manner that was relevant to me because each of the examples had examples from the current media or other things that we were familiar with or that made us laugh.” This comment summarized how UGTA 3 used familiarity to make content relevant to students.

Five themes emerged in the Confidence construct. The first theme was encouraging students to ask questions, which was reported by seven students. A student reported, “Frequently asks if we have questions. Doesn't go too fast.” Another student
reported, “Asked us after every step if we understood what we were doing.” It appears that UGTA 3 encouraged questions in class to increase the students’ confidence. The second instructional practice was walking around the lab during instruction to give individual guidance to students, which was reported by 19 students. A student reported, “Because everything is gone through step-by-step, and if there are any questions someone, either the TA or assistant is quick to help.” Another student stated, “He walked around a lot and helped us to understand what he taught. He even did it on the projector for everyone here and there.” It appeared that walking around the lab during instruction helped to increase students’ confidence to ask for assistance. The third instructional practice was having extra practice examples that students could complete on their own during and at the end of lab, which 20 students reported. A student stated, “Instead of us just watching him do amortization over and over again, he would do it once, and make a good amount of templates so we could keep trying to figure it out on our own.” Another student commented, “He let me try things on my own. And I like learning like that.” It appeared that allowing students to practice concepts learned on their own in lab helped to increase their confidence level. The fourth instructional practice was reviewing material from previous class sessions, which was reported by four students. A student reported, “He would start off with amortization, making sure we all got this specific concept down.” Another student stated, “A typical class would start off with an amortization problem, then other problems where we had to implement all sorts of functions.” The extra practice examples and review at the beginning of the lab sessions appeared to be sub categories of the fifth instructional practice, repetition, which was reported by 25
students. A student reported, “The TA did make learning easy during the Excel lesson because he went over everything so many times so that it was hard to forget the material.” Another student stated, “The TA did increase my confidence during the Excel unit because he taught everything so repetitively so we couldn't forget any of it.” Therefore, it appears that the level of repetition helped to increase the students’ confidence.

The researcher coded two instructional practices in the Satisfaction category. The first instructional practice was learning concepts that were useful, which was reported by nine students. When asked about Satisfaction, a student stated, “Yes, although I am open to learning more about Excel, I believe that the skills I have learned so far (amortization, sum/count/if functions, etc.) are quite useful, especially in the business world.” Another student stated, “Yes, he taught the material very well and because it applied to everyday life, it was interesting all around.” Therefore, learning items that were perceived as useful appeared to lead to student satisfaction. The second instructional practice was teaching concepts that students previously did not know existed, which was reported by six students. When asked about satisfaction, a student reported, “Yes I did not know you could do so much things on Excel now I know.” Another student stated, “I learned many concepts that I was not familiar with at all coming into the Excel lessons in the beginning. Therefore, I think mission accomplished! I learned a lot from the lessons, and feel confident using Excel myself.”

UGTA 3 had one theme that was coded into the Other category. The item that was categorized in the Other category was his accessibility outside of class, which was
reported by three students. Outside of class, UGTA 3 e-mailed his students a review sheet, answered e-mails, and had office hours. This item was coded in the Other category because it was not an instructional practice that occurred in class. Students indicated that the out of class assistance increased their levels of confidence. A student reported, "Emailed us a list of things we needed to know and how to do them, and was very open for questions." The other student stated, "He emails every student the things on Excel to look out for, kind of like review list."

Common Themes of UGTA 3 Section 1 & 2

The common themes of the instructional practices are summarized in Table 27. For Attention, both of UGTA 3's sections agreed that UGTA 3 used reminders, informing learners of the objectives, humor, and topics to either gain or maintain their attention. The use of anecdotes was not a common theme of both lab sections. Therefore, it was not considered a common theme or a best instructional practice for

Table 27

Common themes of sections 1 & 2

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders</td>
<td>• Apply concepts to academic situations</td>
<td>• Encourage questions</td>
<td>• Learned concepts that are useful</td>
<td>• Accessibility outside of class</td>
</tr>
<tr>
<td>• Inform learners of the objectives</td>
<td>• Apply concepts to life outside of school</td>
<td>• Walk around the lab to ensure students can ask for help individually</td>
<td></td>
<td>(review sheet, e-mail, office hours)</td>
</tr>
<tr>
<td>• Humor</td>
<td>• Apply concepts to situations that may be beneficial in the future</td>
<td>• Give time to practice during and at the end of class sessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Topics</td>
<td>• Familiarity of Topics</td>
<td>• Review at the beginning of each lab session</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Repetition</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
UGTA 3. For Relevance, both of UGTA 3’s sections agreed that UGTA 3 applied concepts to academic situations, current life outside of school, future situations, and used topics that were familiar to the students. All of the themes that emerged from the data in the Relevance category were validated across both of UGTA 3’s lab sections. Within the Confidence construct, the four themes were validated across both of UGTA 3’s lab sections. The themes included encouraged questions, walked around the lab to individually guide students, provided extra practice examples that students could complete on their own in lab, reviewed material from previous lab sessions at the beginning of class, and provided many opportunities for repetition. Within the Satisfaction construct, a common theme emerged across the two lab sections, learning concepts that were useful. The familiarity of topics used in teaching and learning concepts that students were not previously aware of, were not common themes across the two lab sections. Consequently, the two themes were not considered UGTA 3’s best instructional practices. UGTA 3’s accessibility outside of class was also considered a best practice, as it was a common theme across both of his sections.

Axial Coding of UGTA 3 and Students’ Perspectives

In the axial coding stage, the researcher cross-analyzed the codes developed from UGTA 3’s interview and the TA Instructional Practices Motivation Survey. The researcher analyzed the data by finding the common themes that existed. However, the researcher maintained the codes that existed in the TA Instructional Practices Motivation Survey and not in the interview. The researcher used the follow-up interview to verify these themes, as the students perceived them as beneficial to their motivation as framed
The researcher found that both UGTA 3 and the students reported that reminding the students of due dates and upcoming events and his discussion of the topic used each day helped to gain the students’ attention. Teaching with examples that were pertinent to the students’ academic situations, current life outside of school, situations that may be beneficial in the future, and teaching with familiar topics increased the level of relevancy to the students. Teaching with topics that were familiar to students did not emerge as a Relevancy instructional strategy in the initial interview of UGTA 3, but was originally classified in the Attention construct. UGTA 3 increased the students’ confidence by walking around the lab to guide the students, gave time to practice during and at the end of class sessions, repeated concepts at the beginning of each lab session, and encouraged questions.
of each class session, and used a lot of repetition of concepts. Both UGTA 3 and his students believed that satisfaction occurred when the students learned concepts that were not only applicable but also perceived as useful. A common theme that existed outside of the ARCS Model of Motivation was UGTA 3’s assistance outside of class. UGTA 3 e-mailed a review sheet to his students, answered e-mail questions, and had office hours.

Follow-up Interview of UGTA 3: Member Check

In the follow-up interview with UGTA 3, the researcher conducted member checks for all of the common themes in Table 28. UGTA 3 verified all of the instructional practices listed in Table 28. Following the member check, the researcher interviewed UGTA 3 regarding the themes that emerged from the open-ended survey of the students that did not transpire in the first interview. UGTA 3 verified that all of the instructional practices that emerged from the TA Instructional Practices survey occurred in the laboratory.

The students felt that informing them of the objectives for the day and UGTA 3’s use of humor also helped to attain and maintain their attention. This finding was verified in the follow-up interview of UGTA 3. UGTA 3 stated, “I kinda said that we would do these things and then after that we are going to practice amortization and lookup again so I guess that’s what they are talking about.”

Reviewing concepts learned in previous class sessions did not transpire in the first interview, but was verified in the follow-up interview. UGTA 3 stated, “Yeah, I would always review either at the beginning or the end so yeah, I would always have a review of that.”
The students felt that encouraging questions helped to increase their confidence. This finding did not emerge in the first interview, but was verified in the follow-up interview. UGTA 3 stated, “I encouraged questions especially when we first did [um] when we were starting off amortization. I would check if like everybody got the same numbers, and like you know for PPMT and IPMT they use the same numbers right.”

**UGTA 3 Lab Assistant Member-Check**

UGTA 3 had one lab assistant in each of his sections of ICS 101. The researcher interviewed both lab assistants separately to conduct member checks to verify the findings. Both lab assistants verified all of the instructional practices listed in Table 28. Therefore, the lab assistant member-check offered further triangulation of the findings.

**Video Verification of Findings**

The researcher verified two themes using the video. The researcher verified topics because UGTA 3 projected the topics on the screen, which made them viewable. The researcher also verified walking around to ensure students could ask for help individually.

**Follow-up Interview of UGTA 3: Development of Instructional Practices**

The researcher coded the follow-up interview to determine how UGTA 3 developed his best instructional practices. The themes that emerged from the coding process were reflection, modeling from the undergraduate TA that taught UGTA 3, modeling from the undergraduate TA that UGTA 3 assisted as an LA, socialization, and instructional practices that were unintentional (see Table 29).
Reflection. The first theme, oral and written reflection, was the basis for three Relevance, two Confidence, and one Satisfaction instructional strategies. However, UGTA 3 indicated that the course coordinator and orientation played an important role in his reflection process. He stated,

I think that for like when I was a TA and LA that gave me more of a broad direction I should be going in. The orientation you gave and the ARCS things kind of refined it where I would think about it like I would need to accomplish this, this, and this and I need to present it in a manner where I can get their attention, keep their attention, and make them feel good about it. The ARCS kind of refined it and put it in a like straight context so I could think when I am making my files or when I am organizing my lesson plan because [um] I don't really follow the skill list. I just try to figure out okay, I can group these skills together to make it easier for them.

It appears that the course coordinator and the orientation session had an impact on UGTA 3's reflection process.
The first instructional practice that UGTA 3 developed through reflection was applying concepts to academic situations, which was a Relevance instructional practice. UGTA 3 stated, “When I taught first and was thinking about the whole ARCS thing, I think about when I take class what’s important to me. I also thought about like what’s important to my friends because we always talk about school and stuff.” He further explained, “I know there is a lot of business majors and this is the first year that I am in the college of business. I know that these skills, especially Excel is going to be really prevalent.” UGTA 3’s reflection on the ARCS Model of Motivation, the aspects of school that he and his friends valued, and his experiences in business play a role in his implementation of applying concepts to academic situations in his labs.

The second instructional practice that UGTA 3 developed through reflection was applying concepts to life outside of school, which was a Relevance instructional practice. UGTA 3 stated,

Actually, that finance thing, I noticed that I am really bad with money. At the end of the month even if I made a lot of money, I still won’t have anything. Like this is my second job, so like I had an extra 500 dollars at the end of the month, but it didn’t seem like I had anything left. So, I actually started doing it and every day, I would input what I spent into Excel and I found it really useful. So, um, it’s something I brought up with my class because I think that’s always a major issue with college students, finances and where the money is going. And especially with young people. Even if finances is an important issue like if they don’t have a lot of money, they’ll still spend like crazy. So, if they record it in Excel, they can kind of get a perspective of how much they are spending like, “I spent that much, that’s crazy.” So, it kind of puts a more practical aspect into Excel or even if they didn’t put it into Excel, they can still see use it for monthly spending and keep track of my checking.

UGTA 3 developed this instructional practice based on his own experiences and reflecting on them.
The third instructional strategy that UGTA 3 developed through reflection was the use of topics while teaching, which was a Relevance instructional practice. UGTA 3 used topics to teach lab sessions to help his students understand the way concepts could link together. He stated, “I was just panicking to make a file. Pavaratti, I like Pavaratti, maybe someone else will like Pavaratti. Or at least know the name. He was so prevalent.” He felt that the students in his class may have similar interests, which is why he used different topics to teach during lab sessions.

The fourth instructional practice that UGTA 3 developed through reflection was repetition, which was a Confidence instructional practice. He stated,

Yeah so, when I took the class, I really didn’t feel like we did amortization enough. Um, we did it for 2 days. I guess that back when it was only four days. Yeah, so we did it two times. Relatively I guess that was a lot, but I didn’t feel like it was enough for me to really get a grasp on it. Um, even with some other things like subtotal, we did it once, when it came to the checklist, I was kind of like I kind of remember this but. So, I guess it was from my personal experience and taking the class. Now that we do have this longer time period that I really should repeat it as much as I can because it was hard for me and it was hard for my friends in the class that I was taking it with too.

UGTA 3 felt that the he did not have enough repetition to feel confident in the different skills he learned. Since he had a difficult time learning the concepts, he felt that his students could benefit from more repetition in his teaching.

The fifth instructional practice that UGTA 3 developed through reflection was reviewing concepts at the beginning of each lab session, which was a Confidence instructional practice. He stated, “Um, for that I guess it was from my own experience and reflection. I know that with the skills list, we usually just teach a set of skills each day. I know when I took the class, the things like subtotals; we learned it on the last
class. So, when we did it again, I would totally draw a blank. I guess it falls into the whole repetition thing.” UGTA 3 felt that he had a difficult time learning skills only once. Therefore, reviewing concepts the next day helped with repetition.

The sixth instructional practice that UGTA 3 developed through reflection was teaching concepts that are useful, which was a Satisfaction instructional practice. UGTA 3 stated, “So like with my other classes, I really do think that students will remember the stuff that they can use for themselves. Especially for this, with computers, [um] I emphasize the utilitarian point of view because there are the things that I think they are going to use more often.”

Modeling of TA. The second theme, modeling from the undergraduate TA that taught UGTA 3, was the basis for one Attention, one Relevance, and two Confidence instructional practices. UGTA 3 used reminders in lab to ensure students were aware of the due dates for the course, which was an Attention instructional practice. UGTA 3 stated, “For reminders, my TA (when I took the class) would do it. Um, the TA I assisted would do it too. I guess I thought all of the TAs did it.” UGTA 3 felt that reminding students of due dates was a common practice that all undergraduate TAs used.

The second instructional practice that UGTA 3 developed through modeling of his undergraduate TA was applying concepts that may be beneficial in the future, which was a Relevance instructional practice. UGTA reported,

So, it was something that I got from my TA (when I took the course) and [um] I kind of thought of the whole college atmosphere in general because college students are in themselves their own category. So, they kind of have a mindset. I kind of assume that they are in college because they want to make money and have a good job and buy cars and a house and have a family.
The third instructional practice that UOTA 3 developed through modeling of his undergraduate TA was encouraging questions, which was a Confidence instructional practice. He stated, “Um, I guess that’s the way UGTA did it. So I did it. So, I would ask if anyone had any questions a lot.” Therefore, UOTA 3 modeled this instructional practice after his undergraduate TA.

The fourth instructional practice that UOTA 3 developed through modeling of his undergraduate TA was walking around lab to ensure students could ask questions individually, which was a Confidence instructional strategy. He stated, “Since I was with my TA (that taught UOTA 3 as a student), I was in the small room, so it would be easy for her to walk down the center aisle and see how everyone is doing. It was pretty much what she did.”

*Modeling as LA.* The third theme, modeling of the undergraduate TA that supervised UOTA 3 when he was an LA, was the basis for one Attention and one Confidence instructional strategies. UOTA 3 used humor in class to gain and maintain the students’ attention. UOTA 3 stated, “For that, I guess, my TA when I was a LA. I don’t think he would tell stories, but he would use humor. He would say funny little phrases and stuff. It worked in keeping their attention.” Since UOTA 3 saw humor keep students’ attention in lab, he implemented it in his teaching.

The second instructional practice that UOTA 3 developed through modeling of the TA that supervised UOTA 3 as an LA was his accessibility outside of class, which was an Other strategy. He stated, “When I was an LA, I would always see my TA answering e-mails.” He further explained, “Even [um] when I was a LA, I had a couple
of friends taking the class. So, they asked me after class if I wanted to go to lab to help them and I would go even though I wasn’t getting credit or it wasn’t a requirement either. I felt good about it because they needed the help and I could do it.” The combination of observing his TA’s accessibility and the positive feeling he got from being accessible outside of lab as an LA assisted him being more accessible to his students as an undergraduate TA.

Socialization. The fourth theme, socialization with other undergraduate TAs, was the basis for one Attention and one Confidence instructional strategy. The first instructional practice that UGTA 3 developed through socialization with other TAs was informing the learners of the objectives, which was an Attention instructional practice. He stated, “I think was it UOTA. I talked to UOTA a lot too and I got a lot about how to gain attention and keep attention from her.” He indicated that socializing with other undergraduate TAs during his first semester as a TA helped him to develop his teaching practices.

The second instructional practice that UGTA 3 developed through socialization was giving his students time to practice concepts during and at the end of class, which was a Confidence instructional practice. UGTA 3 stated, “Yeah, so um, when I first got this job. With anything new that I do, I watch people who are already good at it or did it before. Like when I get into a new sport, I would watch other people and how they do it. I would just go through the motions and try to copy what they did.” UGTA 3 stated that he took time to observe other undergraduate TAs’ labs to learn how they would teach.
He also stated that he would speak with others about teaching and learning in the undergraduate TAs’ shared office.

**Member Check of Development Themes**

The researcher conducted a member check to verify the findings in Table 29. UGTA 3 verified all of the themes and the instructional practices associated with each theme.

**Reflection Logs Verification of Instructional Development Findings**

The researcher reviewed UGTA 3’s reflection logs to verify the development of the instructional practices. Using the reflection logs, the researcher was able to verify one instructional practice. The instructional practice that the researcher verified with the reflection logs was using topics while teaching.

**Case 3: Summary**

The researcher summarized the findings of case 3 in Table 30. The researcher included a legend to indicate how each instructional method was developed and how each instructional practice was verified.
Table 30

Summary of Findings for UGTA 3

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders (2, M, L)</td>
<td>• Apply concepts to academic situations (2, M, L)</td>
<td>• Walk around the lab to individually guide students (2, M, L, V)</td>
<td>• Teaching concepts that are useful (1, M, L)</td>
<td>• Accessibility outside of class (review sheet, e-mail, office hours) (2, M, L)</td>
</tr>
<tr>
<td>• Topics (1, M, L, V)</td>
<td>• Apply concepts to life outside of school (1, M, L)</td>
<td>• Give time to practice during and at the end of class sessions (4, M, L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Inform learners of the objectives (4, M, L)</td>
<td>• Apply concepts to situations that may be beneficial in the future (2, M, L)</td>
<td>• Repetition (1, M, L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Humor (3, M, L)</td>
<td>• Familiarity of topics (1, M, L, V, R)</td>
<td>• Review at the beginning of each lab session (1, M, L)</td>
<td>• Encourage questions (2, M, L)</td>
<td></td>
</tr>
</tbody>
</table>

Legend

1 - Reflection
2 - Modeling from UGTA 2's undergraduate TA
3 - Modeling from UGTA 2's supervising as an LA
4 - Socialization
M - Member check verified
L - Lab assistant verified
V - Video verified
R - Reflection log verified

Cross Case Analysis

The researcher conducted a cross case analysis of the three undergraduate TAs who were classified as best-case by the cluster analysis. The researcher analyzed the common instructional practices and development of the instructional practices.

Cross Case Analysis of Instructional Strategies

The researcher analyzed the findings from the three cases to determine the common themes (see Table 31). There were four Attention, four Relevance, five
### Table 31

**Common themes of instructional practices**

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Inform learners of the objectives (3 UGTAs)</td>
<td>• Apply concepts to academic situations (3 UGTAs)</td>
<td>• Walk around the lab to individually guide students (3 UGTAs)</td>
<td>• Teaching concepts that are useful (3 UGTAs)</td>
<td>• Accessibility outside of class (2 UGTAs)</td>
</tr>
<tr>
<td>• Reminders (2 UGTAs)</td>
<td>• Apply concepts to life outside of school (3 UGTAs)</td>
<td>• Encourage questions (2 UGTAs)</td>
<td>• Teaching concepts students were not previously aware of (2 UGTAs)</td>
<td></td>
</tr>
<tr>
<td>• Topics (2 UGTAs)</td>
<td>• Apply concepts to situations that may be beneficial in the future (3 UGTAs)</td>
<td>• Repetition (2 UGTAs)</td>
<td>• Review at the beginning of each lab session (2 UGTAs)</td>
<td></td>
</tr>
<tr>
<td>• Humor (2 UGTAs)</td>
<td>• Familiarity of Topics (2 UGTAs)</td>
<td>• Give time to practice during and at the end of class sessions (2 UGTAs)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Confidence, two Satisfaction, and one other instructional strategies. Informing learners of the objectives was the only Attention instructional strategy that was a common theme in all three cases. Using reminders, topics, and humor were common themes of two of the three cases.

Three of the four Relevance instructional strategies were common themes of all three cases. The three common themes were applying concepts to academic situations, applying concepts to life outside of school, and applying concepts that may be beneficial in the future. It appears that these three Relevance instructional strategies were based on what students viewed as important in their life. The Relevance instructional strategy that was a common theme across two cases was using topics that were familiar to students.
This finding was consistent with the topic finding in the Attention category, as it was based on the same two teaching assistants.

One of the five Confidence instructional practices was a common theme across all three cases. The common theme was walking around the lab to ensure students could ask for help individually. The students appeared to ask more questions when the undergraduate TAs were in closer proximity to the students. The four instructional practices that were common themes across two cases were encouraging questions, repetition, giving time to practice during and at the end of class sessions, and reviewing at the beginning of each lab session. The last two themes, giving time to practice during and at the end of lab sessions and reviewing at the beginning of each lab session appeared to be subcategories of repetition. They were included as their own themes, as it promoted the specific instructional practices that other undergraduate TAs could use in their instruction.

Two common themes emerged in the Satisfaction category. The first common theme, teaching concepts that are useful, was common across all three cases. It appears that the students differentiated between concepts that were applicable and useful. Useful concepts were ones that students either used or felt they would use in life. Applicable concepts were those that related to their life, but may not necessarily be useful. The second theme, teaching concepts that students were not previously aware of, was a common theme across two of the cases. Students reported being satisfied when they learned concepts that they did not know previously existed.
One common theme emerged in the Other category across two cases. The theme that emerged was the accessibility of the undergraduate TA outside of class. This theme included personal availability, electronic communication, and remediation provided. Since this was not an instructional practice, it was not included within the ARCS Model of Motivation.

Cross Case Analysis of Development of Instructional Practices

The researcher found six common themes in the development of instructional practices (see Table 32). Four of the common themes emerged from all three cases, while two common themes emerged from two cases. The four common themes that emerged in all three cases were course coordinator/orientation, oral and written reflection, modeling of the undergraduate TA that taught the undergraduate TA as a student, and modeling of the undergraduate TA’s supervising TA as an LA. The two common themes that emerged across two cases were socialization and instructional practices that were developed unintentionally.

The first theme was the orientation session and discussing teaching and learning with the course coordinator. This was the basis for three exemplary instructional

Table 32

<table>
<thead>
<tr>
<th>Common themes of development of instructional practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development Method</td>
</tr>
<tr>
<td>• Course coordinator/orientation (3 UGTAs, overall theme, 3 instructional practices)</td>
</tr>
<tr>
<td>• Reflection (3 UGTAs, 13 instructional practices)</td>
</tr>
<tr>
<td>• Student (3 UGTAs, 7 instructional practices)</td>
</tr>
<tr>
<td>• LA (3 UGTAs, 8 instructional practices)</td>
</tr>
<tr>
<td>• Socialization (2 UGTAs, 4 instructional practices)</td>
</tr>
<tr>
<td>• Unintentional (2 UGTAs, 4 instructional practices)</td>
</tr>
</tbody>
</table>
practices from one undergraduate TA. However, the orientation and discussion with the course coordinator were viewed as a theme that affected the reflection process for the other two best-case undergraduate TAs. UGTA 1 viewed the orientation session and discussions with the course coordinator as methods of framing her reflection about teaching and learning. UGTA 3 stated, “First of all, everything that I did, when I first got the job, I did take notes with the pedagogy and everything. So, I did when I was creating my lesson files, I would think about what I should do for Attention, how should I relate it. Um, I guess it came from the ARCS at orientation.” This finding gave evidence that an orientation session and follow-up can help undergraduate TAs develop instructional practices.

The second common theme amongst the three undergraduate TAs was oral and written reflection when developing instructional practices. Reflection was the basis for 13 instructional practices across the three undergraduate TAs. All three best-case undergraduate TAs reported reflecting orally and in writing to determine different instructional practices to employ in the lab sessions. The undergraduate TAs were required to write reflections once a week and submit them in a private on-line forum. Each undergraduate TA only had access to his/her section of the forum and could not view others’ reflections. This finding gave evidence that reflecting on instructional practices can help the undergraduate TAs develop approaches to teaching.

The third common theme amongst the three undergraduate TAs was modeling of the undergraduate TA who taught the undergraduate TA as a student. This theme was the basis for seven instructional practices across the three undergraduate TAs. Each of the
undergraduate TAs were required to enroll in ICS 101 two semesters prior to becoming an undergraduate TA. The researcher found that this theme gave evidence that each undergraduate TA affects subsequent undergraduate TAs based on their teaching methods.

The fourth theme was modeling of the undergraduate TA who supervised the undergraduate TA as an LA. This theme was the basis for eight instructional practices across the three undergraduate TAs. Each of the undergraduate TAs were required to enroll in ICS 390, the teaching internship course prior to becoming an undergraduate TA. Therefore, this finding gave evidence that the supervising TA influences the way that each undergraduate TA teaches. It appears that each undergraduate TA has one year to learn different teaching practices prior to becoming an undergraduate TA.

The fifth theme was socializing with other undergraduate TAs. This theme was the basis for four instructional practices across two undergraduate TAs. Both of the undergraduate TAs reported developing instructional practices when they socialized with other undergraduate TAs. Both of the undergraduate TAs stated that socialization occurred in the ICS 101 TA Office. The ICS 101 TA Office was a shared office space, which consisted of three rooms. All 12 undergraduate TAs and 4 on-line learning assistants used this space as a shared office and socialized with one another regarding their instructional practices. UGTA 2 stated, “I think it is a good room because there are computers available. People come in here to study, come in here to play video games, come in here to watch TV and just hang out with each other.” UGTA 2 further explained, “Having the video game system just makes it a friendlier environment so it’s
not always about work. But we seem to talk about teaching a lot when we’re playing.”

UGTA 3 explained,

That’s (the office) definitely a big thing. We can always bounce things off of each other and like [um] even like [um] when students have problems, we can give other TAs a heads up on what might happen. Um, and there’s like situations like I know other TAs think that they hate teaching this thing and then we can bounce it off each other. It helps them and it helps you yourself too because you can kind of re-think about this is the way I teach it and it puts into perspective I guess not everyone teaches the same way. So, um, having other TAs to help out.

UGTA 3 further explained, “The video game system really brings us together. Like it’s something we all have in common and enjoy playing and talking. It’s our water cooler talk.” Therefore, the ICS 101 TA Office appears to be a place where the undergraduate TAs socialized and promoted the development of instructional practices. The video game system, also appeared to shape the environment to be less formal and promoted greater levels of collaboration between the undergraduate TAs.

The sixth theme was unintentionally developing instructional practices. This theme was the basis for four instructional practices across two undergraduate TAs. The two undergraduate TAs indicated that it was good for them to know which instructional practices were unintentional, so they are able to identify and continue the ones that were beneficial to their students.

Summary

This study looked at exemplary undergraduate teaching assistant practices and their development. Sixteen undergraduate TA instructional practices emerged as exemplary based on evidence gathered in the study. Six of the 16 instructional practices were common themes across all three of the best-case undergraduate TAs. The six
exemplary instructional practices were informing learners of the objectives, applying concepts to academic situations, applying concepts to life outside of school, applying concepts to situations that may be beneficial in the future, walking around the lab to individually guide students, and teaching concepts that are useful. Ten of the 16 instructional practices were common themes across two of the three best-case undergraduate TAs. The 10 instructional practices were using reminders, topics, humor, familiarity of topics, encourage questions, repetition, giving time to practice during and at the end of lab, reviewing at the beginning of each lab session, teaching concepts that students were not previously aware of, and accessibility outside of class.

Six common themes of the development of the exemplary instructional practices emerged based on evidence gathered in the study. Four of the six themes were common across all three of the best-case undergraduate TAs. The four common themes were course coordinator/orientation, oral and written reflection, modeling of the undergraduate TA that taught the undergraduate TA as a student, and modeling of the undergraduate TA’s supervising TA as an LA. Two common themes emerged across two of the best-case undergraduate TAs. The two common themes were socialization and instructional practices that were developed unintentionally.
CHAPTER V

DISCUSSION

The purpose of this study was to determine what undergraduate TA instructional practices were exemplary as framed by the ARCS Model of Motivation and how the TAs developed these practices. This chapter provides a summary of the study followed by a discussion of the findings in context with each of the research questions. Further discussion is also given as to the implications of this study for practice, future research, and theory.

Summary of the Study

In the late 1990's, approximately 35% of university students were enrolled in large-enrollment introductory courses. Therefore, a group of the nation's higher education leaders met to discuss the redesign of these courses, as less funding was available. The higher education leaders also looked to improve learning outcomes in these courses, as they served as a basis for subsequent coursework. One of the recommendations to improve these learning environments was the use of TAs to increase the teacher-student ratio.

Graduate TAs have become more responsible for many undergraduate courses including large-enrollment courses. Therefore, a focus on graduate TA instruction was important to ensure students met the learning outcomes needed for subsequent coursework. With decreasing funds, some colleges used undergraduate students as TAs to assist in the instruction of undergraduate courses.
Undergraduate TAs were utilized due to limited funding, mastery of course content, and empathy towards students. Undergraduate TAs typically had a higher level of mastery of specific course content, as many complete the course before becoming a TA as opposed to graduate TAs. Undergraduate TAs were also perceived by students as being more empathetic than graduate TAs because they had undergone similar experiences and could relate to other undergraduate students’ experiences. The researcher reviewed the undergraduate TA literature and found a gap regarding undergraduate TA instructional practices. Therefore, the researcher conducted a study on undergraduate TAs’ instructional practices. The researcher grounded the research in motivation, as motivation was identified as an important consideration in large-enrollment instruction. Therefore, the researcher used the ARCS Model of Motivation as the theoretical framework for the study because it was the only motivational model grounded in instructional design.

The purpose of this study was to determine what undergraduate TA practices were exemplary as framed by the ARCS Model of Motivation and the common themes of the development of the exemplary instructional practices. The conceptual framework for this study was grounded in the ARCS Model of Motivation. The researcher used a sequential mixed methods approach to identify the exemplary teaching practices and their development.

The researcher used quantitative methods to identify the best-case undergraduate TAs to study qualitatively. In the qualitative phase, the researcher collected data from primary and secondary data sources. The primary data sources included interviews of the
best-case undergraduate TAs and a survey of their students to determine which instructional practices were viewed as effective as framed by the ARCS Model of Motivation. The primary data sources were coded using open and axial coding strategies to determine each undergraduate TA's best instructional practices. The best-practices were verified using secondary data sources including video verification, LA verification, and member checks.

Once the researcher coded the data, he conducted a follow-up interview of each of the undergraduate TAs to determine how they developed each of their best practices. The researcher used the undergraduate TAs' reflection logs and member checks to verify the development of the instructional practices.

The researcher conducted a cross-case analysis of the three best-case undergraduate TAs to determine the common themes amongst their instructional practices and the development of their instructional practices. The common themes amongst the best instructional practices were classified as exemplary because they were the best practices that existed in this case.

Discussion

The following section presents the evidence produced in this study by discussing the results in context of each of the two research questions. The findings are grounded in the literature concerning undergraduate TAs and the ARCS Model of Motivation.
Research Questions

1. What are exemplary undergraduate TA instructional practices as framed by the ARCS Model of Motivation?

Sixteen instructional practices were identified as exemplary based on the evidence gathered in this study. Since the theoretical framework for the study was the ARCS Model of Motivation, the findings were influenced by it. Therefore, instructional practices that did not fall within the ARCS Model of Motivation framework may not have been discovered.

Six of the exemplary instructional practices were common themes across all three cases and are summarized in Table 33. Of the six instructional practices,

Table 33

Common themes of instructional practices across all three cases

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Inform learners of the objectives</td>
<td>• Apply concepts to academic situations</td>
<td>• Walk around the lab to individually guide students</td>
<td>• Teaching concepts that are useful</td>
</tr>
<tr>
<td></td>
<td>• Apply concepts to life outside of school</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Apply concepts to situations that may be beneficial in the future</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

one instructional practice was classified within the Attention construct, three instructional practices were classified within the Relevance construct, one instructional practices was classified within the Confidence construct, and one instructional practice was classified within the Satisfaction construct.

The exemplary Attention instructional practice was informing the learners of the objectives for the day. Students enrolled in the three best-case undergraduate TAs’ labs
reported that being informed of the objectives for the day helped to attain their attention and maintain it throughout each lab session. The students felt that knowing the objectives prepared them to learn.

The three exemplary Relevance instructional practices were: applying concepts to academic situations, applying concepts to life outside of school, applying concepts to situations that may be beneficial in the future. The students felt that three types of examples were relevant to their needs. The first application of concepts was concerning students' academics. The examples that the students found to be relevant were different based on major, but the underlying theme was the usage of examples that were appropriate for college students. The second application of concepts was concerning students' lives outside of academic settings. These examples were similar for most students, as many undergraduate students had similar experiences outside of the university. For example, students reported using the spreadsheets program to manage their personal finances, which was relevant to their everyday needs. The third application of concepts was for situations that were perceived to be beneficial in the future. An example that was prevalent amongst students was preparing an amortization schedule for a mortgage. They found examples that were perceived to be applicable in the future to be beneficial to their learning. The three Relevance instructional practices appear to be consistent with existing undergraduate TA literature, where undergraduate TAs were effective discussion leaders because they had undergone similar experiences (Boeding & Vattano, 1976; Kohn & Brill, 1981; White & Kolber, 1978). Therefore, they were able to
develop examples that were pertinent to the current undergraduate students’ perceived needs.

The exemplary Confidence instructional practice was walking around the lab to ensure students could ask for help individually. Several students felt that having the undergraduate TA walk around the room to ensure they understood concepts helped to improve their confidence levels to ask questions. The students reported not having the confidence to ask questions, even in the lab environment. However, they felt more confident to ask questions when the undergraduate TA was within close proximity. It appears that the confidence instructional practice helped to account for minimal interaction with the instructor and receiving minimal feedback, which was cited in the literature as a common issue in large-enrollment instruction (Twigg, 1999).

The exemplary Satisfaction instructional practice was teaching students concepts that were perceived as useful. The students felt that learning concepts that were useful was the main reason for greater levels of satisfaction. Therefore, the students wanted to learn concepts that they felt they could use immediately or after they complete their degree, as opposed to learning concepts that were applicable but not necessarily useful.

Ten of the exemplary instructional practices were common themes across two of the three cases and are summarized in Table 34. Therefore, the evidence supporting these instructional strategies were not as compelling as the findings that were supported by all three cases. Of the ten instructional practices, three instructional practices were classified within the Attention construct, one instructional practice was classified within the
Table 34

Common themes of instructional practices across two of three cases

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reminders</td>
<td>• Familiarity of topics</td>
<td>• Encourage questions</td>
<td>• Teaching concepts</td>
<td>• Accessibility</td>
</tr>
<tr>
<td>• Topics</td>
<td></td>
<td>• Repetition</td>
<td>students were not previously aware of</td>
<td>outside of class</td>
</tr>
<tr>
<td>• Humor</td>
<td></td>
<td>• Give time to practice during and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>at the end of class sessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Review at the beginning of each</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>lab session</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Relevance construct, four instructional practices were classified within the Confidence construct, one instructional practice was classified within the Satisfaction construct, and one instructional practice was classified within the Other category.

The Attention instructional practices included reminders, topics, and humor. Students felt that having reminders at the beginning of lab session helped to attain their attention because there are many due dates in the ICS 101 course. The reminders helped the students to keep track of the due dates and helped to ensure they did not miss any of them. The topics also helped to gain the students' attention in lab. The students felt that the use of topics caught their attention because it would make learning concepts more appealing. The use of humor also helped to attain and maintain the students' attention.

The Relevance instructional practice was the use of topics that were familiar to students. Students felt that the familiarity of the topics made learning more relevant to them because they were familiar with the topics, as opposed to learning the content with abstract ideas. This finding also appeared to be parallel to the Relevance instructional practices that were identified by all three cases, where the familiarity of topics used could
be due to the similar experiences of undergraduate TAs and students (Boeding & Vattano, 1976; Kohn & Brill, 1981; White & Kolber, 1978).

The four Confidence instructional strategies were: encouraging questions, repetition, including time to practice during and at the end of lab sessions, and reviewing at the beginning of each lab session. The students reported feeling more confident to ask questions when the UGTAs encouraged questions. Repetition appeared to be the major theme for Confidence, while practice during and at the end of lab sessions and reviewing at the beginning of each class session were subcategories of repetition. Students believed that repetition helped to increase their confidence. The repetition included the undergraduate TA covering learning objectives multiple times as well as giving students time to practice during and at the end of class sessions. Students also reporting that they felt increased levels of confidence when they reviewed material from previous class sessions in the beginning of lab. It appears that the confidence instructional practices helped to account for some of the issues that arose in large-enrollment courses including minimal interaction with the course material, minimal interaction with the instructor, and receiving minimal feedback (Twigg, 1999).

The Satisfaction instructional strategy was teaching concepts that students did not know previously existed. Students reported being satisfied when they learned concepts that were foreign. Both students who were proficient and novices at computer technology reported this instructional strategy. Students who were proficient reported being satisfied that they could learn “new things” because they believed that they
understood everything that the undergraduate TA taught him/her. Novices reported being satisfied that they could learn about the different possibilities of the programs taught.

The item coded in the Other category was the undergraduate TA’s accessibility outside of class. Students reported feeling more confident when they received help from their undergraduate TA outside of class time.

2. What were the common themes of the development of the undergraduate TAs’ exemplary instructional practices?

The researcher found six common themes of the development of the exemplary instructional practices. Four of the common themes were common across three of the undergraduate TAs. The four common themes were: course coordinator/orientation, reflection, modeling from their undergraduate TA as a student, and modeling from their undergraduate TA as an LA (see Table 35).

Table 35

Common themes of the development of instructional practices across all cases

<table>
<thead>
<tr>
<th>Development Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course coordinator/orientation (3 UGTAs, overall theme, 3 instructional practices)</td>
</tr>
<tr>
<td>Reflection (3 UGTAs, 13 instructional practices)</td>
</tr>
<tr>
<td>Student (3 UGTAs, 7 instructional practices)</td>
</tr>
<tr>
<td>LA (3 UGTAs, 8 instructional practices)</td>
</tr>
</tbody>
</table>

The orientation session and subsequent discussions with the course coordinator was the first theme for the development of instructional practices. One of the undergraduate TAs cited the course coordinator as the reason that he developed three of his instructional practices. However, the other two undergraduate TAs noted that the
orientation session and subsequent counseling sessions with the course coordinator helped to frame their reflection practices and the development of their teaching craft. Therefore, the orientation session and the course coordinator had a greater impact than the three instructional practices that were developed. This finding was consistent with Shannon et al.'s (1998) claim that on-going formative assessment was needed to ensure instructional effectiveness.

The second common theme for the development of instructional practices was through oral and written reflection. The undergraduate TAs were required to write weekly reflection logs to promote reflective practices. During this time, the undergraduate TAs developed several exemplary instructional practices. Reflection occurred 13 times of 39 possible instances for the development of instructional practices. Therefore, reflection accounted for a third of the exemplary instructional practices that were developed.

The third and fourth themes of the development of the exemplary instructional practices were modeling from another undergraduate TA. Based on the backgrounds of the undergraduate TAs, this method of instructional practice development occurred over the course of a year. Initially, the undergraduate TAs were enrolled as students in ICS 101, where they developed some of their instructional practices based on the undergraduate TA that initially taught them. In this instance, the modeling of the undergraduate TA occurred seven times of 39 possible instances for the development of instructional practices. In the subsequent semester, they assisted an undergraduate TA for a semester as an LA, where they developed other instructional practices. Modeling of
the supervising TA occurred eight times out of 39 possible instances for the development of instructional practices. The undergraduate TAs’ experiences with the ICS 101 course, as a student and an LA, accounted for more than a third of the exemplary instructional practices that were developed. This finding reinforced Bandura’s (1977) assertion that humans primarily learned through modeling.

Two development themes were common across two of the three cases. The two themes were socialization and instructional practices that were developed unintentionally (see Table 36).

Table 36

<table>
<thead>
<tr>
<th>Development Method</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialization (2 UGTAs, 4 instructional practices)</td>
<td></td>
</tr>
<tr>
<td>Unintentional (2 UGTAs, 4 instructional practices)</td>
<td></td>
</tr>
</tbody>
</table>

The first common theme for the development of exemplary instructional practices was through socialization with other undergraduate TAs. The undergraduate TAs shared an office space that had three rooms, where they collaborated and socialized with each other throughout the year. During this time, the undergraduate TAs spent time socializing with each other and discussed many different topics, ranging from their social life to school life. However, the undergraduate TAs reported that most of their conversations came back to teaching their labs and how best to teach the students. The two undergraduate TAs also described their office as a friendly environment that promoted socialization and collaboration. The TA office also included a video game console, which made the atmosphere “less cold.”
the video game console as their “water cooler” to gather around and speak with one another.

The second common theme across two undergraduate TAs was unintentionally developing instructional practices. UGTA 1 stated, “I didn’t know I did that, but it’s good to know to try to keep on doing it.” Therefore, she felt that knowing which unintentional practices helped her students could be beneficial to her instruction, as she would know what she should continue to do and add to it.

**Implications**

The implications are discussed with the evidence gathered in the study. The following areas were examined: implications for practice, implications for future research, and implications for theory.

**Implications for Practice**

The findings from this study highlighted the importance of an orientation session and follow-up, reflection, modeling, and socialization in the development of instructional practices. It appears that the orientation session and follow-up with the course coordinator paralleled the literature reviewed. Shannon et al. (1998) discussed the importance of on-going formative assessment, as opposed to a one or two-day orientation session. Therefore, the orientation session and course coordinator follow-up appeared to give evidence to support Shannon’s claim.

Many undergraduate TAs were not aware of the impact that they had on the development of exemplary instructional practices. The undergraduate TAs were aware of the impact their supervising TA had on them, but they were not aware of the impact they...
had on their students and LAs. It appeared that over a third of the instructional practices were developed through modeling (Bandura, 1977). This finding was consistent with Bandura's claim that modeling is the primary way in which human behavior is learned. Therefore, the researcher recommended including this aspect as a part of the TA training session that occurs prior to each semester and including follow-up prompts for their weekly reflections. The researcher believes that undergraduate TAs can leverage this knowledge to have a greater impact on their students and LAs, which could promote the development of other instructional practices and increase awareness in the lab.

Reflection was an important factor in the development of effective instructional practices for undergraduate TAs. Even though the undergraduate TAs did not have teaching experience prior to becoming a TA, reflection played a vital role in the development of the majority of their exemplary instructional practices. Therefore, the researcher recommended reflections for undergraduate TAs, as it promoted exemplary instructional practices and can be implemented into many different instructional environments.

Socialization was also an important factor in the development of instructional practices. The researcher believed that the shared office space was vital to the socialization process, where the undergraduate TAs discussed their teaching practices and their effectiveness. Even though the undergraduate TAs discussed many topics that were not related to their job and played video games, their conversations typically found their way back to teaching and learning. This implication was consistent with an aspect of Bandura's extension of the social learning theory. Bandura (1977) claimed that
individuals’ responses were based on their own observation, judgment, and response. Therefore, the undergraduate TAs used the office as common meeting ground for discussing teaching and learning. They shared their responses based on their experiences, observations, and judgments. The researcher believed that socialization can be leveraged to improve instruction. In other departments in the Research Extensive university, many of the TAs either have their own office or share their office with one or two individuals. However, the socialization process appears to add to the development of instructional practices because the office space is shared amongst the 12 undergraduate TAs and four on-line learning assistants. The researcher recommended shared office space for undergraduate TAs with instructional duties because it can create a synergistic environment, where the focus of much discussion is on teaching and learning.

The findings of the first research question indicated that six instructional practices increased the motivation of students enrolled in ICS 101 and were common themes across the best-case undergraduate TAs. Ten other instructional practices emerged across two of the three undergraduate TAs. Departments utilizing undergraduate TAs should consider these specific instructional practices when training undergraduate TAs for instructional environments. Since many undergraduate TAs do not have experience teaching prior to becoming a TA, these findings may assist them in becoming more comfortable in a higher education instructional setting. These findings may also be beneficial for more experienced undergraduate TAs who are refining their teaching skills. Therefore, the researcher recommended including these instructional strategies in orientation and training sessions to help undergraduate TAs understand the types of
instructional practices that may help their students to learn. The researcher also recommends on-going formative assessment and follow-up with undergraduate teaching assistants if possible, as it helped the undergraduate TAs to develop their teaching craft.

Implications for Future Research

The goal of this study was to determine exemplary undergraduate TA instructional practices as framed by the ARCS Model of Motivation and their development. In the course of conducting the study, several items have emerged which have implications for future research. The first item of interest is exploring courses in other departments to determine if the findings of this study are consistent in other disciplines. This would increase generalization of the findings of this study to other fields. Examining other departments would also help to determine if the methods used to develop instructional practices were similar, which would also further increase the ability to generalize the findings.

Since the qualitative phase of the study was conducted on one unit of instruction (Spreadsheets), the researcher recommended studying additional units of instruction. Studying the different units of instruction can allow future researchers to determine if instructional practices are effective in specific units of instruction or are effective in multiple units of instruction.

The third item of interest is to study the two profiles developed by the cluster analysis. Studying the profiles over time could help to determine if a trend exists, which could give predictive ability regarding teaching assistant development. Studying the
different profiles in detail could also assist in determining how TAs from different groups can switch profiles over time and why the switch occurred.

The fourth item of interest is studying the undergraduate TAs' development from the time that they are enrolled in ICS 101 as a student to becoming an undergraduate TA. This future research can help to determine traits that exist in ICS 101 students to determine which are likely to become effective LAs and TAs.

*Implications for Theory*

An exemplary instructional practice that was common across two undergraduate TAs that was not within the ARCS Model of Motivation framework was the TA's accessibility outside of class. This finding indicated that the ARCS Model of Motivation framework was inclusive of most of the instructional practices that emerged in this study. However, it appears that the ARCS Model of Motivation may not be inclusive of all instructional practices that can impact students' motivation. Therefore, the researcher believes that it may be possible to extend the ARCS Model of Motivation for instructional practices to include factors outside of the classroom that impact the students' motivation.

*Conclusion*

Exemplary undergraduate TA instructional practices that were common themes across all three cases included: informing learners of objectives, applying concepts to academic situations, applying concepts to life outside of school, applying concepts to situations that are perceived to be beneficial in the future, walking around the lab to give students an opportunity to ask questions individually, and teaching concepts that were
perceived as useful. Other exemplary undergraduate teaching assistant practices that were common across two cases were: reminders, topics, humor, encouraging questions, repetition, giving practice time, reviewing at the beginning of class sessions, teaching concepts that students did not know existed, and accessibility outside of class. These exemplary instructional practices were derived from six developmental practices including: course coordinator/orientation, reflection, modeling after their undergraduate TA as a student and as an LA, socialization, and unintentional. The findings of this study indicated the greatest influence on effective instructional practices was personal reflection. However, the course coordinator and orientation session had an impact on how the undergraduate TAs reflected on their teaching craft.

The purpose of this study was to increase our understanding of undergraduate TA instructional practices that motivate undergraduate students to learn and the development of these instructional practices. Based on the findings, it is clear that undergraduate TAs have a unique relationship to their students that allows them to instruct in a manner that motivates the students to learn. The undergraduate TAs had the ability to explain concepts in a manner that is relevant to the students because they had similar experiences as the undergraduate students, which led to increased levels of perceived empathy. When using undergraduate TAs in instructional contexts, it is important to understand their advantages to maximize instructional effectiveness. This study gave insight into specific instructional practices that were exemplary within the ARCS Model of Motivation. The findings also indicated how the undergraduate TAs developed their instructional
practices, which can lay the groundwork for others who use undergraduate TAs and would like to improve their instructional effectiveness.
APPENDIX A

Instructional Motivation Survey
Instructions
Instructional Motivation Survey
Michael-Brian Ogawa

1. There are 36 statements in this questionnaire. Please think about each statement in relation to the instruction you have just received over the course of the semester, and indicate how true it is. Give the answer that truly applies to you, and not what you would like to be true, or what you think others want to hear.

2. Think about each statement by itself and indicate how true it is. Do not be influenced by your answers to other statements.

3. Please click on the “Save Answer” button after you answer each question, and follow any additional instructions that may be provided in regard to the survey. Thank you.

Question 1
The TA presented something interesting at the beginning of lessons that got my attention.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree

Question 2
The TA presented lessons that were appealing.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree

Question 3
The quality of the TA’s teaching helped to hold my attention.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree
Question 4

It was easy to keep my attention on the TAs teaching.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree

Question 5

The TA’s instruction was interesting.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree

Question 6

The TA presented the material in a manner that helped keep my attention.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree
Question 7

The TA taught in a manner that stimulated my curiosity.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 8

The amount of repetition in the lab lessons kept my attention.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 9

I learned some things in lab that were unexpected.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 10

The variety of exercises in lab helped keep my attention on the lesson.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 11

The TA’s style of teaching was stimulating.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree
Question 12

The TA spoke enough to keep my attention.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 13

It is clear to me how the content of the lab lessons is related to things I already know.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 14

The TA used examples that showed me how this material could be important to some people.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 15

Completing lab lessons successfully was important to me.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree
Question 16

The content of the lab material is relevant to my interests.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 17

The TA provided explanations of how people use the knowledge.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 18

The style of instruction by the TA conveyed the impression that the course content is worth knowing.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 19

The TA's teaching methods helped me to learn.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree
Question 20

I could relate the content of the lab portion of the course to things in my own life.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree

Question 21

The lab material will be useful to me.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree

Question 22

When the TA first introduced lessons, I had the impression that it would be easy for me.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree

Question 23

The lab content was easier to understand than I thought it would be.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree
Question 24

After the TA introduced each lesson, I felt confident that I knew what I was supposed to learn from each lesson.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 25

The TA presented the material in a manner that made it easy for me to pick out the important points.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 26

As I worked on the lessons in lab, I was confident that I could learn the content.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 27

The TA's teaching increased my confidence.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree
Question 28

After learning from the TA, I was confident that I would be able to pass a test on it.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 29

I could understand most of the material presented by the TA.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 30

The organization of the content by the TA helped me be confident that I would learn the material.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

Question 31

Completing the exercises in labs gave me a satisfying feeling of accomplishment.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree
Question 32

I enjoyed the lab lessons so much that I would like to know more about the topics that were presented.

a. Strongly Agree  
b. Agree  
c. Neither Agree nor Disagree  
d. Disagree  
e. Strongly Disagree

Question 33

I really enjoyed learning the lab content.

a. Strongly Agree  
b. Agree  
c. Neither Agree nor Disagree  
d. Disagree  
e. Strongly Disagree

Question 34

The TA’s feedback helped me feel rewarded for my effort.

a. Strongly Agree  
b. Agree  
c. Neither Agree nor Disagree  
d. Disagree  
e. Strongly Disagree

Question 35

It felt good to successfully complete the lab.

a. Strongly Agree  
b. Agree  
c. Neither Agree nor Disagree  
d. Disagree  
e. Strongly Disagree
Question 36

It was a pleasure to work with the TA.

a. Strongly Agree
b. Agree
c. Neither Agree or Disagree
d. Disagree
e. Strongly Disagree
APPENDIX B

TA Instructional Practices Motivation Survey
Instructions
TA Instructional Practices Motivation Survey
Michael-Brian Ogawa

1. There are 10 questions in this open-ended survey. Please think about each question in relation to the instruction you have just received (Excel Unit), and answer them to the best of your ability. Give an answer that truly applies to you, and not what you would like to be true, or what you think others want to hear.
2. Do not be influenced by your answers to other questions.
3. Please click the “Save Answer” button after you complete each survey question and follow any additional instructions that may be provided in regards to the survey. Thank you.

Attention:
1. Was the TA able to gain my attention at the beginning of each lab session during the Excel Unit? If yes, how so (Please give specific examples)? If no, why not?
2. Was the TA able to maintain my attention during the Excel lessons? If yes, how so (Please give specific examples)? If no, why not?
3. Were the Excel lessons interesting or appealing to me? If yes, how so (Please give specific examples)? If no, why not?

Relevance:
4. How did the TA present the course material? Please write how a typical day of lab went (be as specific as possible).
5. Did the TA present the material on Excel in a manner that was relevant to me? If yes, how so (Please give specific examples)? If no, why not?

Confidence:
6. Did the TA make learning easy during the Excel lesson? If yes, how so (Please give specific examples)? If no, why not?
7. Did the TA increase my confidence during the Excel unit? If yes, how so (Please give specific examples)? If no, why not?

Satisfaction:
8. Did the TA teach the material on Excel in a manner that satisfied me? If yes, how so (Please give specific examples)? If no, why not?

Other:
9. Other comments regarding the instructional practices my TA used that helped me to be motivated and successful in the course.

10. General comments.
APPENDIX C

Interview Guides for TAs
Dear TA Name,

Thank you for agreeing to take part in this research.

The purpose of this study is to determine exemplary undergraduate TA teaching practices as framed by the ARCS Model of Motivation.

Your participation will require three separate interviews. We can make appointments at your convenience. However, once we begin a session it will be best if we can continue uninterrupted. I expect that you will be required to spend no more than three hours total participating in this study.

At the first session, I will ask about your teaching practices. I will also ask you to describe your instructional practices during the Excel Unit of instruction. Please answer each question as honestly as possible.

At the second session, I will ask you to verify the findings from the first interview. After verification of the findings, I will ask you to describe how you developed your laboratory teaching practices.

At the third session, I will ask you to verify the findings from the second interview.

Each session will be recorded and later transcribed by me. Your identity, the session and dates will remain strictly confidential. No identifying information will appear in the final dissertation or any published work. In addition, at the conclusion of the study, you will have access to the full description of your case as used in the dissertation.

I hope you will find participating in this study interesting and enjoyable, and useful to you in your own work. Thank you again.

Sincerely,

Michael-Brian Ogawa
Interview Guide (Session 1)

Could you please describe your instruction during the Excel Unit of instruction?

Attention:
1. What did you do to gain the attention of your students at the beginning of the Excel Unit of instruction?
2. How were you able to maintain your students' attention throughout the laboratory sessions?
3. What did you do to make the Excel lesson interesting and appealing to your students?

Relevance:
4. How did you present the material? Please walk me through the Excel Unit of instruction.
5. How did you teach the material in a manner that is relevant to the students? Please give specific examples of what you did and why you thought it was relevant.

Confidence:
6. What did you do to make learning easier for your students?
7. How did you increase your students' confidence in lab?
8. What did you do to increase your students' confidence to learn lab content?

Satisfaction:
9. What did you do to ensure your students were satisfied with the instruction they received?

Other:
10. Other comments regarding the instructional practices that you employed to motivate your students’ learning.
11. General Comments
Interview Guide (Session 2)

1. The following is a list of my findings from the previous interview. Could you please verify them for me?

2. How did you develop these teaching practices? (each practice will be listed and asked separately)
Interview Guide (Session 3)

1. The following is a list of my findings for the development of your instructional practices. Could you please verify them for me?
APPENDIX D

LA Verification Interview
Interview Guide

1. The following is a list of my findings from an interview with your TA and his/her students. Could you please verify them for me?
APPENDIX E

Institutional Review Board Approval
MEMORANDUM

February 13, 2007

TO: Michael-Briet Ogawa

Principal Investigator:
Curriculum & Instruction

FROM: William H. Dendle

Executive Secretary

SUBJECT: CHS #15901: "Exemplary Undergraduate Teaching Assistant Practices Using the Aiken Model of Motivation"

Your project identified above was reviewed and has been determined to be exempt from Department of Health and Human Services (DHHS) regulations 45 CFR Part 46. Specifically, the authority for this exemption is section 46.101(b)(2). Your certificate of exemption (Optional Form 1001) is attached. This certificate is your record of CHS review of this study and will be effective as of the date shown on the certificate.

An exempt status signifies that you will not be required to submit renewal applications for full Committee review at least as long as the portion of your project involves human subjects remains unchanged. If, during the course of your project, you intend to make changes which may significantly affect the human subjects involved, you should contact this office for guidance prior to implementing those changes.

Any unanticipated problems related to your use of human subjects in this project must be promptly reported to the CHS through this office. This is required so that the CHS can institute or update protective measures for human subjects as may be necessary. In addition, under the University's Assurance with the U.S. Department of Health and Human Services, the University must report certain situations to the federal government. Examples of these reportable situations include deaths, injuries, adverse reactions or unforeseen risks to human subjects. These reports must be made regardless of the source: funding or exempt status of your project.

University policy requires you to maintain as an essential part of your project records, any documents pertaining to the use of human subjects in your research. This includes any information or materials conveyed to, and received from, the subjects as well as any control, consent forms, thus and analysis materials. These records must be maintained for at least three years after project completion or termination. If this is a funded project, you should be aware that those records are subject to inspection and review by authorized representatives of the University, state and federal governments.

Please notify this office when your project is completed. We may ask that you provide information regarding your experiences with human subjects and with the CHS review process. Upon notification, we will close out this file pertaining to your project. Any subsequent modification of the project will require a new CHS application.

Please do not hesitate to contact me if you have any questions or require assistance. I will be happy to assist you in any way I can.

Thank you for your cooperation and efforts throughout this review process. I wish you success in this endeavor.

Sincerely,

[Signature]

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[Institute_Governance/Knowledge_Actions/Institution]
REFERENCES


