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Peer tutoring at the postsecondary level has been studied extensively, particularly over the last twenty years. Peer tutoring programs are common across institutional type and size in the United States (Boylan, Bonham, Bliss, & Saxon, 1995; Maxwell, 2001) given students' preferences for tutors who share age and status similarity (Cohen, 1986; Marsh, 2001; Maxwell, 1991) as well as the cost-effectiveness for the institution (Beasley, 1997; Boylan et al., 1995; Dvorak, 2004; Lidren & Meier, 1991; MacDonald, 1993; Marsh, 2001; Maxwell, 2001; Riggio, Fantuzzo, Connelly, & Dimeff, 1991). Additionally, peer tutoring has been shown to improve student achievement (House & Wohlt, 1989; McKellar, 1986) and compensate for low grades in traditional lecture environments (Dvorak, 2004).

While much has been written about the nature of tutoring conducted by learning center tutors, the instructional strategies applied by academic department peer tutors, the nature of tutoring in this setting, and environmental differences represented significant gaps in the research literature. Consequently, it is critical that comparisons across program variables be conducted to learn more about tutoring behaviors and student learning (Roscoe & Chi, 2007). Moreover, research has shown that students' academic success improves significantly when they receive tutoring from trained staff (Boylan, Bliss, & Bonham, 1997; Schleyer et al., 2005), including: higher exam scores (Fantuzzo et al., 1989), higher course grades (Chadwick & McGuire, 2004), and higher grade point

averages (Boylan et al., 1997). However, understanding how tutors select their strategies based on the training received was unclear.

This study examined the instructional strategies used by learning center and academic department tutors, how training impacted the selection and use of particular strategies, as well as the resulting scaffolding that occurred for the tutees. Also, this study focused on the impact that environmental differences and the structure of tutoring services had on tutoring sessions conducted by both groups of tutors. Specifically, differences were examined between walk-in tutoring services conducted by the academic department tutors and appointment-based tutoring conducted by the learning center tutors.

The researcher used a case study design to compare two academic department tutors and two learning center tutors at a mid-sized, southeastern U. S. university. The data from this case study design included three formal interviews, six to seven non-participant observations, and six to seven debriefing interviews of each tutor. Additional results, implications of these findings, and recommendations for future research are discussed.

Overall, this study demonstrated several key findings: (a) while both academic department tutors employed many of the same questioning and instructional techniques that the learning center tutors used, they did so less frequently, did not use as many higher level thinking questions, and relied more on explanations as part of their instructional approach; (b) there were significantly fewer demonstrations of active learning and academic skills instruction among the department tutors; (c) the learning

center tutors engaged in relational communication more frequently than the academic department tutors; (d) the academic department tutors experienced greater pressure in finding sufficient time to address each tutee's concerns based on the structure of walk-in tutoring services; and (e) regular attendance enabled the learning center tutors to better understand their tutees' learning styles and academic needs, which facilitated the selection of specific strategies based on tutor training and the tutors' own academic success.

TUTORING STRATEGIES: A CASE STUDY COMPARING LEARNING CENTER TUTORS AND ACADEMIC DEPARTMENT TUTORS

by

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Approved by

_____
Committee Chair

This dissertation is dedicated to all of the tutors who earnestly serve our university community. You have contributed in immeasurable ways to the academic success of college students.

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina Greensboro.

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CHAPTER I

INTRODUCTION

The concept of tutoring predates the existence of colleges and universities, stemming from ancient Greece and Rome (Moust & Schmidt, 1994). The use of tutoring in higher education also shares a rich and long history. Harvard University used tutors to assist men as early as 1636 (Boylan, Bonham, Bliss, & Saxon, 1995). Yet, the development of formalized tutoring programs did not occur until the twentieth century (Marsh, 2001; Maxwell, 2001). The passage of the GI Bill in 1945 and the Higher Education Act of 1965 both contributed to a mass matriculation of underprepared college students who required remediation of basic skills deficits. Formalized tutoring programs were developed to address these deficits (Marsh, 2001) and improve overall academic performance (Cohen, 1986; House & Wohlt, 1990). Although initially staffed by faculty and professional tutors, peer tutoring has become the norm given college students' preferences for tutors who share age and status similarity (Cohen, 1986; Marsh, 2001; Maxwell, 1991) as well as cost-effectiveness (Beasley, 1997; Boylan et al., 1995; Dvorak, 2004; Lidren & Meier, 1991; MacDonald, 1993; Marsh, 2001; Maxwell, 2001; Riggio, Fantuzzo, Connelly, & Dimeff, 1991).

Such programs have become commonplace in higher education, spanning institutional type and size (Maxwell, 2001). As of 1995, an estimated 2200 tutorial programs existed in the United States, with 71.1% of two-year schools and 74.6% of

four-year schools offering such services (Boylan et al., 1995). Often located in comprehensive learning centers (Dvorak, 2004), such programs can be decentralized with services being provided by academic departments, support programs, and even housing and residence life departments. However, the greater coordination of services in centralized programs at four-year institutions is considered to be a key reason students earned higher first-term GPAs and cumulative GPAs compared to students participating in decentralized programs (Boylan, Bliss, & Bonham, 1997). Regardless of location on campus, peer tutoring is considered the "most popular learning support service in American colleges today" (Maxwell, 2001, p. 8).

While numerous tutoring formats exist, individual or one-on-one tutoring is the most common (Hock, Deshler, & Schumaker, 1999; Marsh, 2001). Researchers consider individual tutoring vital in providing remedial or supplemental instruction (MacDonald, 1991), especially for at-risk populations (MacDonald, 1993), for students with disabilities (Kowalsky & Fresko, 2002), as well as for the general population (Dvorak, 2004). Group tutoring is a popular format since it enables tutees to contribute additional insights and questions to the session (Dvorak, 2004), share learning strategies and promote self-sufficiency (MacDonald, 1993), and because it provides cost-savings when budgets are reduced (MacDonald, 1993). Variation in tutoring formats ensures that the diverse needs of students are met more effectively (Dvorak, 2004).

Peer tutoring offers numerous advantages over using faculty members. Notably, peers behave like colleagues rather than appearing superior (Johansen, Martenson, & Bircher, 1992), which fosters a non-threatening environment (Dvorak, 2001).

Correspondingly, their similar status enables them to share information and feedback more easily (Cohen, 1986). More specifically, this may come about because peers use similar language, as opposed to subject jargon, making them more effective than graduate students and faculty (Nelson, 1995/96). They also were perceived as more adept with providing feedback and showing greater empathy for challenging material (Kassab, Abu-Hijleh, Al-Shboul, & Hamdy, 2005). Peer tutors can also model challenging material, support students' efforts, and place timely demands on their tutees (Nelson, 1995/96). Interestingly, several researchers have noted that course competence is necessary, but not the most critical aspect of the tutoring relationship. Tutors who showed patience, care, and sensitivity were more effective in their roles (Bobko, 1984; Dvorak, 2001), as were those who were flexible, took time to build rapport, and served as academic role models (Dvorak, 2001). Peer tutors are also more apt to credit their tutees for academic success rather than taking credit themselves (Medway, 1991).

Unfortunately, there remains no consensus on a universal definition of effective tutoring (Person, Kreuz, Zwann, & Graesser, 1995). Moreover, Topping (1996) proffered a typology of peer tutoring that demonstrated variability on as many as ten dimensions: curriculum content, group size, year of study, ability, role continuity, place, time, tutee characteristics, tutor characteristics, and objectives. When peer learning, in general, was examined, variability was extended to thirteen factors (Topping, 2005).

Often, researchers use different terminology to describe peer tutoring, including peer learning and reciprocal peer tutoring. Some will argue that there are distinct differences. However, there are some common characteristics, such as: the use of more

experienced or advanced peers helping less experienced ones (Beasley, 1997; Roscoe & Chi, 2007; Saunders, 1992); students with a similar academic status assisting or teaching others (Cohen, 1986; Colvin, 2007; Topping, 2005); students helping each other learn (Loke & Chow, 2007; Mynard & Almarzouqi, 2006); and peers sharing the teaching role (Fantuzzo, Dimeff, & Fox, 1989; Medway, 1991; Rittschof & Griffin, 2001).

Given the multiple program designs that exist (e.g., Topping's taxonomy), it is important for researchers to "analyze and compare behaviors and learning across different program variables, such as tutoring format and structure" (Roscoe & Chi, 2007, p. 561). For example, it is important to distinguish between interactions that occur in appointment-based tutoring versus walk-in tutoring. Both tutoring formats exist at the researcher's institution, with the former occurring in the university-wide Learning Assistance Center (LAC) and the latter being sponsored by some academic departments. Often, walk-in tutoring is utilized for assistance with homework problems. Hock et al. (1999) refer to this as assignment-assistance tutoring, where the goal is the specific task. This contrasts with appointment based tutoring where the purpose is typically instructional, with the goal of developing skilled, independent learners (Hock et al., 1999). The failure to accurately describe these differences in previous tutoring studies has led to mixed results regarding effectiveness (Hock et al., 1999).

Likewise, it is critical that researchers devote more time to examining the types of instructional strategies used by tutors in different settings. Most research in the United States has been conducted with tutors operating out of learning centers, through a specific faculty member's class, or in an artificial setting rather than a naturalistic one. To date,

this researcher could not find one study, conducted in this country, involving tutoring strategies specifically used by tutors employed in academic departments. Moreover, no comparisons have been done comparing strategies used by learning center tutors and academic department tutors to learn if there are similarities or differences, nor investigating how the tutors select the types of strategies used to assist tutees.

Furthermore, it is essential that tutor administrators, be they staff or faculty, provide training for their tutors. Medway (1991) noted that students do not inherently come with solid teaching or helping skills, knowledge of tutoring methods, or strategies for assisting with various academic issues. Correspondingly, numerous studies have been conducted that demonstrate the benefits of tutor training for developing effective tutors (Cohen, 1986; Johansen et al., 1992; Kassab et al., 2005; MacDonald, 1993; Marsh, 2001; Maxwell, 2001; Medway, 1991; Rings & Sheets, 1991). Yet, this researcher found only one study demonstrating the existence of tutor training specific to academic department tutors (Schleyer, Langdon, & James, 2005). However, this study examined peer tutors in England, where the typical tutoring structure involves large groups rather than individual or small group tutoring, which is overwhelmingly seen in the United States.

Moreover, it is crucial that researchers develop a more clear understanding of what tutor training aspects or training topics have yielded the greatest benefit for tutors' thinking, behaviors and methods (MacDonald, 1993; Roscoe & Chi, 2007). Roscoe and Chi (2007) recommend developing systematic coding to enable researchers to connect

tutor training with actual tutoring behaviors in order to determine whether or not training is being used and how.

Statement of the Problem

The purpose of this study was to develop a better understanding of the instructional strategies used by learning center and academic department tutors, how training impacted the selection and use of particular strategies, as well as the resulting scaffolding that occurred for the tutees.

Research Questions

The study was guided by two primary research questions and several sub-questions:

1. What instructional methods were used by learning center tutors and academic department tutors, and how did they differ?
    a. What happened in academic department tutoring sessions?
    b. What happened in learning center tutoring sessions?
    c. How and why did tutors choose the particular methods they used?
    d. How did environmental differences among academic department and learning center tutors impact tutoring sessions?
2. What was the impact of tutor training on learning center tutors' practice?
    a. What was the impact on their behavior?
    b. What training had the most influence?
    c. What training had the least influence?

Furthermore, the research questions were realist in nature, as described by Maxwell (2005). Like Maxwell, the researcher placed greater value in understanding peoples' beliefs and perceptions about what was taking place than initially proving what had happened. Additionally, tutors' beliefs about their roles, how they characterized their tutoring sessions, how training or a lack of training impacted their experiences, how they adapted their tutoring based on their experiences, how they believed they had grown as tutors, and their perceptions of how students responded to them all greatly informed the researcher about the nature of tutoring. Finally, the sub-questions that informed the research questions can be defined as both realist and process-oriented in nature. They helped reveal the meaning tutors' placed on their activities and roles and also how these events unfolded on a typical basis.

Definition of Terms

For the purposes of this study, the following operational definitions were used:

Peer Tutoring: Numerous researchers have attempted to define peer tutoring, as was noted previously. Given the characteristics and the diverse representation of students who serve as tutors at colleges and universities, this researcher used Dvorak's (2001) definition of peer tutoring, which states that tutoring "is an active learning process with tutors functioning as facilitators and role models" (p. 35).

Instructional Strategies: Many researchers reference instructional or learning strategies in a tacit manner without fully defining the terminology. This researcher used the definition proffered by a Miami-Dade County Schools Website (2007), which states

"instructional strategies involve techniques, methods, materials, and other means that are used to assist a student to achieve an educational goal."

Scaffolding: The research literature mentions several forms of scaffolding. For this study, the focus was placed on cognitive scaffolding.

> Cognitive scaffolding can narrow the scope of a task or break it into substeps, focus students' attention on a particular part of a problem or solution, remind students of relevant factual or procedural information, or elicit further answers from students. (Cromley & Azevedo, 2005, p. 88)

Some examples of cognitive scaffolding include providing hints, prompts, clues, modeling or demonstrating steps, correcting misinformation, and using open-ended questions.

Active Learning: McKinney (n. d.) describes the role of students as being engaged and not simply listening. Specifically, she defines active learning as "doing something including discovering, processing, and applying information" (¶ 1).

Facilitator: Since this term may be defined in numerous ways, the researcher used the following definition to represent his beliefs. The Merriam-Webster Online Dictionary (2008) defines facilitator as "one that helps to bring about an outcome (as learning, productivity, or communication) by providing indirect or unobtrusive assistance, guidance, or supervision."

Significance of the Study

This study was unique given that no one had examined the nature of academic department tutors in naturalistic settings and what specifically happens in their tutoring sessions. In addition to addressing this deficit in the research literature, this study helped

inform administrators and faculty about the factors influencing the selection of particular tutoring strategies by both learning center and academic department tutors. Moreover, it examined how tutor training affected the selection of specific strategies and what training topics had the greatest impact on such decisions.

Limitations of the Study

There were several limitations that impacted this study. First and foremost, one of the two populations in this case study design conducted walk-in tutoring exclusively. Since no there was no guarantee that students would attend walk-in tutoring times, the researcher initially identified ten tutors from the Chemistry department who tutored in introductory coursework and eventually narrowed down to two tutors. This was done in order to maximize the opportunities for more comprehensive data collection and enable a more accurate comparison between academic department and learning center tutors' strategies. The researcher also had to adjust other professional responsibilities and attend extra tutoring times in order to observe the tutors when students chose to show up for academic assistance. Consequently, this helped the researcher observe these tutors' specific strategies in the full context that helped answer the research questions.

Second, the other tutor population being studied worked for the researcher's department; the university Learning Assistance Center (LAC). Creswell (2003) describes this as "backyard research" because it involves the researcher's own work setting (p. 184). Because this type of research presented validity threats, specific steps were taken to establish trustworthiness with the research findings. This is addressed in the Trustworthiness section of the Methodology chapter.

Conceptual Framework

The researcher's conceptual framework built on both the research literature and his practical experience. While the existing research indicated that tutor training makes a significant difference in both a tutor's ability to facilitate the learning process and improve a student's ability to grasp concepts more effectively, which also is very affirming for practitioners working in learning centers, it does not provide a complete picture of how tutors draw upon their training to aid students. Further, there was no picture of how this process unfolded for academic department tutors. In particular, research-practitioners do not know what strategies are used by tutors working for academic departments because no one has specifically studied and compared this particular group with learning center tutors.

The researcher thought the most important knowledge that informed this research included the concept of scaffolding as a means of supporting student learning. It was relevant to know that there are cognitive and motivational methods that tutors can use to undergird the learning process. What was missing was a clearer understanding of how tutors actually selected approaches for assisting their students. Did they draw specific aspects from training and, if so, how did they decide upon those approaches? If one considers a non-trained tutor, what did they draw upon? Intuition? Strategies they witnessed during their coursework or that they emulated from their faculty?

In an effort to portray this process more concretely, the researcher utilized Inspiration 8.0 software to depict a comparison between academic department tutors and learning assistance center (LAC) tutors from a mid-sized, southeastern U. S. university

(see Appendix A). Given that there was no information about what, if any, training was received by academic department tutors, and there was no understanding of the instructional strategies used in their tutoring sessions, there was an incomplete understanding of the degree of scaffolding that occurs and in what ways it manifests. Furthermore, from the researcher's experience, many faculty members are less concerned about the personal attributes and communication skills of tutors than the content knowledge they hold. However, based on the research literature, the former qualities are essential for scaffolding to develop because learning occurs in a social context (Dvorak, 2004). Thus, if training was not provided for academic department tutors and less attention and priority was placed on hiring individuals who also possessed good communication skills, how were these tutors able to communicate their knowledge and what types of scaffolding were incorporated?

Comparatively, LAC tutors at this university are required to attend ten, one-hour training seminars during the span of the semester. One training topic per week is covered, with the structure of trainings including topic instruction, group and individual exercises, reflection activities, and multiple learning styles. The training is based on nationally accredited guidelines set forth by the College Reading and Learning Association (CRLA). These tutors learn instructional strategies, needs assessment, learning styles, communication skills, academic skills, and about the needs of specialized populations, to name a few (see Appendix B). Further, by attending training and accumulating direct tutoring experience, these staff work towards earning national certification at level one, level two, or level three, as set forth by CRLA and the LAC.

While the researcher had evaluation feedback and anecdotal evidence that training was beneficial, he considered this information limiting in terms of understanding how training specifically informs tutors' selection of strategies and approaches in helping students and what training was most often utilized in creating scaffolding to support their students.

As a result, the researcher depicted his conceptual framework (see Appendix A) to indicate that while the instructional strategies provided during training for LAC tutors are known, the actual ones employed by tutors were unknown. As a result, the researcher wanted to examine the instructional strategies used and the resulting scaffolding that occurred so that he could better understand the nature of tutoring from this perspective. He compared this to the nature of tutoring and type of scaffolding that occurred with academic department tutors. In doing so, he addressed the type of learning that occurred in tutoring situations from non-trained and trained staff.

Summary

Prior research about tutoring in college settings did not fully examine the types of tutoring strategies employed by different types of tutors, particularly among academic department tutors. Likewise, there were no studies that compared learning center and academic department tutors in naturalistic settings to learn whether the strategies they employed to assist students were similar or different, and what specific experiences guided these tutors' efforts. Correspondingly, there was a need to strengthen the understanding of how tutor training specifically impacted the strategies employed by

tutors. This research built on the existing literature base by examining these issues, as well as introducing a coding schema to connect tutor training with actual behaviors.

Additionally, this research demonstrated that there were distinct differences in the level of scaffolding created by learning center and academic department tutors. This was important because it can be used to inform both administrators and faculty about the manner in which student learning outcomes are directly impacted by the efforts of trained and non-trained tutors, the types of instructional strategies and approaches that are commonly utilized by both types of tutors, and whether resources would be better utilized by either investing in particular types of training or centralizing the tutoring services.

Finally, this research can aid decision-makers in better understanding the tutoring context, the strategies chosen by tutors, and how tutor training impacted the selection of particular strategies for assisting learners. By better understanding these aspects, decision-makers can make more informed judgments about expenditures for specialized services, like tutoring, particularly at a time when financial and personnel resources are severely limited or being reallocated altogether.

CHAPTER II

REVIEW OF THE LITERATURE

Benefits of Peer Tutoring

The research literature provides numerous examples of ways in which peer tutoring at the college level benefits students. Some benefits include: higher test grades, course grades, and cumulative GPAs; greater retention rates; earning more credit hours; students engaging in more active learning; and cognitive and affective gains among tutors.

On the whole, peer tutoring has been demonstrated as an effective method for improving student achievement (House & Wohlt, 1989; McKellar, 1986), especially in compensating for low grades and high failure rates associated with traditional lecture formats (Dvorak, 2004). House and Wohlt (1989) found that underprepared students earned higher grades in math and science courses when tutored by someone of the same gender. McKellar's (1986) study demonstrated two important findings: (a) that students earned higher test scores when tutors elaborated on content and shared new information with the tutee; and (b) when tutees asked for greater clarification, their test scores subsequently increased. However, the absence of tutor training and small population size studied—20 pairs—present limitations in generalizing the results. Dvorak (2004) argued that tutoring fosters active learning of subject content, which is absent in the lecture style instruction. Likewise, a tutor's ability to build relationships is crucial to the learning

environment, which is interpreted from an article she referenced from Charles Claxton interviewing Parker Palmer.

Studies also have revealed that tutoring has a positive impact on student persistence and graduation rates, final course grades, course completion rates when tutoring was received, and student attitudes about instruction (Boylan, Bonham, & Bliss, 1994, as cited in Boylan et al., 1995) and course completion rates (Boylan et al., 1994).

Some research data suggested that as little as one hour of peer tutoring per week produced academic improvements (Lidren & Meier, 1991). Using an experimental design, Lidren and Meier (1991) showed that students receiving one hour of weekly tutorial instruction outperformed control groups on course examinations in an introductory psychology class. The experimental design included both a small group tutoring format and a larger discussion-based tutoring group, with the control group receiving no tutoring assistance.

In another study, Rheinheimer (2000) showed marked grade improvements once students received five hours of tutoring. This result held across students' ethnicity and gender. After controlling for previous academic performance, Rheinheimer also found that the highest grade achievements were reached once fifteen hours of tutoring was received. Using a regression analysis, hours of tutoring had the second highest predictive value following the academic index [a score based on pre-college academic performance].

In contrast to House and Wohlt's earlier research (1989), Rheinheimer (2000) found that gender matching did not improve at-risk students' grades. After controlling for

previous academic experience, females and males were shown to perform at equal levels as a result of tutoring. The only exception to this was for African-Americans, with males earning slightly higher grade means than females.

Furthermore, at-risk students receiving tutoring were retained for longer periods than those who would benefit from tutoring but did not use it (Maxwell, 1991). Yet, Nelson (1995/96) suggests that some at-risk students will not use tutoring because of cultural and family norms that do not promote academic diligence.

Research also has been done on the impact of peer tutoring on specific populations in college settings. First-year students who received tutoring, particularly men, earned more credit hours and higher cumulative GPAs (House & Wohlt, 1990). However, this study also revealed that this did not apply to African-American students, possibly due to poor study strategies with this population. Furthermore, students with disabilities reported greater academic and social benefits as a result of tutoring and were found to be less likely to dropout (Kowalsky & Fresko, 2002).

Similarly, students enrolled in specific courses demonstrated greater academic achievement when they received tutoring. Nursing students demonstrated greater application of reflective and critical thinking during tutoring sessions (Loke & Chow, 2007). Likewise, students tutored in an advanced physiology course outperformed non-participants (Lake, 1999). And, students receiving tutoring in a non-majors, upper-level industrial/organizational psychology course outperformed peers who studied alone (Riggio et al., 1991). This last study also demonstrated that: (a) the combination of social and academic structure led to greater cognitive gains; and (b) students in the structured,

academic “integration” groups exhibited less psychological distress compared to non-structured groups.

Peer tutoring also fostered opportunities for students to achieve their academic goals, thereby aiding their intellectual development and adding value to higher education (Dvorak, 2001). In particular, there were more opportunities for students to ask questions in this setting compared to a lecture (Graesser, Person, & Magliano, 1995). Having one’s questions answered led to greater comprehension, possibly because information was being repeated (Fishbein, Eckart, Lauver,, Van Leeuwen, & Langmeyer, 1990). Such opportunities compensated for inadequate practice and promote coaching in problem-solving (Bobko, 1984).

Having students reciprocate the role of the tutor (reciprocal peer tutoring) has also resulted in higher exam scores, higher satisfaction for learning (Fantuzzo et al.,1989), as well as enhanced cognitive gains and lower stress levels (Fantuzzo et al., 1989; Rittschof & Griffin, 2001). This was also evidenced with commuter students enrolled in an upper-level Psychology course (Riggio et al., 1991). Lower anxiety levels and stronger course interest were also witnessed in an earlier study by Bobko (1984).

Some studies reported increased self-confidence related to concept mastery (Beasley, 1997; Bobko, 1984), an appreciation for the effort level involved for mastery (Bobko, 1984), and better study skills (Beasley, 1997) as a result of tutoring. Beasley (1997) reported that 70% of tutees thought their study skills improved as a result of participation in tutoring. Likewise, nearly 70% of the tutors in that study noted improved confidence on the part of tutees as evidenced by reduced hesitancy, greater vocal

participation, and decreased dependency on the tutor. While final grades were reported, there was no comparative data or control group used in the study. Likewise, a small *n* detracted from the generalizability of the findings. Unfortunately, Bobko's (1984) findings derived from anecdotal evidence based on conversations with his students rather than from objective or quantitative measures.

Peer tutoring has also been demonstrated to help the tutors themselves (Annis, 1983; Beasley, 1997; Bobko, 1984; Dvorak, 2001; Fantuzzo et al., 1989; Lidren & Meier, 1991; Loke & Chow, 2007; Medway, 1991; McKellar, 1986). By reviewing multiple times and reorganizing material in meaningful ways, tutors develop greater course knowledge (Medway, 1991). Greater content-specific and generalized cognitive gains have also resulted from the teaching inherent in tutoring (Annis, 1983). When students engaged in reciprocal teaching activities, they, too, scored higher on both domains (Annis, 1983). Tutors have also reported satisfaction in providing assistance to other students (Dvorak, 2001; Haley, 2003; Kowalsky & Fresko, 2002; Mynard & Almarzouqi, 2006); greater self-confidence and self worth (Beasley, 1997; Johansen et al., 1992; Loke & Chow, 2007); improved communication skills (Beasley, 1997; Bobko, 1984; Lidren & Meier, 1991); greater concept knowledge (Bobko, 1984); greater empathy and improved attitudes towards learning, academic progress and motivation, leadership, and career decision-making (Dvorak, 2001); enhancements in teaching (Lidren & Meier, 1991); leadership skills (Lidren & Meier, 1991; Mynard & Almarzouqi, 2006); and better time management skills (Loke & Chow, 2007).

Tutor Training

Advocacy for tutor training, supervision, and feedback is prominent in both journal articles (Cohen, 1986; Dvorak, 2004; Marsh, 2001; Maxwell, 2001; Medway, 1991; Rings & Sheets, 1991) and research studies (Johansen et al., 1992; Kassab et al., 2005; MacDonald, 1993). Professional associations and retention professionals consider tutor training a best practice (Reichert & Hunter, 2006), with groups such as the College Reading and Learning Association (CRLA) and the National Tutoring Association (NTA) providing guidelines, certifications, and increased professionalism for the field (Dvorak, 2004; Marsh, 2001; Maxwell, 2001). Currently, there are over 740 CRLA certified tutoring programs in the United States (CRLA, 2009).

But, perhaps the sagest remarks that support the use of tutor training came from Baxter Magolda and Rogers (1988), when they noted that the act of students working together does not necessarily produce critical thinking. This is evident when students ask each other questions at a knowledge or comprehension level, indicating an ability to simply define or describe information based on Bloom's taxonomy (National Teaching and Learning Forum, 1999). It is also seen when students change the conversation subject because they are unsure how to move beyond lower levels of thinking and reach application, analysis, synthesis or evaluation levels of thinking.

Thus, tutor training is now considered the norm for college programs (Marsh, 2001). As of the mid-1990's, 80% of four-year institutions offering tutoring incorporated training programs for staff (Boylan et al., 1994; Boylan et al., 1995). Some training programs incorporate mandatory seminars, workshops, or courses for credit (Boylan et

al., 1995), while others use a combination of videotapes, manuals, in-service training, or online tutoring manuals (Haley, 2003). MacDonald (1993) even promoted training models specific to group tutoring in an effort to manage the complexity of managing students' different needs and learning styles. Additionally, Norton (2001) has offered key recommendations for conducting tutor trainings.

Recommendations for training topics are proffered by both researchers and professional associations. Such topics include relational communication (Chadwick & McGuire, 2004); helping skills and positive reinforcement methods (Cohen, 1986); reporting procedures, program rules and procedures, rapport building, goal and objective setting, study skills and strategies, tutor ethics, time management, study skills, test taking, and anxiety reduction (Boylan et al., 1995); learning strategies, learning styles, and metacognitive strategies (MacDonald, 2004; Rings & Sheets, 1991); intellectual development of college students and student development theory (Baxter Magolda & Rogers, 1988; Rings & Sheets, 1991); collaborative learning approaches and learning how to summarize (Maxwell, 2001); strategies for helping students become self-directed (MacDonald, 1991; Rings & Sheets, 1991); referral skills, effective communication, active listening, and cultural differences (Rings & Sheets, 1991); learning disabilities (Rings & Sheets, 1991; Vogel, Fresko, & Wertheim, 2007); peer relationships and challenging situations (Vogel et al., 2007); and the use of probing questions (MacDonald, 2004), questioning techniques (Maxwell, 2001), question phrasing, and clarification (Medway, 1991).

Professional associations, including the College Reading and Learning Association (CRLA), have outlined certification requirements for tutoring programs (CRLA, 2008). These include amount and duration of tutor training, modes of tutor training, topics to be covered in tutor training, required tutoring experience, tutor selection criteria, and tutor evaluation criteria.

Common instructional methods for training include the use of role plays (Baxter Magolda & Rogers, 1988; Boylan et al., 1995; Brandwein & DiVittis, 1985); case studies, simulations and questioning methods (Baxter Magolda & Rogers, 1988); videos (Boylan et al., 1995; Haley, 2003); discussion groups (Boylan et al., 1995; Brandwein & DiVittis, 1985); and independent activities and observations of master tutors (Boylan et al., 1995). Additionally, trainers are recommended to incorporate detailed instructions for activities, demonstrate sensitivity to frustration levels, provide specific instructions for tutoring methods, and use positive encouragement with tutors (Baxter Magolda & Rogers, 1998).

Research has shown that students' academic success improves significantly when they receive tutoring from trained staff (Boylan et al., 1997). Boylan et al. (1997) found that students receiving tutoring from trained staff earned higher first-semester GPAs at both 2-year and 4-year schools, earned higher cumulative GPAs at 4-year schools, and earned higher passing grade rates in developmental English courses at both types of schools. An important aspect of this study was the fact that the researchers accounted for tutoring programs that did not utilize training.

In fact, students who received tutoring from trained tutors performed better (Schleyer et al., 2005), were more likely to have higher first semester grade point averages (GPAs) at both 2-year and 4-year institutions, earned higher cumulative GPAs, and were retained at higher rates at 4-year institutions (Boylan et al., 1997). Schleyer et al. (2005) found that peer tutors in an engineering course, who were trained in learning approaches, group techniques, brainstorming, and how to re-direct questions, enabled their students to generate different ideas, discuss approaches, and think through problems resulting in higher grades for exercises. The research by Boylan et al. (1997) was significant in that it examined not only institutions with tutoring programs, but specifically tutoring programs with training components. In doing so, they refuted previous studies that did not show an impact on student success because they were able to control for the positive effects of tutor training. An additional strength to the study was the large *n*. Boylan et al. (1997) used a random sample of six thousand students enrolled in one hundred sixty institutions (narrowed down from three thousand by a circular, systematic sampling procedure).

Other research also has demonstrated higher exam scores by students receiving tutoring from trained tutors (Fantuzzo et al., 1989), enhanced academic performance, and as much as a half letter grade better in tutored courses regardless of academic discipline (Chadwick & McGuire, 2004). In fact, significant differences were found when tutors received just one hour of learning styles training and thirty minutes of relational communication training (Chadwick & McGuire, 2004). However, although significant differences in students' grades were found in this study, Chadwick and McGuire (2004)

did acknowledge a small effect size. More experienced tutors also demonstrate significantly greater cognitive scaffolding than less experienced ones (Cromley & Azevedo, 2005). Thus, tutoring programs that offer training are considered more successful (Boylan et al., 1995).

In contrast, tutoring without the benefit of trained tutors has revealed limited impact on success (Boylan et al., 1997). Additionally, a lack of coordinated services and decentralized services detracts from student success and lowers grade performance (Boylan et al., 1997). Unskilled tutors are limited to a few helping strategies, notably question answering, giving explanations, and using collaborative problem-solving (Graesser et al., 1995). Greater tutor dominance and less opportunity for becoming self-sufficient is also common when tutor training is not received (Chadwick & McGuire, 2004).

Scaffolding

Peer tutoring has been shown to expand students' content knowledge through a concept called scaffolding, which involves breaking concepts into simpler ideas and parts and then rebuilding them to convey a big-picture perspective (Cromley & Azevedo, 2005; Dvorak, 2004; Sutton, 1998). In essence, the tutor provides the scaffolding by supporting the student through an activity until s/he feels comfortable with the concept and can demonstrate proficiency. Then, the tutor removes the "scaffold" and proceeds to the next topic (Dvorak, 2004; Puntambekar & Hübscher, 2005).

For example, a Biology tutor may determine that a student does not fully understand the purpose of cellular respiration. Through open-ended and reflective

questioning, the tutor determines that the student is confused with one particular part: glycolysis. The tutor may ask the student to refer back to her/his notes or the text for an explanation of the steps involved in glycolysis and the function it serves in cellular respiration. Then, the tutor might ask the student to summarize what s/he has just shared in her/his own words. The tutor could ask the student to not only explain the steps involved (energy investment phase and energy harvest phase), but also visually depict or draw the steps in glycolysis. The tutor might also have the student work backwards in the process or make a connection to another part of cellular respiration to verify the level of understanding that is being co-created. Each step along the way, the tutor may review foundational concepts, tap into different learning styles, ask open-ended questions, and provide verbal encouragement and support to help the student develop concept mastery. At the end of the scaffolding process, the tutor would be able to have the student effectively switch roles and "teach" the concept back in its entirety.

In doing so, scaffolding provides a valuable form of academic support often needed by many college students, as well as creates informal interactions whereby students test and apply content knowledge safely (Dvorak, 2004) without judgment or grading. Scaffolded learning corrects for weaker preparation and aids those who are underprepared for college-level coursework (Dvorak, 2001).

Inherently, then, tutoring is a means by which students socially construct knowledge (Cohen, 1986; Dvorak, 2004; Baxter Magolda & Rogers, 1988). Active learning strategies are one approach used in tutoring that requires greater demonstration and application of content knowledge compared to simple rote exercises (Dvorak, 2004).

"When students are able to extrapolate from knowledge and critically apply that knowledge to other situations, problems, or examples, they demonstrate a greater mastery over the subject content and are better prepared for using that knowledge beyond the scope of just one test" (Bailey, 2006, p. 3).

Essential to cognitive scaffolding is a mutual understanding of the goal or activity, coupled with continuous assessment of the person's level of understanding (Puntambekar & Hübscher, 2005). Such assessment can be manifest in question-asking and response activities, problem-solving, demonstrations, and as tutees explain concepts back to the tutor.

Moreover, the concept of scaffolding has its roots in Lev Vygotsky's educational theories, particularly an aspect of learning called the Zone of Proximal Development (ZPD). The ZPD is defined as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Cole, John-Steiner, Scribner, & Souberman, 1978, p. 86; Puntambekar & Hübscher, 2005). In other words, a student can perform a task with a tutor or adult that he/she would not be able to do on his/her own accord. In essence, tutors serve as a "more capable peer" and must gauge both the actual developmental level of each tutee and their potential learning (Nelson, 1995/1996). When tutees provide qualitative feedback to tutors, as part of knowledge assessment, it illustrates Vygotsky's emphasis on social interactions to achieve cognitive gains (Rittschof & Griffin, 2001). Thus, the very nature

of tutoring shares common ground with Vygotskian theory (Mynard & Almarzouqi, 2006).

Peer Tutoring Role and Strategies

Numerous tutor strategies have been described by researchers, including: asking questions (Baxter Magolda & Rogers, 1988; Fishbein et al., 1990; Graesser, Person, & Hu, 2002; MacDonald, 2004); brainstorming (Schleyer et al., 2005); verbal prompts (Chi, 1996); providing explanations (Roscoe & Chi, 2007); demonstrations (Baxter Magolda & Rogers, 1988); discussing methods, strategies, and content (Dvorak, 2004; Roscoe & Chi, 2007); problem-solving procedures (Dvorak, 2004); using examples (Dvorak, 2004; Roscoe & Chi, 2007); analogies (Roscoe & Chi, 2007); using drawings, diagrams, and other visual stimuli (MacDonald, 2004); giving explanations (Fishbein et al., 1990); summarizing (Fishbein et al., 1990; Roscoe & Chi, 2007); having tutees summarize their learning (MacDonald, 2004); calling on less conversational tutees to contribute in groups (MacDonald, 1993); silence (MacDonald, 2004); and scaffolding knowledge (Cromley & Azevedo, 2005; Dvorak, 2004; Puntambekar & Hübscher, 2005; Roscoe & Chi, 2007; Sutton, 1998). These types of active engagements help tutors identify knowledge gaps (Person et al., 1995) and remediate them.

Structuring the tutoring sessions also promotes greater co-construction of knowledge and subsequent learning. Graesser et al. (2002) proffer a 5-step framework involving a tutor question, student response, tutor feedback, multi-turn exchange, and tutor assessment through comprehension gauges. Additionally, by assigning specific tasks, tutors can help students focus on course content rather than socializing

(MacDonald, 1993). Tutor prompts for co-constructing knowledge have also been shown to improve learning (Chi, 1996). Whereas prompts can be made without course content knowledge, scaffolding students' learning does require content knowledge (Chi, 1996). Both strategies foster greater dialogue as opposed to one-time responses (Chi, 1996).

Additionally, discussing key ideas, principles and relationships, as well as finding errors and identifying misconceptions, all contribute to student learning (Roscoe & Chi, 2007). Similarly, the use of critical thinking or deep-reasoning questions, challenging the tutees' beliefs and knowledge, and having tutees develop their own explanations all promote greater learning (Graesser et al., 2002). Ultimately, it is beneficial when tutors teach their tutees to use these strategies independently as a way of creating self-sufficiency (MacDonald, 2004).

These efforts to actively engage tutees promote greater learning and minimize problems in the tutoring relationship. Common problems emanating from passive learning include tutors and tutees merely explaining information back and forth (MacDonald, 1991). Roscoe and Chi (2007) describe this as knowledge telling, which contrasts with knowledge building. Another concern is when tutors accept student affirmation of knowledge when it does not exist (Graesser & Person, 1994). Oftentimes, this occurs when students are unaware of missing knowledge (Graesser & Person, 1994; Person, Graesser, Magliano, & Kreuz, 1994) or when they are trying to be polite (Graesser & Person, 1994). Tutors can remediate this by listening for fragmented answers or uncertainty (Graesser et al., 1995), not trusting yes/no feedback, and asking detailed questions of tutees (Graesser & Person, 1994). Although one study found that 'good'

students provided more thorough responses to tutors' questions and were more apt to admit when they did not understand (Person et al., 1994), it is probably prudent to follow the aforementioned guidelines with all tutees.

Academic Department Tutoring

Currently, there is a dearth of information in the research literature regarding academic department sponsored tutoring. This researcher found only one study published about an academic department-based peer tutoring program, located at the University of Liverpool in England (Schleyer et al., 2005). Peer tutors were trained on different learning approaches, icebreakers, ground rules, session strategies, helping students brainstorm, redirecting questions, group dynamics, and listening skills. Student survey responses to the most effective teaching methods used by tutors included group discussions (35%), having them explain their ideas (25%), board work (10%), brainstorming (10%), individual help/advice (10%), drawing sketches (5%), and splitting group into threes for more discussion (5%). Unfortunately, there was no observational confirmation of the full range of techniques used. Additionally, larger groups were the norm rather than individual or small-group sessions, which are more common in the United States.

Although decentralized services involving remedial coursework and laboratories are often offered by individual academic departments in colleges and universities (Boylan et al., 1997), it is not known to what extent departments sponsor their own tutoring services, especially when tutoring programs exist on a campus. For academic departments in the United States who sponsor their own tutoring services, there is nothing

in the research literature to indicate how common training might be nor the types of topics covered.

A related study by Savage and Sharpe (1998) emphasized the need for graduate teaching assistants to receive training in effective teaching skills, supplemented with guided practice. According to their research, less than 50% of colleges and universities had any type of formal training in place for teaching assistants, with only three institutions specifically incorporating a teacher training component. Furthermore, as tutors gain more experience, one-on-one supervision becomes increasingly vital (Norton, 2001). Yet, there is no evidence in the research literature of whether this takes place in academic department tutoring or the quality of such supervision.

One study at an Australian University established a tutor training network to assist faculty and some graduate students serving as tutors, as opposed to peer tutors (Smith & Bath, 2003, 2004). Department representatives participated in a 'train the trainer' model, receiving instruction on types of learning, learning styles, communication skills, assessment, small-group teaching, and problem student interactions. However, participation problems were common, and tutor trainers were inadequately prepared to translate generic teaching practices into subject-specific situations. Moreover, tutoring at Australian universities is often geared towards larger groups rather than one-on-one or small group tutoring.

In another related study, it was noted that graduate assistants are recruited for teaching roles based solely on their grade point average, GRE scores, past area of study and interview performance (Savage & Sharpe, 1998). However, formal training and

instruction was often missing (Savage & Sharpe, 1998). Likewise, Koenig and Endorf (2003) emphasized the need for teaching assistants to receive training and practice on how to ask probing questions and utilize Socratic questioning. Similar logic can be extrapolated to graduate and teaching assistants who are hired as academic department tutors.

Additionally, Jordan, Phillips, and Brown (2004) emphasize the need for experienced supervision, mentoring, and feedback for beginning teachers. Yet, faculty members tend to view supervision positively when it involves graduate student research connected with their own interests (Kyvik & Smeby, 1994). Unfortunately, it is unknown how faculty members view supervision when the context involves tutoring. Correspondingly, when peer instructors receive limited guidance, supervision, training, or skill demonstrations, they employ a limited scope of instructional behaviors and do not include supplemental materials (Medway, 1991).

Given these limitations in the research literature, the instructional strategies applied by academic department peer tutors and the nature of tutoring in this setting remain unclear. To date, no direct comparisons have been done between academic department tutors and learning assistance center tutors who receive specific training.

Furthermore, given the high demands placed on faculty to conduct research, publish (Altbach, 2005; Benjamin, 1997; Miles, 1998), and acquire grant monies (Altbach, 2005), let alone maintain teaching loads, guide advisees, and serve on committees, there may be insufficient time and experience to engage in the hiring, supervision, and training of tutors. In one study, Colvin (2007) suggested that faculty in

communication studies were hesitant about the time required for integrating, training, and using tutors in their coursework. Faculty also may mistrust the effectiveness of peer tutoring given that they do not perceive students as subject authorities (Baxter Magolda & Rogers, 1988).

When individual academic departments sponsor their own tutoring services in lieu of using coordinated services and trained staff who already exist on a campus, it may raise concerns about the quality of tutoring provided, duplication of services, and the type of scaffolding that occurs for students receiving tutoring assistance. Thus, it is imperative that we learn more about academic department peer tutoring to understand whether such concerns are well-founded or misplaced.

Tutoring Environment

To date, there is little known about the tutoring environment in academic departments, particularly when compared to learning centers. One Finnish study by Honkimäki and Tynjälä (2007) investigated study strategies employed by graduate students earning degrees in English at two different universities. One university utilized peer tutoring while the other used staff tutoring. Although the term staff was not clearly defined, the fact that they distinguished this term from peers suggested that it involved professional staff at the university. They found that non-tutored students experienced significant motivational deficits in their second year, students tutored by staff were more vocationally oriented, and students tutored by staff emphasized practical knowledge more frequently. Essentially, they found that students in staff-tutored environments demonstrated greater self-regulation surrounding their academics.

CHAPTER III

METHODOLOGY

Design Introduction

The purpose of this study was to develop a better understanding of the nature of tutoring instruction of both trained and non-trained tutors, as well as the instructional strategies utilized by both, and how training informed the instructional strategies chosen by trained tutors. To address this issue, two types of tutoring formats were examined within a single university setting: appointment-based tutoring sponsored by the Learning Assistance Center and walk-in tutoring sponsored by the Chemistry department.

A secondary purpose was to examine the scaffolding that emerged for tutees. Although the researcher examined the ways in which this scaffolding took place, this was not the primary focus. Since the researcher based this from an observer's perspective rather than soliciting directly from the tutees or examining the impact of their learning in the form of test grades, these observations were incorporated into the discussion as well as the implications for future research.

Tutors were recruited from the Learning Assistance Center and the Chemistry department using concept sampling. This chapter describes the different procedures that were used to collect and analyze the data.

The study was guided by two primary research questions and several sub-questions:

1. What instructional methods are used by learning center tutors and academic department tutors, and how do they differ?
    a. What happens in academic department tutoring sessions?
    b. What happens in learning center tutoring sessions?
    c. How and why do tutors choose the particular methods they use?
    d. How did environmental differences among academic department and learning center tutors impact tutoring sessions?
2. What is the impact of tutor training on learning center tutors' practice?
    a. What is the impact on their behavior?
    b. What training has the most influence?
    c. What training has the least influence?

Case Study Design

This study used a case study design to address the research questions. Somekh and Lewin (2005) assert that case study is more of an approach to research based on a particular theoretical stance rather than a coherent form of research. In a case study, the researcher examines a program, event, activity, or process and is typically focused on individuals rather than groups (Creswell, 2003, 2005; Stake, 1995). When groups are the focus, the researcher is describing activities rather than shared behavior patterns (Creswell, 2005). Case study is a means of sharing peoples' stories so that we might better understand them and their experiences (Stake, 1995). Because the researcher collects significantly detailed information over protracted timeframes, typically only a few cases are examined (Creswell, 2003; Stake, 1995). Its strength lies in uncovering rich

details about people and issues, but often at the expense of not being able to generalize individual cases to a larger population (Somekh & Lewin, 2005). Yet, a case study design is effective for this research because it offers the investigator the ability to examine rich details concerning the nature of tutoring and instructional strategies in two different environments, as well as the opportunity to examine how tutors incorporate training into their work.

Creswell (2005) and Stake (1995) highlight three types of case studies: (a) intrinsic, involving an unusual situation or person's experience we want to learn about; (b) instrumental, which examines a particular issue that is broader in scope than just the person(s) studied; and (c) collective studies, where multiple cases are described and compared to help explain an issue. One way of understanding the differences between intrinsic and instrumental is that intrinsic focuses in on specific cases, whereas instrumental focuses on the dominant issues inherent in cases studied (Stake, 1995). Depending on the study and research questions, case study design may actually involve a combination of these types (U. C. Reitzug, personal communication, January 9, 2009).

Furthermore, the researcher can take on a variety of roles and must decide the nature of her/his involvement. S/he may serve as a teacher, advocate, evaluator, biographer, interpreter, constructivist, or relativist (Stake, 1995). Each role involves deliberate choices on the part of the researcher: how much to personally participate; the degree to which one acknowledges expertise; whether to be neutral or evaluative in nature; the extent to which s/he will meet the needs of readers; how much interpretation

is provided; how strongly one will advocate a particular stance; and whether the case study is shared as a story (Stake, 1995).

Typical data collection methods include individual or group interviews, observations, document analysis, and critical incident analysis (Somekh & Lewin, 2005). Interviews require the researcher to generate thought-provoking questions and probes as a way to evoke informative responses (Stake, 1995). This enables richer descriptions of experiences, explanations, and interpretations on the part of the participants. Interviews are also characterized by greater influence and control by the interviewer, whereas observations typically lack control and are, hopefully, more indicative of a naturalistic response on the part of participants (Stake, 1995).

Arguably, Stake (1995) proffered one of the more definitive set of guidelines or procedures for conducting observational case study. He described seven steps for this type of research: anticipation, first visit considerations, further preparation for observation, further development of conceptualization, data collection and validation, data analysis, and providing the intended audience an opportunity for understanding. Each step outlines activities and considerations for conducting effective field-observation.

In particular, this research study had elements of both instrumental and collective case study design. It was instrumental in that the researcher examined an issue that was broader in scope than the actual tutors studied. Specifically, the researcher was interested in understanding what happened in tutoring sessions conducted by both learning center tutors and by academic department tutors. Moreover, the researcher was interested in

learning how and why learning center tutors utilized their training knowledge and experience in their tutoring sessions. The tutors represented the means for examining these processes. Thus, the researcher identified particular cases, or individuals, that most accurately represented the typical nature of tutoring.

To accomplish this, the researcher interviewed and observed Chemistry tutors. Chemistry yielded a large volume of tutoring requests at the researcher's institution, involved coursework that involves both rote learning and critical thinking, and required a broad range of study skills. Participants included two tutors from the LAC and two from the Chemistry department. Thus, the unit of analysis in this type of research was the individual tutor. Additionally, by collecting data from both sets of tutors, as well as using several methods, the researcher decreased the risk of both "chance associations and of systematic biases" that would otherwise emanate from a singular approach (Maxwell, 2005, p. 112).

Furthermore, this research was a collective case study given that multiple cases were described and compared to help explain the issue. Specifically, the researcher selected a total of four Chemistry tutors; two from the learning center and two from the Chemistry department. Collectively, these four tutors represented multiple cases that expanded the researcher's knowledge of what happened in tutoring sessions that occurred in learning centers and academic departments and effectively answered the research questions posed. Additionally, these comparisons enabled a richer examination of how tutoring unfolded in two different contexts and environments. Notably, this involved comparisons of regular, weekly tutoring sessions involving learning center tutors with

walk-in tutoring appointments with Chemistry department tutors. Based on the researcher's professional experience with walk-in tutoring services, the context of the latter tutoring mode involved sessions that were typically more fluid in nature, often involved different students rather than the same slate of students, and had an infrequent quality to the interactions with the students who used the service. Comparing these two different types of tutoring services collectively enhanced the understanding of what techniques were used in both tutoring modes and what distinct differences and similarities existed.

Research Site

The research sites included multiple locations because LAC tutors were permitted to meet with their students in several academically-oriented locations. The researcher observed LAC tutors conducting sessions in the LAC "tutoring lab" and one of the tower floors of the university library. He selected these sites because they represented typical locations for LAC tutors at our university and provided insight into how tutoring was conducted and what strategies were used in these environments. Access to the LAC lab and university library was guaranteed by virtue of the researcher's professional position at the institutional research site. Furthermore, the researcher routinely conducted observations of tutors in these locations as part of his professional position. He discussed the proposed research and methodology with the director of the learning center and obtained his permission and the requisite agency letter for the IRB application packet.

Additionally, the researcher made comparative observations with academic department tutors from the Chemistry department. Observations were conducted in an

academic space designated by the department. The rationale for selecting the Chemistry department was predicated upon the knowledge that they advertised their own tutoring, did not provide training for their tutors, and because they did not place restrictions on their students utilizing department tutors versus the LAC tutors, which happened with one other academic department on campus. A distinguishing feature of the department tutoring was the use of "walk-in" tutoring appointments, where students utilized assistance infrequently and for varied amounts of time. This differed from the learning center tutoring, which consisted of weekly commitments on the part of students who requested assistance. Those sessions spanned one-hour time frames weekly.

The researcher discussed the proposed research and methodology with both the Chemistry department chair and faculty liaison for department tutoring. He emphasized that this information would be used exclusively to generate a better understanding of the nature of tutoring by their tutors and the types of instructional strategies used. He also clarified that this research would be used for the purposes of completing his dissertation and adding to the general body of research knowledge rather than for political gain on campus. They were excited about the proposed research and also provided an agency letter for the IRB application packet.

Finally, all tutor interviews were conducted in a small, private meeting space in the university student center. Although this location afforded privacy for the interviews, the main reason for selecting it was to provide a neutral, non-threatening location for staff, particularly the LAC tutors, to share their viewpoints. This was critical because the

researcher wanted to provide some degree of physical and psychological distance from his usual role as their supervisor.

Participant Selection

In order to connect this research back to the conceptual framework, the researcher specifically chose to use concept sampling to develop information rich data. Creswell (2005) defines concept sampling as "a purposeful sampling strategy in which the research samples individuals or sites because they can help the researcher generate or discover a theory or specific concepts within the theory" (p. 205). For this research, concept sampling allowed the researcher to utilize specific sites and tutors in order to better understand the types of instructional strategies used by both learning center tutors and academic department tutors. It also enabled the researcher to better understand the type of scaffolding that occurred as a result of those instructional strategies. Further, it allowed the researcher to make a direct connection to all the ways in which learning center tutors specifically incorporated their training. Maxwell (2005) emphasized the value of this approach in terms of achieving representativeness and revealing differences between settings and individuals.

Four tutors were selected for this case study: two from the Chemistry department and two from the LAC. Each of these four tutors represented an individual case. With each case, the researcher attempted to understand that person's tutoring, what she or he specifically did in tutoring sessions, and why she or he tutored that particular way. The researcher focused on Chemistry tutors given that this was a highly requested subject for tutoring in our learning center and because the researcher had access to academic

department tutors in this subject. Notably, the researcher had strong relationships with the faculty in our Chemistry department. This facilitated access to, observation of, and interviewing these academic department tutors.

The tutors selected for this study were involved in introductory coursework assistance. At this institution, the two introductory Chemistry courses for science majors are CHE/111 (General Chemistry I) and 114 (General Chemistry II). Additionally, tutors often assist students enrolled in an Introductory Chemistry course (101) taken by students whose majors require one semester of science or the General Descriptive Chemistry (103) for students whose majors require one year of college chemistry. Focusing on these courses offered the advantages of comparing tutors who share similar roles, cover similar course content, and involved subject content generally understood by the researcher.

The LAC tutors were chosen based on having been employed at least one semester as a tutor for introductory Chemistry courses and having completed the first level of tutor training (which consists of ten training topics spanning a total of ten hours of training). The Chemistry department tutors were selected based on both their course coverage and the times they worked. Out of twenty academic department tutors, ten specifically tutor 100-level coursework and labs at times that did not conflict with weekly professional obligations that the researcher was unable to reschedule.

Given that the Chemistry department structured their tutoring sessions as “walk-in” sessions, there was no way to ensure the same students would be present. Additionally, during a given tutoring period, numerous students had access to the tutor. There was also variation in terms of how long service was provided to each tutee. This

proved to be important in terms of understanding the tutoring environment and the level of scaffolding. An initial concern for the researcher was that there may have been insufficient time to accurately gauge the full complement of instructional strategies used by the tutor. However, this was not the case given that seven observations were actually conducted with each academic department tutor.

The researcher consulted with the Chemistry department faculty member who oversaw the department's tutoring services. The faculty member was unable to determine consistent patterns when students utilized tutoring. Furthermore, given the researcher's other professional responsibilities, it was impractical to sit in their tutoring space in the hopes that students would come by for assistance. Consequently, to maximize the opportunities for observing walk-in tutoring sessions, the researcher invited all walk-in Chemistry department tutors to participate in the study. For the ones who agreed, the researcher selected several who had tutoring times that enabled him to attend without presenting conflicts with my full-time professional responsibilities. In the event that the researcher was not present during one of their sessions, he asked them to call or send a text message to his cell phone when a student arrived for tutoring so that he could attend the tutoring session.

Each tutor was provided with an informed consent form in accordance with IRB procedures (Creswell, 2005). The consent form clarified the voluntary nature of participation, the right to withdraw, the purpose of this research, the procedures and methods utilized, the right to ask questions, the right to obtain results of this research, the right to have anonymity, a declaration that there were no known risks involved in

participation, and the benefits of this research. Each person was asked to sign the consent form. The forms were secured in a locked filing cabinet in the researcher's office.

Data Gathering Methodology

The researcher specifically chose a case study method for this research because he was interested in generating information rich data to help better understand the nature of a process; in this case, tutoring from two different perspectives. Individual interviews, non-participant observations, and member checking were the primary methods of data collection. These methods were deliberate in that they provided the researcher with the best means for answering the research questions to the fullest extent possible.

Maxwell (2005) noted that "methods are the means to answering your research questions" (p. 92). Given that statement, the researcher recognized his limitation in anticipating all the potential beliefs that tutors espouse about their roles and the nature of their work. Further, the research literature did not provide the researcher sufficient information to identify all the variables that would aid in developing a comprehensive survey. Thus, it would have been very limiting to simply ask tutors to complete a survey. In addition, the researcher anticipated that tutors would reveal information about the nature of tutoring that would allow him to ask more probing questions that he had not already established. Furthermore, the researcher anticipated that he would witness specific strategies and scaffolding through observation that would not immediately come to mind for a tutor during either an interview or a survey. Often, this was dictated by a particular student's needs or learning obstacles that forced the tutor to adapt to the situation.

The researcher began this research by conducting one-on-one interviews with each tutor selected for the study. From prior experience, the researcher found tutors to be generally quite articulate and familiar with conveying information in a more personalized way that reinforced this format over a focus group. The researcher also chose interviews as the first method because he wanted to first understand tutors' beliefs about their own tutoring. The interviews revealed how tutors characterized their roles, how they characterized their tutoring sessions, how they assisted students (i.e., strategies) with their content questions, and what their perceptions were of how students responded to their approaches and strategies. LAC tutors also helped the researcher understand what training was significant for them and in what ways training impacted their behavior. Tutor interviews were taped using digital recorders and then transcribed for coding purposes, theme development, and inductive analysis.

The interview protocol (see Appendixes C, D, and E) provided for six questions to be asked of each participant. However, the interview format was semi-structured to allow greater flexibility in adapting to information provided by the tutors. Consequently, when a tutor's commentary provided insight into unanticipated areas, the researcher adapted by asking additional probing questions to generate more information.

The researcher then used non-participant observations to look for evidence of instructional strategies, scaffolding techniques, and as a way to avoid interfering with the actual tutoring instruction and learning process of students. Consistent with Creswell (2005), an observational protocol (Appendix F) was used to record a description of the tutoring activities, what was said during a tutoring session, and to generate reflections

and themes. Moreover, this enabled the researcher to generate confirmatory data and compare what tutors do, say, and produce, in terms of tutoring with what they indicated in the interviews. Each tutor was observed a minimum of six times, with academic department tutors observed seven times. This was done to ensure that no new data or patterns emerged. Non-participant observations also minimized the reactivity that the researcher had on the setting, the tutors, and the students. A related validity threat existed with respect to LAC tutors and is addressed in that section of the chapter.

The frequency of these non-participant observations enabled the researcher to address the research questions and sub-questions, as well as identify discrepancies between what the tutor thinks s/he does and what actually takes place. One distinct difference occurred with observations of LAC tutors. These tutors typically maintained the same slate of tutees throughout the semester. This meant that the researcher was able to observe each tutor with the same student or a similar group of students. In contrast, the structure of academic department walk-in tutoring sessions enabled students to attend a single session, attend on an infrequent basis, or come every session. The benefit of observing LAC tutors with the same or similar students was the ability to gain greater insight into the level of scaffolding that occurred.

Member checking occurred through secondary and final interviews, as well as debriefing sessions following each non-participant observation. The debriefing protocol (see Appendix G) enabled the researcher to immediately process what happened during a tutoring session to ensure that the tutor could remember with greater accuracy. The second and third formal interviews were conducted after the third and sixth observations,

respectively, as a way to determine what the tutor thought occurred during the span of several tutoring sessions. Specifically, the researcher asked similar questions to the first interview and focused on any discrepancies that occurred between the initial interview and what he observed. The researcher also asked the tutors' to reflect on their thought processes regarding how and why they were employing particular strategies during their tutoring sessions. All three formal interviews were recorded and transcribed.

Finally, by utilizing two different methods and member checking as a form of data collection, the researcher was able to effectively triangulate his information, acquire a more thorough understanding of the nature of tutoring, and generate better conclusions.

A crosswalk matrix is provided in Appendix H to illustrate how the aforementioned data collection methods map on to the specific research questions.

Role of the Researcher

The researcher's role was that of a non-participant observer, especially during observations of the tutoring instruction taking place. Furthermore, the researcher took specific steps to protect his objectivity given that he was invested personally and professionally in the field of tutoring. First, the researcher incorporated "neutral" sites in the student center for the interviews as a means of achieving some physical and psychological distance for the LAC tutors whom he supervised. Second, the researcher added an explanatory clause to the interview process which stated that

> the commentary provided by the interviewee will not be used in any way for supervision or employment purposes for LAC tutors . . . If the tutor feels otherwise at any time, s/he has the right to stop participation in this dissertation and notify the Student Success Center Director immediately about her/his concerns.

Third, pseudonyms were used when referring to each of the case study participants, thereby insuring their respective confidentiality.

Furthermore, the researcher thought it was critical to take additional steps in minimizing the potential subjectivity he may have had in this research given the nature of his professional position. Therefore, he discussed his data collection, analysis and final reporting with the faculty member who coordinated the Chemistry department tutoring. The researcher solicited feedback about his analysis and interpretations so that it did not unduly favor learning center tutors over academic department tutors.

Procedures for Data Analysis

Maxwell (2005) and Creswell (2005) both addressed the importance of conducting continuous data analysis following each interview or observation. This emerging design (Creswell, 2005), based in grounded theory research, helped the researcher determine when he needed to make adjustments to his interview and observational protocols. It also informed the researcher of additional data he needed to search for in subsequent interactions. This was especially critical with respect to understanding the nature of academic department tutoring because the researcher had no basis for knowing a priori the strategies they used, to what degree scaffolding occurred, nor the manner in which they viewed their roles. The design was also inductive given that constant data analysis allowed the researcher to identify patterns, generate themes, and advance his understanding of tutoring from a narrow viewpoint to a broader one.

Transcription of each tutor interview began immediately after each session and prior to the next interview. As mentioned in the methods of data collection section, the

researcher used a digital voice recorder for each interview. He transcribed each recording by hand. By transcribing each interview personally, the researcher had greater familiarity with the data and was more intentional with each of the observations he conducted.

Coding using Creswell's (2005) method was conducted for each interview. The researcher developed a preliminary set of codes based on his conceptual framework, which incorporated the use of tutor strategies, the reference to training knowledge, and how tutors viewed their roles and experience (see Appendix I). The codes dealt with strategies and training knowledge that were reflective of both the types of training provided to LAC tutors as well as topics mentioned directly in the research literature, such as relational communication (Chadwick & McGuire, 2004). Because academic department tutors did not receive training, there was a distinct possibility that the initial coding scheme might have been limiting in terms of application. Therefore, an important addition to the analysis came from data coding memos. During coding, the researcher generated memos as he read back through each transcript. Memos facilitated analytic insights about the data (Maxwell, 2005) that did not come from pre-established codes that the researcher used to categorize the data. Furthermore, the memos not only helped the researcher determine if his codes were appropriate or needed expansion, but also helped him generate themes about the data. This rearrangement, or fracturing, of the data was an integral part of qualitative research (Maxwell, 2005).

Afterwards, the researcher identified four types of themes based on Creswell (2005). These included:

- ordinary themes that the researcher expected to find based on the research literature and/or his experience;
- unexpected themes that spoke to some new aspect of scaffolding, particularly as it related to non-trained tutors;
- hard-to-classify themes, which tended to stand alone or not group well; and
- major and minor themes

Then, the researcher layered his themes in order to move from specificity to broader levels of conceptualization. A side benefit was the additional rigor this added to the study (Creswell, 2005).

A final consideration in the researcher's data analysis was the fact that his research questions asked about the nature of tutoring across different types of tutors. Maxwell (2005) asserted that connecting strategies was appropriate for such questions—provided they were not used exclusively—because they dealt with similarities or differences among individuals and settings. Thus, to balance out the other data analysis methods selected, memos and categorizing strategies, the researcher used member checking with each tutor through debriefing interviews following each tutoring observation, as well as a second and third formal interview following the third and sixth sessions, respectively (discussed further in the trustworthiness section).

Trustworthiness

In order to develop information rich data to address the research questions, the researcher conducted both semi-structured, one-on-one interviews and non-participant observations of both learning center tutors and academic department tutors. In doing so,

the researcher was able to address validity concerns by triangulating information (i.e., comparing what the tutor says s/he does against what the researcher observed). Additionally, by collecting data from both types of tutors and in different settings, as well as using several methods, the researcher decreased the risk of both "chance associations and of systematic biases" that would otherwise emanate from a singular approach (Maxwell, 2005, p. 112).

To further enhance his validity, the researcher conducted member checking with each of the four tutors participating in the case study. This was accomplished by holding debriefing interviews that lasted between ten and fifteen minutes following each observation. This was done to ensure that both groups of tutors could accurately remember what transpired during their respective tutoring sessions, as well as affording the researcher the opportunity to raise questions about discrepancies that may have occurred between actual tutoring practice and the tutors' interviews. Conducting these two types of validity checks fits with Creswell's (2005) recommendations of appropriate practice.

Additionally, the researcher purposefully conducted multiple observations of each tutor participating in the study. This was particularly crucial with respect to LAC tutors since they knew him as a supervisor and/or trainer. Because this bias represented a validity threat (previously referred to in Chapter I as "backyard research"), the researcher felt it was important to conduct multiple observations until no new data or patterns emerged. It also helped reduce the chance that an LAC tutor tried to incorporate something atypical into their sessions out of a belief or desire to please him simply

because they know the researcher in a different role. The researcher believed that it would be difficult to maintain such an effort over the course of six, one-hour sessions, particularly while focusing on the content knowledge the tutors were trying to help the student understand.

Summary

It is essential that research-practitioners continue to investigate how different tutoring formats and settings impact the learning process for college students. To this end, the researcher used a case study design to examine how academic department and learning center tutors at one institution selected strategies to assist students and explored the tutors' rationale for using such strategies. Moreover, the researcher studied how tutor training has specifically impacted learning center tutors' behavior and strategies. The use of case study design enabled the researcher to generate rich data and information that would not have been possible through other methods such as survey design. In addition, triangulation using direct observations of tutors' methods enhanced the trustworthiness of this study. The researcher intended for the data analysis and discussion to fill gaps in the research literature and expand the understanding of this important service on university campuses.

CHAPTER IV

RESULTS

Introduction

The purpose of this study was to develop a better understanding of the instructional strategies used by learning center and academic department tutors, how training impacts the selection and use of particular strategies, as well as the resulting scaffolding that occurs for the tutees.

The research questions that guided this investigation were:

1. What instructional methods were used by learning center tutors and academic department tutors, and how did they differ?
    a. What happened in academic department tutoring sessions?
    b. What happened in learning center tutoring sessions?
    c. How and why did tutors choose the particular methods they used?
    d. How did environmental differences among academic department and learning center tutors impact tutoring sessions?
2. What was the impact of tutor training on learning center tutors' practice?
    a. What was the impact on their behavior?
    b. What training had the most influence?
    c. What training had the least influence?

In this chapter, the results of data collection will be presented to show what happened during each tutor's tutoring sessions, how learning center tutors and academic department tutors compared to and differed from one another, how the different learning environments affected tutoring sessions, and how training impacts learning center tutors. Finally, four major categories of themes, as outlined by Creswell (2005), will be reported to provide a clearer perspective on the results obtained.

Demographic Information

The four tutors selected for this study were identified through concept sampling as outlined in Chapter III. Specifically, the two learning center tutors were selected based on several factors: (a) they both had completed at least one level of tutor training (ten sessions) in the tutoring program; (b) they both could tutor the introductory level chemistry classes for majors and non-majors; and (c) they both had been assigned tutees to work with at the time the research began. Given the nature of appointment-based tutoring conducted by the learning center tutors and the schedule of their tutoring sessions, the researcher was able to observe one tutor with the same student for all six sessions. The other tutor was observed with two different students over the course of the six observations.

The two academic department tutors were selected from a pool of twenty graduate assistant tutors. Two graduate assistants were immediately removed from consideration since they had previously worked for the learning center during previous semesters. This previous experience meant that they would have conducted their tutoring sessions differently than their department peers who had not received training, thereby introducing

a bias to the study. The remaining group was narrowed to ten tutors who expressed interest in the research and who subsequently gave informed consent. From there, the researcher was able to narrow down the pool to two final research participants based on their ability to maintain consistent communication with the researcher about scheduling issues and because these tutors consistently had students attending their walk-in tutoring sessions.

There were three distinct labs (CHE/110, 112, and 115) taught at the introductory level, which correspond with the introductory classes (CHE/103, 111, and 114). Each Chemistry department tutor's primary responsibility is to serve as a Teaching Assistant for one of the introductory chemistry labs. Subsequently, each is expected to provide one hour of walk-in tutoring each week in the department's tutoring lab. Nearly every tutor observation consisted of the academic department tutors working with different students. Based on the tutors' comments during interviews, there were only a couple of students who attended more than one walk-in tutoring session.

Each tutor is profiled below to help the reader understand their unique characteristics.

"Lisa"

Lisa is a senior chemistry major. She has worked for four semesters as a chemistry tutor for the learning assistance center, assisting with 100-200 level coursework. During this study, Lisa tutored students enrolled in Chemistry 103 and 111. While she had five tutees assigned to her, she was specifically observed with three tutees based on her tutoring times. She kept the same slate of tutees for the entire semester. At

the start of this research, Lisa had accrued 137.25 tutoring hours and completed 20 hours of tutor training (thereby earning her first two CRLA international certifications). By mid-November, she had completed all 30 training hours with the LAC, thereby earning her third CRLA certification. Lisa describes herself as being very extroverted and passionate about her major and says that she brings this enthusiasm into her tutoring sessions. She plans to pursue graduate studies in Chemistry in fall 2010.

"John"

John is a senior biochemistry major. He is beginning his sixth semester of employment as a learning assistance center tutor in 100 level chemistry and 100-200 level biology coursework. During this study, John tutored two students enrolled in Chemistry 103. He was specifically observed with one tutee for all six observations. Similar to Lisa, John met with the same tutees for the entire semester. At the start of this research, John had accrued 192 tutoring hours and completed all 30 hours of tutor training (thereby earning all three CRLA international certifications). Most semesters, the majority of his tutees have been enrolled in various 100 level courses in chemistry. John is equally passionate about his academics and boasts that the tutoring has enabled him to maintain a 4.0 grade point average for the last five semesters of his employment. John is diagnosed with a learning disability specifically ADD. John plans to pursue graduate studies in fall 2010.

"Kelly"

Kelly originally hails from the northeastern United States. She just graduated from a small, high-caliber, private institution in the Southeast and has entered the

master's program in Chemistry. Kelly speaks very quickly and seems to process information equally quickly. She is very extroverted and often discussed many personal things outside the context of this research study. Kelly serves as a Teaching Assistant for one of the Chemistry 110 labs (associated with the Chemistry 103 course) and provides one hour of walk-in tutoring weekly for the department. She also tutors one student privately, and she has tutored privately during high school and college.

"Oscar"

Oscar is a candidate in the master's program in Chemistry. He graduated from the same small, high-caliber, private institution as "Kelly." He is interested in research and possibly going on to medical school. Oscar has a diagnosed learning disability, specifically ADHD. His tone is quieter than Kelly's, and he is slightly introverted. Yet, he enjoyed sharing in our interviews and debriefing sessions. Consequently, the researcher developed richer data from Oscar's responses compared to Kelly's responses. Oscar serves as a Teaching Assistant for one of the Chemistry 112 labs (associated with the Chemistry 111 course) and was slated to provide one hour of walk-in tutoring weekly for the department. By choice, Oscar added an additional hour of walk-in tutoring about halfway through the semester. Oscar also tutors one student privately.

Data Analysis

Research Question 1

1. What instructional methods were used by learning center tutors and academic department tutors, and how did they differ?
    a. What happened in academic department tutoring sessions?

b. What happened in learning center tutoring sessions?
c. How and why did tutors choose the particular methods they used?
d. How did environmental differences among academic department and learning center tutors impact tutoring sessions?

What Happened in Academic Department Tutoring Sessions?

During their first interviews, the academic department tutors indicated that their tutoring sessions typically focused on homework assignments, lab questions, and lab problems (e.g., math problems, balancing equations, chemical reaction rates [kinetics]). Commonly, tutees attended walk-in tutoring immediately before the assignment was due. Both department tutors also noted that it was less common for tutees to have broader concept questions about rules and relationships in chemistry. Kelly interpreted this to mean that there was a communication barrier between what was written in the lab materials and how the instructor explained information during the pre-lab or lab. Specifically, ". . . the way it was explained to them wasn't, you know, wasn't good for them." She also noted that students commonly have difficulty articulating their questions. In other words, she said, "they don't know what they don't know." Oscar indicated that he tried to use questions to guide them rather than giving answers, as well as showing them how to actually do certain calculations. In other words, he valued modeling the homework or lab problems as a way to help them understand the calculations. He also cited that students frequently do not bring all their materials to tutoring, especially their textbooks. Oscar interpreted this to mean that students viewed the lab assignments as

being distinct from what was discussed in class. Oscar also shared that the class was moving at a faster pace in covering concepts than what was employed during lab times.

These descriptions persisted during the second interview. Both Kelly and Oscar indicated that their tutoring sessions were very "fact-driven" and less about conceptual issues. Students tended to emphasize concerns with their labs and homework questions. Moreover, both department tutors shared that there was a significant time constraint given the number of tutees attending their sessions. Consequently, this created a sense of feeling rushed for Kelly and "tutoring on the fly" for Oscar. This theme also emerged during the debriefing interviews. During her second debriefing session, Kelly stated that she felt the pressure of time and tended to rush "particularly if there are lots of students like today" and because she knew she needed to leave for her own class afterwards. Additionally, each tutor noted that there was a disconnection still present between the lab and the actual course. Oscar described this by saying, "…the lab is often ahead of the coursework."

Given the fact that several weeks elapsed between the first and second interviews, both tutors had the opportunity to reflect on the few students who were attending tutoring on a regular basis. Kelly indicated that she gave more focus to the tutees who were repeat customers. Although she stated that she cared about the others' academic welfare, she believed they could just as easily use the other walk-in tutors for assistance. "I'm not their . . . only source of information . . . I don't always feel that I'm completely and totally responsible for their, you know, academic success." Similarly, Oscar indicated that the repeat tutees demonstrated the real desire to learn. In particular, he noted that he

could see some improvements among his tutees. When asked about this, Oscar said it was evident by the fact that "they take less time to answer a question that I give them . . . they are also able to make relationships, uh, between different concepts." However, one frustration that emerged related to the fact that most students in his lab seemed oblivious to the tutoring times and days despite multiple reminders and advertisements.

These experiences persisted over the span of Kelly and Oscar's tutoring sessions. By the third and final interview, both tutors stated that their sessions remained primarily "fact-based," which, to them, required more explanations and telling on their part. Both independently agreed that their tutees often lacked critical knowledge or information that precluded them from making connections between concepts and being able to solve problems on their own. Despite this observation, Kelly felt that she was better able to identify common problems among her tutees and take less time to figure out what to do to address their learning obstacles. The large number of students who attended walk-in tutoring still presented significant challenges, particularly for Oscar. Consequently, after the second interview, Oscar began offering a second tutoring session on Thursdays during the early evening hours. He shared that he was the only tutor to do so and was often asked by his peer teaching assistants why he bothered when the students were not making enough of an effort to learn the material on their own accord. His response to that was "Well, I want to make them care!" Similarly, in the debriefing interview following session two, Oscar remarked that other teaching assistants made remarks to him like, "Students don't think for themselves. They're not being inquisitive or thinking like a computer."

Kelly and Oscar agreed that one of the major obstacles they encountered was the ability of tutees from all three lab levels (110, 112, and 115) to attend any walk-in tutor's sessions. Given that the tutors had not performed lab experiments other than their own, it often took longer to figure out the purpose of other labs, what information was being solicited from the lab questions, and how best to guide these students. Kelly admitted to feeling intimidated, which was compounded by the lack of support materials for other labs.

> . . . you sort of have to figure out what subject they're doing. Try to remember everything you need to know about that subject. Um, and then figure out, you know, the specific application that they're, that they need. And then, try to explain it to them in terms that they're going to understand. And it's, it's a little scary when you don't know what they're going to ask you. So that, that moment when you say, "Hey, can I help you?" is actually kind of scary. Because you have no idea whether you're going to be able to help them or not.

Her fears involved several factors: not knowing in advance what students were likely to ask in a session; having to accurately gauge what concepts were involved in other labs; trying to remember certain concepts from other labs; finding ways to explain concepts in ways that made sense to tutees; and feeling "crushed" if she was unable to help them. As Kelly described it, ". . . that's one of the most, like, *crusshhhinnng* feelings I've ever, I've had. Is to not be able to help someone when, you know, when they came to me expecting help."

Another obstacle related to students' knowledge about the availability of tutoring. Oscar stated that he continued to provide reminders to his lab students about tutoring days and times. However, the vast majority still did not seem to pay attention to this

information. This was reflected by both tutors in terms of how few of their lab students actually attended their tutoring sessions versus the number of students from other labs who chose to attend. It was also manifest in the lower number of tutees who attended more than one or two tutoring sessions.

Oscar also reported that his strategies remained consistent during his tutoring sessions. Specifically, he started with questions to help gauge their knowledge, asked more questions as they responded, and resorted to telling them how to do something step-by-step if they continued to struggle. In order to handle the volume of students attending his walk-in sessions, he affirmed that he tried to find a common problem or activity to focus everyone's attention on.

The researcher's observations also provided insight into what happened during academic department tutoring sessions. Beyond the first observations of each tutor, it was more common for multiple students (five or more) to be present during walk-in tutoring. During those sessions, there were typically multiple conversations taking place. As a result, the sessions themselves could be characterized as noisy and somewhat chaotic. The tutors had to physically move around the room frequently to ensure that they addressed each tutee's questions and learning needs, which meant that it was hard for Kelly and Oscar to balance their attention on everyone, particularly given the diverse range of the tutees' questions and learning obstacles.

Moreover, when students from different labs attended tutoring, it often took longer for both academic tutors to process what the assignments or labs involved and how to help address the tutees' questions. For example, Oscar and Kelly both asked lots of

clarification questions in order to determine the gist of the lab assignments. Furthermore, many students were at different stages in their level of understanding, at different places in the lab assignments or homework, and varied in terms of how much time it took for them to process and understand the material. Consequently, it was difficult for either tutor to select a common problem for the group to work on. At best, tutees subdivided into smaller groups—either by choice or by a tutor's direction—to work on a particular lab question. Thus, the researcher's observations matched both tutors' descriptions of feeling rushed and not being able to provide as much time as necessary to each person.

Neither tutor engaged in much relational communication with their tutees. Kelly and Oscar were apt to start their tutoring sessions by jumping immediately into the tutee's lab and homework questions. Typically, there was no time spent chatting beyond a simple hello at the start, which sometimes was not even present. However, the atmosphere was not unfriendly or hostile. Rather, there was simply an air of wanting to focus on the task at hand or "getting down to business." When asked about this, Oscar acknowledged that this was the typical modus operandi. This may have been a product of having such large groups of students to focus on and less of a relationship built with students due to fewer repeat attendees.

An additional observation made by the researcher was that Oscar was a few minutes late for four of the seven tutoring sessions observed. During one particular tutoring session that this occurred, the previous tutor remained for fifteen additional minutes past his shift because there were so many tutees seeking assistance. However,

when Oscar was late, he usually remained past his session time to compensate for his tardiness.

What Happened in Learning Center Tutoring Sessions?

In contrast with walk-in tutoring sessions provided by the academic department, the learning center tutoring sessions were appointment-based. In this study, toth learning center tutors met weekly with the same slate of tutees for the entire semester. In general, the only time this would not occur was if tutees dropped their course or decided to drop the tutoring service. Both learning center tutors were observed with lower level Chemistry courses. Lisa assisted students with Chemistry 103 and 111, whereas John assisted his students with Chemistry 103.

Both learning center tutors described their tutoring sessions in very similar ways to one another. In particular, they established expectations at the onset of the tutoring relationship, notably by use of a tutoring contract. This involved spoken and inferred expectations provided by the tutors. For example, Lisa stated:

> I ask them to come with questions, their textbooks, and any materials they have . . . they usually have questions for me. And, then, if they don't have questions, then I usually tend to look through their notes with them and I'll make up my own questions.

John also described a particular structure and set of expectations to start each tutoring session:

> Usually at the beginning, you know, it's meet and greet for a couple of minutes and ask how they're doing. And then, try to find out if they've had any recent quizzes, tests, anything they've had trouble with . . . and then, usually I'll go and ask if they have any particular questions, anything they've had trouble with in the

> content. Of course, I expect them to come up their own list of questions before the session starts.

This "meet and greet" enabled John and his tutee time to catch up personally, provide a transition into the session, and establish personal connections with one another. John and Lisa both incorporated an expectation that their tutees come prepared with questions for their tutoring session.

Similarly, both indicated that they demonstrated flexibility in terms of the structure and adjusted their strategies to their tutees' needs. For example, Lisa shared that "if they are prepared . . . I let them lead . . . and, they design the tutoring structure and what happens. If they're not prepared, then I . . . take the lead." Typically, the sessions began with the tutees' questions, progressed into practice problems and opportunities to guide students through the critical thinking process, and involved time for reviewing concepts and quizzing students on how effectively they retained information or understood details and the big picture perspective. John also stated that he checked with his tutees about previous quiz and test results in order to determine what problems were missed. Lisa and John both remarked on the importance of having the tutee apply knowledge often and engage in teaching concepts back to the tutor in a process called reciprocal peer tutoring (RPT).

Scaffolding their tutees' learning was paramount in both interviews. John elaborated on scaffolding through the following description:

> You start pretty much at the bottom level. After you've broken it [the concept] down into pieces, and you slowly work your way up piece by piece. Kind of build a little bridge, if you will, to the next concept or the next part of it. And, if they

> can't quite get it themselves, you kind of push them slowly up until they can understand it themselves. And, you keep going, slowly, one piece at a time until they've built the whole thing. And then you go back and see if they have that whole concept.

They indicated that it was essential not to simply assume that a tutee understood certain information, but to have the tutee actually demonstrate knowledge through application. In fact, Lisa was forthright in stating, "I don't always trust students when they say, 'Oh, I totally know it' when they read off their notes. So, I do a lot of question asking." Additionally, John added that he summarized his sessions at the end and often provided additional tasks for the tutee to complete.

During the second interview, Lisa reiterated many of the same descriptions she provided the first time. In particular, she emphasized the value of being flexible with the structure of tutoring and changing her strategies to best meet the needs of her tutees. Lisa remarked that different levels of guidance were necessary for each tutee. "One student, I feel like I have to be more involved in the process of breaking down the problem. While another one, I can kind of get her started . . . she can do the rest." She reiterated the value of starting tutoring with the tutees' questions before progressing to ones she thought of to test the students' knowledge, incorporating quiz time using open-ended questions, evaluating the accuracy of the tutee's knowledge, and repeating concepts and information in order to help the student encode information in their long-term memory. Another major feature of her sessions was to utilize lots of practice problems in order to help the student better prepare for class and tests. A major challenge for tutees is that practice

problems are “just reworded differently . . . and that freaks people out. And so . . . I get her to compare the problems . . . and see how they’re different.”

John was much more specific during the second interview regarding what happened during his tutoring sessions. Specifically, he commented that his current tutee “has made progress that normally is not made in that short of an amount of time.” John indicated that the sessions were productive based on her ability to demonstrate critical thinking in response to questions he asked or practice problems he posed. Based on her responses, he believed she was “learning to think a little more critically for herself” and rely somewhat less on him for guidance, particularly before attempting to solve practice problems on her own. John also noted that she was beginning to display some self-confidence. However, he stated that limited scope of topics covered in class meant that he did not have “as much of a chance to employ a lot of the methods I normally would. It’s been rather selective.”

For the final interview, Lisa conveyed that there was consistency in her strategies over the span of the researcher’s six observations. Specifically, she utilized open-ended and Socratic questioning, used analogies, used games, employed visuals, and scaffolded concepts and knowledge for her tutees. As was the case for the first two interviews, Lisa stated that, “it just depends on the student and how they learn” in terms of what approaches and strategies she selected. Meanwhile, John continued to reflect on his specific sessions with the same tutee. He characterized them as “fairly typical in this level of Chemistry.” He affirmed his use of different learning styles, conceptual modeling, multiple types of open-ended questions, and the use of scaffolding to help the student

learn. John emphasized that scaffolding "builds on previous knowledge, and so it helps a person advance on their own with very little support because it ties key things together in a way that you can kind of see the next step on your own."

The researcher's observations confirmed the learning center tutors' descriptions of what happened during their tutoring sessions. Both established expectations up front, whether spoken or inferred by the repetition of a similar structure each tutoring session. There was a flexible quality to the sessions as evidenced by Lisa and John selecting strategies based on what their tutees were experiencing. Open-ended questions, patterned after Bloom's taxonomy and Socratic dialogue, were common to the tutoring sessions. This served as one of the primary tools employed by both learning center tutors in assisting their tutees and guiding them towards the solution or specific knowledge. While the majority of their questions reflected the knowledge and comprehension levels, there were definitely application questions and an occasional analysis question woven into the mix.

Similarly, both tutors emphasized practice problems during each tutoring session. This matched with their assertion that it was one of the best ways to prepare for tests, particularly given that students were often confused by word problems phrased differently yet still covering the same concept. Lisa and John also incorporated a review of previous concepts during each tutoring session, whether by virtue of the questions raised by tutees that necessitated referring back to prior knowledge or in the form of a quiz. When their tutees claimed that they understood specific information, both tutors were diligent about confirming this through active learning. This active learning often

took the form of the tutee demonstrating or modeling knowledge through problem-solving or RPT. Whereas Lisa had her tutees problem-solving on notebook paper, John often had his modeling on the dry erase board.

Interestingly, although both tutors acknowledged the importance of relational communication during the first interview, it was not specifically addressed during either the second or third interviews. However, the relational communication employed by both learning center tutors was significantly more pronounced and observable during their sessions compared to academic department tutoring. This was manifest in their greetings at the start of tutoring, asking about how their day went, what they did for Halloween, how class was going, as well the periodic chatting that occurred near the end of a tutoring session. Overall, the researcher inferred that the use of relational communication, questioning, and active learning strategies was intentional on the part of both learning center tutors and mirrored the job expectations and training they have both received.

How and Why Did Tutors Choose the Particular Methods They Used?

Academic department tutors. The academic department tutors provided key insight into the strategies they emphasized. Notably, during her interviews, Kelly consistently stated that she used questioning (knowledge, comprehension, application, and yes/no responses), explanations, review, and problem-solving as her primary strategies. Oscar was consistent in stating that questioning, problem-solving, getting students to teach concepts back (essentially, he described RPT), having tutees re-read information in their lab manual or text, using prompts and hints, and providing explanations were his primary strategies. Any other strategies they cited (see Table 1)

were only mentioned once during the three interviews. Interestingly, when Oscar and the researcher discussed whether study strategies were incorporated or taught to tutees during tutoring, he remarked “no, not unless they ask . . . because they’re . . . there for help.” The researcher inferred from this that specific course content had more relevance to the way Oscar viewed his tutoring role.

Table 1

Strategies Reported by the Department Tutors

Kelly	**Oscar**
Question asking	Question asking
Analogies	Analogies / real-life scenarios
Explanations / telling	Explanations / telling
Application / problem-solving	Problem solving
Re-read book	Re-read book, lab manual, Q’s
Socratic questioning	Visuals
Review	Have tutees teach it back (RPT)
Paraphrasing / rewording	Model calculations
Discussion	Prompts & hints
Affirmation of correct responses	Referrals
	Using resources (e.g., text, periodic table)
	Writing information down
	Repetition
	Self-check or check work in small groups

While there was some overlap in terms of why certain strategies were used, there were distinct differences between Kelly and Oscar in terms of the number of strategies they discussed and why those particular ones were selected in their tutoring sessions. Kelly focused on three strategies in particular: question-asking, providing explanations, and problem-solving. Although she was observed employing other strategies that she named, these three tended to be the primary methods she used to assist students. To

begin, Kelly's use of question-asking involved multiple reasons. She stated that, "I'm always a fan of getting them to answer the question and understand why." This involved gaining more knowledge and understanding certain lab concepts more effectively. Kelly felt that by having tutees answer questions, it prevented them from returning with the same questions at a later time. Moreover, question-asking helped students: think about the whole equation, the steps needed to be taken, and how the parts relate; build connections with other concepts; use and apply knowledge; build self-confidence when they answered correctly; and enabled them to walk through a process from start to finish. For example:

> . . . especially on the labs, there'll be follow-up questions . . . And, so, I'll usually go through the next question with them and say, "Why?" . . . so, if this part of the equation means this, then what does it mean about the other part of the equation? And how do they relate to each other? And, usually, that will get them sort of thinking about what the whole equation, the different parts actually represent. And, how they relate to each other.

The other active learning method Kelly emphasized in her interviews was problem-solving. She stated that she used this method in order to help her tutees practice and learn that they could repeat the process with new problems they encountered on homework or tests. This was apparent in her third interview when Kelly stated, ". . . it's all about problem solving. And, if they can figure out how to problem solve certain types of questions, then they can do it again."

Finally, Kelly shared her rationale for providing explanations to students, which involved more passive learning on their part. Specifically, she felt that it was essential to provide new ways and terminology that students were likely to understand, particularly if

they were confused during lab or lecture. Additionally, she used this method so that students would understand rules and how to apply information. For example:

> . . . I try to give them basic knowledge before we can do anything about it. But, then I, I try to make sure that they understand, you know, what, what these rules, I guess you'd call them, mean in sort of a larger sense and how to apply them to other situations. So, you know, if I'm just building up their knowledge base, that's fine as long as they know how to apply it to other things.

The final reason for using explanations was to ensure that tutees understood what a specific equation meant, as well as the specific parts of the equation, in order for them to apply it again.

At the second interview, when the researcher asked Kelly how well she thought students responded to her strategies, overall, she explained, ". . . I think it varies . . . I think the sort of question-answer . . . works well" for one particular tutee. However, she also acknowledged that ". . . it's a little harder when you only have, you know, ten minutes with someone. And, they run off and you never see them again. So, I have no idea whether they learned anything." However, by the third interview, when Kelly was posed the same question, she replied, ". . . I guess they've responded well because they keep coming back!" She added that she's "seen improvement about how they start to think about the questions . . ." Yet, she acknowledged that the vast majority of students do not return beyond the one tutoring session, which makes it difficult to judge how effective her strategies have been.

Oscar provided substantially more information about nearly all the strategies he named than Kelly did. Five strategies focused on more passive learning based on Oscar's

descriptions: explanations, repetition, connecting concepts from lab with the class, analogies, and visuals. He stated that he used explanations in order to provide real-life examples, to describe relationships between facts or concepts, when questions and analogies did not seem to work, and to provide step by step instructions when students were unclear where to begin their lab assignments. For example, during his first interview, Oscar recalled burning magnesium in the lab and how he incorporated an explanation for his students:

> And, I said to myself, "Okay, how's this useful to them?" And, so, we're just trying to make them understand how to connect it to real life, such as magnesium use in fireworks. And, I said, "Magnesium's used in the military to have high, high temperature. To cause an explosion." Um . . . and they're able to remember it a lot better on tests.

Sometimes, Oscar wanted students to use the correct Chemistry terminology. "I wanted to make sure she wrote in down in a specific way. It needed better vocabulary, like it was denser air, not heavier air." Oscar also noted that explanations consisted of both verbal responses and emails on his part. Moreover, he used repetition as a strategy to help improve a student's level of understanding. When asked about this, Oscar stated that he used repetition, ". . . when they don't say they've got it or can't answer my questions . . ." or "when they keep looking down with a blank face, I often repeat things."

The last few passive strategies involved connecting concepts, using analogies, and using visuals (arguably, all involved a form of explanation based on his descriptions). Oscar thought these were essential because he perceived a lack of depth in certain aspects of the lab manuals and because students often did not connect course concepts with the

ones being focused on in their labs. For example, Oscar used analogies "to have them relate it to something they [tutees] can see or understand from real life. People can't visualize what two ions look like, but they can picture what two magnets might look like" as they pull on one another. Likewise, by using real-life scenarios or referencing pre-existing knowledge, Oscar indicated that it helped foster stronger connections with the lab concepts and spark interest in the material. For example, Oscar referenced the movie *Fight Club* to connect one of the labs with knowledge already held by some of his tutees.

> Like, uh, like in lab I was, they were using sodium hydroxide and I, I gave them the, the analogy to Fight Club, where they made soap out of fat. I told them that if you left your hand in there, it would make soap. But, it would obviously hurt because it would dissolve your fat.

This was also why he provided visuals to his tutees. Oscar thought that having visuals helped his students as much as it aided his ability to explain things. During his first debriefing session, Oscar stated that he modeled how to use the periodic table for his tutee because "she didn't know that the numbers near each elemental symbol provided the key for converting grams to moles."

The majority of the strategies he described, and his rationale for using approaches, involved more active learning methodologies. Oscar used questions to help guide students towards the right answer, to evaluate their level or the accuracy of their knowledge, and to force them to explain their logic. He stated that the most effective approach with his tutees involved ". . . either questioning them and then showing, telling them where to get the information. Or, actually writing it down." For Oscar, this led to the greatest learning on their part. Similarly, he said he used prompts and hints when

tutees did not explain something correctly or when they were stuck as a way to redirect their efforts towards the correct answers. Problem-solving was especially beneficial for students because it enabled them to learn how to apply concepts correctly. Correspondingly, he valued having students check their work as a means of identifying their own errors. He also said that it helped students to focus on a common problem—particularly in small groups—while he attended to individual issues that arose. Another tactic, which was observed by the researcher when Oscar had small groups, was to have tutees re-read their lab manual or textbook (including out loud). He said he did this to help spark their memory as well as his. This was especially beneficial when it involved students from other lab sections. It provided Oscar with a chance to think about the lab concept or question at hand and decide what strategy would be most effective.

Interestingly, reciprocal peer tutoring (RPT) was not effectively utilized by Oscar based on his own admission. However, he intuitively understood that if students could explain a concept back to the tutor, it resulted in better understanding on their part. It also identified knowledge gaps that allowed him to clarify missing information or correct mistaken thinking. Oscar shared that he focused first on providing students with all the information they needed and progressed to this strategy when he thought they were ready to handle it. However, it was unclear from his responses when this actually occurred or how he gauged when they were ready.

The last strategy Oscar described was the use of referrals. He mentioned that he has used this to help students who experienced test anxiety. Interestingly, during observations, he indicated that there was a resource on campus that might help. However,

he offered no further elaboration, specific resource information, or verification on whether the student followed through on his suggestion.

In order to triangulate the use of such tutoring strategies, the researcher observed each academic department tutor for seven sessions and made detailed notes during each. Synopses of these observational notes are broken out in groups of two (save for the seventh and final observation, which stands alone) as a way to examine changes over time and minimize the chance that key data or patterns would be lost. This was particularly critical given that no one had previously studied academic department tutors in naturalistic settings. During her first two observations, Kelly did most of the talking rather than her tutees. She placed more emphasis on providing explanations, thereby limiting the number of questions she asked of her students. This was evident in the following example during session one:

> Kelly: Intramolecular means it's happening in one molecule, whereas intermolecular means . . .
> [continued to define the differences for her tutee]
> Tutee: I don't really understand what this means [pointed to the next part of her lab assignment].
> Kelly: It's figuring out which way a reaction occurs. If you're making things, the biggest number of alkele groups identifies the major product.

Typically, when she asked questions, she employed comprehension questions, followed by other comprehension questions or knowledge questions. Occasionally, she incorporated an application or analysis level question. Interestingly, Kelly did engage in some problem solving and application exercises with her tutees. She also provided praise for her tutees efforts. Similarly, she displayed positive non-verbal communication and

body language. To the researcher as observer, this connoted interest and attentiveness in her students as well as her tutoring role.

During her third and fourth observations, Kelly continued to employ explanations as her primary tutoring strategy. There were fewer questions during these sessions, with most focusing on the comprehension level of Bloom's taxonomy. Again, Kelly continued to provide affirmation and praise for her tutees. She also displayed more patience with her tutees as evidenced by longer periods of quiet time while students worked and based on only interrupting a student one time during these two sessions. Interestingly, Kelly noted during the debriefing sessions that she used questions more with conceptual issues and less with the math problems and kinetics. The latter were typically covered during walk-in tutoring. Yet, there seemed to be a disconnection for Kelly in realizing that she could employ questions with math problems as well. Consequently, Kelly stated that she used explanations more frequently during these types of sessions (recognizing herself accurately) and acknowledged that "the nitty-gritty stuff is boring and you have to end up telling them things like what equations to use and why."

In the fifth and sixth observations, the researcher began noticing a pattern in Kelly's communication style. She tended to process information out loud for herself while simultaneously attempting to assist her tutees with the problem or concept that confused them. This often resulted in half-finished sentences as she either completed a thought for herself or recognized what she wanted to say and redirected her approach (e.g., by employing certain questions). Additionally, she sometimes asked questions but did not give tutees sufficient time to process what had been asked or answer the question;

she even answered some herself as if her questions were rhetorical in nature. These aspects were evident in the following exchange:

> Kelly: Was it .1 molar or 1 mole? So it is delta H. It's the delta H of your solution/mole. Does that make sense? You can use that from the relationship . . . [elaborated on her explanation] Did you calculate work?
> Tutee: [Shakes her head no]
> Kelly: No. Gosh! Well, your volume didn't change, right?
> Tutee: Right.
> Kelly: You should just be able to. . . [elaborated on what she thought would suffice for the lab assignment]. I don't want to lead you wrong. What I would interpret this to mean is you have your moles, so I would use your delta H which is this [pointed to the laptop] and they're equivalent. That's what I would use.

Yet, overall, she was more effective in covering different levels of knowledge along Bloom's taxonomy with her questions compared to previous observations.

When tutees from other lab sections utilized her tutoring assistance, it often took numerous clarification questions on Kelly's part to figure out the purpose of the lab or the questions being asked by the instructor on the lab worksheet. For example, at the onset of session five, Kelly was working with a tutee from a different lab section:

> Tutee: I was in earlier asking someone for help. First . . . [asked a detailed question]?
> Kelly: Okay. Are these your numbers?
> Tutee: Yes.
> Kelly: Okay. Did you actually do an experiment?
> Tutee: Yes.
> Kelly: Did you use a calorimeter?
> Tutee: It was a container sitting over top of . . . [provided a detailed account of what was done in the lab experiment].
> Kelly: Okay, so it was a . . . [Kelly did not finish her statement]. I'm just going to check your math to be sure.
> Tutee: That's fine.

Kelly: You never know when something silly happens. You're right! According to your numbers that's totally fine. That's mass I'm assuming?
Tutee: Yes. M is mass. Mass of water.

This coincided with both department tutors' viewpoints that they knew their own labs sufficiently well but were less familiar with the other lab levels' experiments due to insufficient time for review or inaccessibility to other lab materials. Finally, Kelly did not regularly test students' knowledge. She was prone to asking her tutees if something made sense and moving on to the next topic if they said "yes." However, there was no verification regarding the accuracy of her tutees' knowledge.

During the seventh and final observation, the researcher noted that Kelly primarily asked knowledge and comprehension level questions appropriate for introductory coursework. She also displayed patience and allowed tutees sufficient time to answer her questions without doing so for them. Kelly employed praise and affirmation, consistent with all of her previous tutoring sessions. When she used explanations, it was typically done to expand on the tutees' responses by adding more specificity or inserting the correct chemistry terminology.

In comparison, Oscar's tutoring sessions were characterized by his calm, slow-speaking manner, which conveyed interest in his tutees' needs and a willingness to take as much time as necessary to assist them. He was patient and displayed attentive body language and posture. Throughout both sessions, Oscar incorporated a generous amount of affirmation and praise, which he often followed repeating students' answers to help reinforce knowledge. Interestingly, relational communication was absent during the start

of tutoring, as was casual conversation at any point thereafter. Although the atmosphere was friendly, the emphasis seemed to be placed on getting down to business.

In terms of strategies during the first two sessions, Oscar employed both knowledge and comprehension questions during his first session. Although he balanced question-asking with instruction and explanations, this shifted to predominantly using explanations during the second observation. This may have been a product of the increased number of tutees (six) attending the second session. This shift towards using more explanations is reflected below. These were back-to-back statements that Oscar made in response to questions asked by his tutees during session two:

Oscar: The limiting reagent is your theoretical yield. When you have this equation, you have reactants going to products. Theoretical yield is how much aspirin you can ideally get from this mass of . . .
Oscar: Whenever converting something, be sure to cancel units out. There'll be a mole to mole ratio.
Oscar: You have to convert from one mole to another.
Oscar: There's grams of what you start off with to moles of what you have.
Oscar: So this is the moles of salicylic acid. Moles of this to moles of aspirin [pointed at lab worksheet]. Then to grams of aspirin. Each one involves multiplying.
Oscar: Grams per mole.
Oscar: The one with the least amount of moles or grams is your limiting reagent.
Oscar: What's your limiting reagent now? If you had extra . . .
Oscar: That is your theoretical yield.
Oscar: You have to define theoretical yield of what you're looking for. Did you get that?
Oscar: You can continue the problem to get the theoretical yield. That's the limiting reagent value [pointed at answer].
Oscar: You can have one value greater than the next. The limiting reagent creates… Theoretical yield should be 100%. You go about finding theoretical yield from the limiting reagent. The one that's least . . .
Oscar: You compare it to your value, which is the actual value. There's an equation for percent yield. It shows how much is pure. If it's a 50% yield, half of it's pure and half is impure.

Similarly, the researcher noted that Oscar consistently used prompts during the entire first session, often in the form of hints or additional questions to guide the tutee in the correct direction. Although prompts were utilized in the second session, there were significantly fewer implemented. Oscar did infuse modeling of chemical equations during the second session. He also provided a couple of academic skills tips, but did not expand the conversation to demonstrate how to apply those suggestions. Consequently, the researcher observed a much different atmosphere in the second session that he attributed to the increased number of tutees; it was more "matter of fact" and explanation-driven.

During Oscar's third and fourth sessions, similar patterns emerged. Oscar was very respectful, polite, attentive to his tutees, and took his time. Yet, relational communication was definitely absent from these sessions as well. Oscar did incorporate affirmation when tutees were correct in their responses or the direction of their thought patterns. Interestingly, there was more affirmation than praise given, as well as a shift towards non-verbal affirmations such as head nods. In terms of strategies, Oscar used explanations frequently to assist his tutees in both sessions. Yet, he was able to infuse some questions into session three. These were primarily knowledge and comprehension level similar to his first session. These types of questions, along with an explanation afterwards, were illustrated in the following excerpt:

Oscar:	Are you guys ready to move to part C? Moles of acetic acid. You have 2 volumes right? 10 ml of vinegar. What other volume do you have?
Tutee #4:	Sodium hydroxide?
Oscar:	Yes. How do you calculate. . . [asked a comprehension question]? What do you have?
Tutee #4:	Molarity of NaOH.

Oscar: Yes, NaOH. What can you do with those?
Tutee #4: Find the moles of . . . [explained her answer fully]
Oscar: Yes, you use the molar ratio. Yeah, the equation is in the book. The coefficients are one (1). See that? It's a 1:1 molar ratio because the coefficients in the ratio are 1. You want to convert to moles of acetic acid. You don't use 10ml in your calculation. Each sample you test, that's your 10ml sample. You're not worrying about 10ml volume. The only volume that you're worried about is sodium hydroxide that you're adding. The number you add equals the number of acetic acid, moles of acetic acid, because of the 1:1 ratio.

However, there were far fewer questions incorporated in session four despite there being only four tutees who attended the whole session. This was striking to the researcher given that the emerging pattern had seemed to indicate that as tutees increased so did the dependence on using explanations as the primary tutoring strategy. Yet, this pattern continued with fewer students in session four as well. Likewise, there were fewer prompts being used, particularly in session three. Oscar also used more clarification questions with students who participated in other labs, comparable to Kelly's experience. Overall, there was a clear shift towards increasing the use of explanations over questions with his tutees. This resulted in fewer strategies being employed.

In sessions five and six, the pattern of jumping directly into the lab material continued. There was no real greeting or relational communication evidenced in either session. Oscar continued to provide a solid amount of affirmations to his tutees in order to let them know they were accurate in their responses. In general, praise was less commonly employed as part of their feedback. Session five also had a more intermittent feel to the tutoring dynamics, in part because Oscar's tutee spent time writing down information and answers on her lab worksheet. Oscar assisted her by processing lab

questions in a step-by-step manner. He utilized prompts (hints), explanations for instruction, and clarification statements to guide her towards better understanding a specific question's purpose. When she made mistakes, Oscar stepped in to correct and guide her. Consequently, there were fewer questions (twelve) employed in this session; all of them were knowledge and comprehension level. During the debriefing session, the researcher asked Oscar how he knew if his tutee truly understood the lab concepts. He replied, "I assume that she knows it unless she says otherwise… If they say, okay, I move on. Or, if it's new, we spend more time on it."

In contrast, session six was perhaps the most chaotic tutoring session the researcher observed of all the tutoring sessions in this study. Seventeen students attended this session; between eleven and twelve were present at any given point in time. Whereas some students stayed for the entire session, others drifted out after their questions were answered. This session was dominated by explanations. Oscar incorporated only eight questions (seven knowledge-based questions and one comprehension-based question) the entire session. Admittedly, the researcher may have missed some questions due to the increased noise levels present in the tutoring room. Oscar agreed during the debriefing that this session was chaotic in comparison to any of the previous sessions he conducted. His goal, confirmed during the observation, was to find common ground for students to work on. However, Oscar was unable to do so given the fact that students were often at different stages of the lab assignment or had varying levels of understanding. Consequently, he approached each person or small group (often lab partners) individually. He had students tell him what they were doing in the lab step-by-step to

ensure they were on the correct track and answering their lab questions correctly. In order to ensure that everyone's needs were being met, he moved through the room very quickly. Likewise, it was unclear how much learning occurred, or even could occur, given the circumstances. However, this was not a reflection on the capabilities of Oscar as a tutor but rather simply the situation he was facing.

In his seventh and final observation, Oscar initiated the session by using some relational communication. Interestingly, the focus was solely on something that happened to him and not on the tutees. Specifically, Oscar stated, "So guess what happened to me? My protein formed a precipitant. So, intermolecular forces lab [for you]?" Compared to session six, the session definitely felt less "rushed," given that there were six students who attended. The primary strategy Oscar used to assist tutees involved explanations. However, he did employ seventeen questions, with nearly equal numbers of knowledge and comprehension-based questions. And, for the first time, Oscar used Socratic dialogue and questions. All of these involved knowledge level questions that were redirected to the students following one of their questions. It demonstrated a much more intentional approach at having students stop and evaluate their own knowledge and break information down.

There were a few discrepancies between the academic department tutors' interviews and the researcher's observations. First, while Kelly described using Socratic questions during her interviews, this technique was not readily apparent to the researcher. Second, Oscar, who did not mention the use of Socratic questions as a strategy, was observed during his seventh observation using this technique with a tutee. Third, Oscar

acknowledged that he rarely asked a tutee to explain or teach concepts back to him as a method (putting the student in the position of being the reciprocal peer tutor). He added that time restrictions prevent him from using this very much. Oscar stated that if students can explain the concepts to him, he can then explain [clarify] them better. Additionally, he articulated that this strategy resulted in better understanding on the part of the tutee. He indicated that he was apt to implement RPT given two factors: 1) when he has first provided tutees with all the information they'll need to understand and concept; and 2) once he thinks they can accomplish this task. However, it was unclear from the interviews when this was supposed to occur or how Oscar evaluated the student's "readiness." Despite this knowledge, this strategy was not specifically observed during Oscar's tutoring sessions. It was distinctly possible that Oscar did not know how to effectively incorporate this strategy given the large number of students typically attending his walk-in sessions.

In spite of the researcher's observations and interpretations, the department tutors both felt that their tutees responded positively to their assistance. Both remarked that body language was an important indicator of a tutee's response. Kelly sensed that students seemed happier when they "have concepts they can apply to other things." To Kelly, students who attended tutoring seemed "almost relieved" by the assistance, which contrasted students who did not attend and often would "just leave things blank on paper." In comparison, Oscar watched facial cues to determine whether or not a student grasped the concept or remained confused. When the latter occurred, Oscar would continue to help the student work through their difficulty.

Additionally, Oscar and Kelly both remarked that the students' ability to answer questions correctly or utilize the correct steps in problem-solving were indicators of how well they responded to the strategies employed in tutoring. Specifically, Oscar stated that students who understood the concepts "take less time to answer a question that I give them," whereas students who struggled with the material may have "a grimace on their face or may have a spaced-out look."

Apart from these commonalities, Kelly thought that her tutees' responded positively to her strategies based on whether they attended tutoring in the first place, when they returned for more than one tutoring session, and because returning students seemed to process lab questions more critically than students who only attended tutoring on one occasion. Oscar, on the other hand, received both verbal feedback and written correspondence regarding his tutoring. In particular, when students began to make connections between their lab or course concepts, they made remarks such as, "I didn't think of that!" Additionally, there were a couple of times where departing students thanked Oscar for his assistance. Similarly, Oscar received some emails from students requesting extra tutoring outside of his regular schedule and requests to remain in the lab with him (or take him next semester) when they were considering whether to drop the course portion due to low grades.

Learning center tutors. The learning center tutors also shared insights regarding what strategies they employed and why those were selected. Both tutors demonstrated a high level of consistency during their interviews in terms of what types of strategies were employed. Notably, they both mentioned employing similar strategies in at least two of

their three interviews; many strategies were cited in all three interviews. Overall, they listed a broad range of strategies they believe they utilized during tutoring sessions (see Table 2).

Table 2

Strategies Reported by Learning Center Tutors

Lisa	**John**
Model / teach concept	Modeling
Gestures & body language	Non-verbals & body language
Hints	Hints
Prompts	Prompts
Practice problems / problem-solving	Problem-solving (including fixing own errors)
Q's (open-ended, fill-in-the-blank, Socratic)	Q's (open-ended)
Scaffolding	Scaffolding
Visual & kinesthetic activities (e.g. draw pictures)	Kinesthetic (Re-write information)
Review (including using professor's notes/PPTs)	Review (continuous)
Reciprocal peer tutoring (described)	Discussion
Have tutee apply concept	Evaluate/assess whether tutee can figure it out on own
Compare problems	Explain / give answer
Connect lab concepts w/ course concepts	
Have tutee ID underlying concept	
Create scenarios	
Games	
Analogies (including visual ones)	
Repetition	
Methodical / step-oriented	

In fact, based on their interviews, they shared nine specific strategies in common. Both tutors emphasized that their strategies focused on actively engaging their tutees in the

learning process rather than simply providing answers or explanations each time they raised a question or ran into a confusing concept. Additionally, both named or described their strategies based on their tutor training and knowledge of educational pedagogy. They each fully described learning processes, such as cognitive scaffolding, clearly and accurately.

In particular, Lisa shared how she determined which strategies to use during tutoring. She based her selection on: soliciting feedback from her tutees; experimenting to see what works for a tutee; self-evaluating the effectiveness of a strategy, particularly by means of a tutee's facial expressions and whether or not they can answer questions correctly and explain concepts back to her accurately; expanding on the use of certain strategies with more than one tutee; alternating between strategies to see what seems most effective for a particular tutee; and selecting strategies based on what worked well for her as a student in learning certain concepts.

During their interviews, Lisa and John collectively described their rationale for fourteen strategies. Out of those fourteen, they shared three in common: question-asking, modeling, and cognitive scaffolding. Although there was some overlap, each approached the strategies from slightly different points of view. For example, Lisa used modeling in order for her tutees to see how a problem might be done, whereas John emphasized its value in helping tutees view concepts from a different learning style or perspective. Both learning center tutors used question-asking to help reinforce concepts. Additionally, Lisa used this approach when she was less sure that a tutee fully understood a concept. John would also use this strategy for helping the student encode information in long-term

memory. His rationale was that additional question-asking helped tutees fully review a concept, thereby committing greater amounts of knowledge to memory. He also stated that it allowed tutees to see concepts from different angles or perspectives not previously considered.

Scaffolding, though, was the one process or strategy that both tutors spent the greatest amount of time discussing. Lisa stated that scaffolding helped students: build knowledge and connections between concepts; ensure that they "connected the dots"; grasp concepts more effectively; relate concepts to current topics; see patterns; reduce test anxiety; interact and process knowledge and information (via RPT); and learn how to apply knowledge independently and in different situations or contexts. She described the process of scaffolding knowledge for a tutee in the following way:

> . . . I got back to, like, the basics and what they learned previously in the semester. Start with something small . . . And, I build on that and relate it to the topic at hand that they're studying in class . . . And, I keep building on it.

Lisa also thought it was beneficial in helping herself reduce the tendency to teach or lecture to students.

John thought scaffolding was valuable given its power to: provide support and challenge for students in helping them learn new information; allow the tutor to see if students can define knowledge; allow the tutor to see if the student could apply knowledge accurately; help the tutee build on previous knowledge; help the tutee connect concepts; and help the tutee discover the next steps in a process more independently.

In some respects, the rationale for employing other strategies was much more succinct. Lisa had her tutees compare problems (e.g., balancing equations, stoichiometry, etc.) to help them see how questions might be worded differently yet still focus on the same underlying concepts. She would also have them repeatedly engage in application and problem-solving exercises to ensure they could replicate such actions at later times; particularly during testing situations. Lisa stated that having tutees connect concepts, especially between the course and their lab, was necessary given that "they're usually at the wrong pace." By this, she implied that the course and lab covered topics at different paces and students often viewed the two rather distinctly. She would also employ scenarios to help students identify what characteristics were different or similar. The final active learning strategy Lisa described was essentially reciprocal peer tutoring. Although she did not know how to name this approach, she did describe the value of selecting approaches that involved students explaining concepts in their own words and teaching it back to the tutor.

The final two strategies were more subtle in nature. Lisa tried to gauge her tutees learning styles (and would sometimes ask them specific questions) in order to help her better select strategies that mirrored their preferred learning mode. Finally, she solicited feedback about her tutoring strategies and reiterated the value of this information in terms of helping her better meet her tutees needs. She would then adjust what she was doing or maintain similar approaches if the tutee found them beneficial.

Meanwhile, John's final strategies were two-fold. He talked about two strategies that incorporated active learning and two that dealt with body language and

communication. For active learning, John emphasized the value of constant review. He said this ensured that the tutee still understood or could remember previous knowledge. This was particularly important as students acquired more information during a test cycle and spent less time keeping up with the older information. He also stated that rewriting information, for some tutees, enabled them to improve their memory. John did not expand on this answer. However, he did discuss learning styles consistently during the interviews and may have inferred a connection with kinesthetic learners.

Finally, John described the use of non-verbals and silence, as well as other body language, as specific tutoring techniques. Specifically, he viewed silence as a means to challenge his tutee to keep trying problems on her own at key times and to give her the opportunity to develop greater self-confidence.

> . . . as I noticed that she was building confidence slowly up in the second session, I noticed that I was being limited by her questioning herself on everything that she did. She had an idea of what she was supposed to do, but she was unsure of herself and so she would ask every single time instead of going forward and if she made a mistake, then learn from it. So, I was trying to enforce that in her, and then she can just go forward.

He said that he could always step in to assist her if she was off-course in her logic. For John, body language, in general, helped him communicate positive and negative reinforcement. It also helped him establish a more comfortable tutoring environment. Notably, John was the only tutor in the case study to identify body language as a deliberate and intentional strategy for helping students learn. He did so to foster comfort and trust, as well as to signal that his tutees continue doing something such as solving a problem independently.

Both tutors' rationale for employing specific strategies related inherently to actively engaging students in learning, providing structure for tutoring, and utilizing an iterative process in their sessions as opposed to one-shot applications. Observations conducted by the researcher actually showed that there were more strategies utilized by both learning center tutors than either one identified on their own. The full list of strategies is depicted in the upcoming section comparing the learning center tutors and the academic department tutors.

Similar to the previous section, the researcher made observational notes of each learning center tutor over the span of six sessions each. Synopses of these observational notes are provided for each tutor, beginning with Lisa. Lisa engaged in relational communication before the start of every session. Most of this was geared towards checking in with the student about their week or weekend, how things were going in class, and conversing about events on campus. Sometimes, during a session, this might involve sharing a personal experience such as a professor's strategy for helping her remember a particular concept like whether ionic bonds tend to end with -ite or -ate in their names (session 1). Another example of how well she knew her tutees was evidenced in session three. Lisa shared that the particular strategies she focused on during this session were open-ended questions, Socratic dialogue, scaffolding knowledge by changing the level of her questions, having the tutee relate it back to the problems and applying them independently. Lisa explained that she chose these strategies because this particular tutee already had a bachelor's degree and did not need "basic tutoring approaches" that a first-year student might benefit from receiving.

During session four, the researcher heard Lisa's tutee share that she met with her advisor about a variety of issues and came away feeling less like "an idiot" for some of the challenges she had been experiencing since her father's death this past summer. If Lisa did not have such a strong relationship with her tutees, it is unlikely that a student would have felt comfortable sharing such personal information. In large part, Lisa fostered this comfortable and safe environment for her tutee by spending time engaging in relational communication. It was also established by Lisa demonstrating positive non-verbal communication throughout her sessions. This included nodding, eye contact, gesturing, attentive body posture, leaning in towards the tutee while talking or working, and smiling. During our first debriefing, Lisa also shared that she used lots of hand gestures because she and her tutee were both visual learners.

Furthermore, Lisa demonstrated strong intentionality in the use of tutoring strategies, prompts, questions, concept review, and critical thinking during her tutoring sessions. She increased or decreased the level of thinking in her questions along Bloom's taxonomy based on the accuracy of her tutees' responses. When tutees struggled with a concept or question, she would lower the level of thinking. A good example of Lisa lowering the level occurred in session two when her tutee had difficulty explaining thermodynamics. Table 3 includes an exchange between Lisa and her tutee and the taxonomy applied to each question asked. Similarly, when a tutee understood the concept, accurately solved a problem, or explained a concept correctly, Lisa would raise the level of thinking in her follow-up questions. The majority of the questions she asked

were along the knowledge, comprehension, and application levels on Bloom's taxonomy. Only a few questions were at the analysis level.

Table 3

Sample Tutoring Session Exchange and Taxonomy Applied

Tutoring Exchange	Taxonomy Applied
Lisa: What's one of the first basics of thermodynamics? Tutee: Internal energy. Lisa: What does internal energy entail? Tutee: It's in the system. Lisa: What makes it up? When you're measuring change in the system, what two things change commonly? Tutee: I don't know. Lisa: What does your first law say? [gestured to tutee to look at her notes] What does it equal? Tutee: [Looks in her notes and states what was written about the law] Lisa: Good. How is work defined? Tutee: Pressure. Lisa: Pressure and . . . ? Tutee: Force? Lisa: No-o-o-o-o… [said it slowly; prompt for her to try again] Tutee: Force is pressure and area, so . . . [tutee continues to explain] Lisa: Close. Not area but _____? [fill-in-the-blank style question] Tutee: Surface area. Lisa: Yes! The way I think of work being done is like a bike pump. You pump up the bike tire and it starts to get really hard because you're decreasing volume and increasing pressure.	Knowledge-level question Comprehension-level question Two (2) knowledge-level questions Rephrases with two knowledge-level questions Knowledge-level question Knowledge-level question Knowledge-level question Affirmation / praise followed by an analogy to reinforce the concept

Lisa consistently tried to foster independence in her tutees by prompting them to attempt problems on their own. Typically, this was done following several problems that they worked on together. If the student became stuck or was unclear, she used prompts, hints, or additional questions to help guide the student. Additionally, Lisa remarked that she did not automatically assume a student understood the content they discussed without first verifying the accuracy of a tutee's knowledge through the use of questions, Socratic dialogue, and having the student teach the concepts back to her (reciprocal peer tutoring). Lisa indicated she was especially likely to test their knowledge when they made comments such as, "I get it!" Rather than simply telling them the answer afterwards, Lisa used prompts, hints, reminders, analogies, examples, and questions to help them correct their own errors. This was also verified during each of the researcher's observations. A good example of how Lisa verified the accuracy of her tutee's knowledge occurred in the following excerpt from session six:

Lisa: Yeah. Let me see if I can find one. Okay, so here's one that includes 2 species. Aqueous means it's just floating in water. So, in this, which one is being oxidized and which is being reduced?
Tutee: Okay, this has +1, this is 0. This is . . . [continued to explain her logic]
Lisa: I wouldn't worry about the times 2 right now, Just view it as +1.
Tutee: Okay. Copper went to . . . it had to gain 2 electrons. Since it gained, it was reduced.
Lisa: [Nodded no.] It went from 0 to a positive number.
Tutee: Right.
Lisa: Electrons are negative. That lost electrons. It kicked it out.
Tutee: But it went from positive 2 to positive 3.
Lisa: To make something more positive, you have to get rid of a negative. This side means . . .
[continued to clarify]
Tutee: Oh, okay.
Lisa: I always think exit when I see this arrow. If that makes sense to you.
Lisa: So, applying this means kicking it out. This taking it in [pointed to the

tutee's work]. Is copper kicking out an electron or taking it in?
Tutee: It would have . . . I don't know. I feel like it would have to lose them to be more positive.
Lisa: Yeah, that's a common mistake. Remember, electrons are negative. Think negative instead of the word electron. That's why I draw out the number line. If you go from 0 to a more positive number?
Tutee: It lost electrons.
Lisa: Correct. If it lost electrons, it's being _____?
Tutee: Oxidized.
Lisa: Correct. And if that's being oxidized, what's being reduced?
Tutee: [Provided a more detailed answer]
Lisa: And how would you show that?
Tutee: [Answered]
Lisa: Correct. So, if you had to write copper and silver like this type of reaction, how would it be written?
Tutee: Like . . .?
Lisa: Like how many electrons would be lost or gained?
Tutee: [Accepted the prompt/question and tried solving it on paper]
Lisa: If it kicked out electrons, which side would it be written on?
Tutee: This.
Lisa: Correct. How many?
Tutee: 2
Lisa: Correct. How are you feeling about it?
Tutee: It's coming.
Lisa: Which one is the reducing agent?
Tutee: Losing gained . . . this lost two. This gained electrons, so silver was reducing
agent and copper was the oxidizing agent.
Lisa: You have them flipped. See . . . [Modeled the correct approach]
Tutee: Okay. [Repeated the whole process from start to finish; reciprocal peer tutoring occurred]
Lisa: Correct.

The combination of her strategies enabled Lisa to scaffold knowledge for her tutees. She often repeated students' answers or paraphrased them as a way to emphasize or reinforce knowledge. Moreover, there was a natural flow / Socratic quality to the dialogue Lisa had with all of her tutees. She treated them equally, but adjusted her strategies to their individual academic needs. Lisa also incorporated praise and

affirmation of her tutees consistently throughout each of the observations conducted by the researcher. Commonly, she included statements such as, “Very good!,” “Correct!,” or “Right.” When tutees were able to answer questions or explain concepts accurately, she would affirm their responses or praise their effort level. Almost always, she would follow up this affirmation with another prompt or question to continue challenging their knowledge at a higher level of thinking. She was highly adept and intentional in such efforts. An example of this occurred in session one:

> Lisa: Okay, let’s go to #1. What’s that special number that compares atoms to moles?
> Tutee: Avogadro’s
> Lisa: Right! If you have that many chlorine atoms, how would you find the number of moles using Avogadro’s number?

The most common use of academic skills I saw Lisa use involved test taking approaches for multiple-choice tests. Rather than talk in generalities about how to take these tests, Lisa helped her tutees analyze the choices for a question, relate it back to the question stem, and determine which choice most accurately answered the question stem. During another session, she verified that the problems the tutee wanted to work on were not part of a graded assignment that would violate the academic integrity policy. However, other academic skills were not directly focused on during my observations.

In comparison, John’s communication style incorporated many of the same relational communication aspects as Lisa’s. Yet, like each of the tutors in this research, he demonstrated unique qualities that characterized his tutoring relationships. While professional, he also evinced sensitivity to his tutee’s needs, could be plain-spoken at

times, was often humorous, and he was even mischievous on occasion. For example, during session two, John encouraged his tutee to believe in her own abilities and keep working towards her academic goal of earning an A in the course:

John: So, when you go home, keep working on these problems so it helps make sense. Feel comfortable about it! Don't worry about mistakes. Learn from them and keep plugging away.
Tutee: I think I'm doing a little bit better. I think I'm going to retake it [the course]. I'm not
getting an A, and I need to get an A. I'm going to stay in it, though. I'm going to stay in the lab, though. I'm getting an A in that.
John: I think you can still get an A [in class].
Tutee: I have to take CHE/104 as well. Is that hard?
John: [answers and provides his opinion]
Tutee: [Nodded affirmatively and paused for a moment] I think that's all I've got [today].

Another example, during session five, showed how John balanced seriousness with humor:

Tutee: And this one is N_2O_4.
John: Correct.
Tutee: That's just the answer?
John: That's what K is equal to. Sometimes, they'll give you both concentrations and tell you to find K. Or, they'll do the opposite and give you K and ask you to find the concentrations.
Tutee: Okay. Can you give me an example of . . . [explained her confusion]? Oh, like this? [pointed to her notes]
John: Yes!
Tutee: She [referred to her professor] said it's hard to type it in the calculator.
John: Only if you had a cheap-o one!
Tutee: No, I've got a good one [enthusiasm in her voice; seemed to sense he was kidding]! I don't know how to do this one. [pointed to another problem]

During tutoring, John displayed patience, never rushed his tutee, was attentive, and was highly observant of the tutee's body language and facial cues. The researcher

observed John initiate questions or conversation based on his attention to his tutee's non-verbal communication. Overall, his relational communication skills and ability to engage in light-hearted conversation were observed in all six tutoring sessions. These skills enabled John to effectively develop trust with his tutee.

On one occasion, during session four, John's tutee made an off-handed remark about academic advising being a waste of time. Rather than disagree outright, John shared a personal experience about his advising experience and the benefits he found from his faculty member's guidance. He encouraged her to give the experience another chance without setting expectations for the situation in advance. He stated this without judgment or trying to make her feel guilty about her perceptions.

John incorporated plenty of affirmations during his tutoring sessions. He used both verbal and non-verbal affirmations, including head nods, smiles, and even a "thumbs up" sign on one occasion. He also used affirmations to confirm when his tutee was correct in her logic or problem-solving. Likewise, John used affirmation as a way to prompt her to continue her train of thought, particularly when she was second-guessing herself or seemed to doubt her own ability or knowledge. Notably, this connected back to John's stated purpose of trying to help her build self-confidence at key junctures especially when problem-solving. While he did give praise, this was less commonly employed than in Lisa's tutoring sessions.

In terms of tutoring strategies, John weaved back and forth along Bloom's taxonomy by using different types of questions. He based the level of thinking required, he said, on how well his tutee understood the concept or could break the concept down.

When she was stuck, he would rephrase or lower the level of the question to help guide her. For example, John reflected questions back to his tutee and lowered the level of knowledge during one exchange in session five dealing with exothermic reactions:

John: But now, let's think about this another way. Let's say it's exothermic. Know what that means?
Tutee: Energy is being released.
John: Yeah. So, which side shows the products and which shows the reactants?
Tutee: Um, this one [pointed to her notes]? If they're together . . . No . . . [seemed confused]
John: You said it's giving off energy.
Tutee: Yeah. [Paused] So, I don't know.
John: If it's giving off energy, which way does the reaction go?
Tutee: To the left?
John: Mmm . . .
Tutee: Or, to the right?!
John: [modeled on the dry erase board]
Tutee: Um, can you explain it in a different way? This is together and… Does it have to do with energy being released?
John: Yes. But, it may not always be that simple. That means the energy has to be on this side [pointed to one part of the equation]. If it's endothermic, what does that mean?
Tutee: Energy is going in?
John: Yes. It has to be one of the reactants, right?
Tutee: Yeah.
John: For this one here, which way does energy go?
Tutee: To the left.
John: And if we take away energy?
Tutee: To the right.
John: Mmm-hmm. You're making this . . . [clarified her error in logic]. That makes your K value larger.
Tutee: Alright, I guess I get it.
John: Let's talk about it some more [until you feel comfortable]

The majority of his questions tended towards the knowledge and comprehension levels, though he did incorporate some application questions across the span of the researcher's six observations. However, there was only one analysis question asked

during the entire span. (However, given that this was a 100-level course, the tutee may not have needed this level of depth to sufficiently comprehend the subject content.)

John was able to string questions together, along with prompts and hints in between, to help guide his tutee towards the correct answer or knowledge. This often necessitated rephrasing questions or incorporating new ones when she was stuck, especially during problem-solving exercises. For example, consider the following exchange from session three:

John: So, what did you just make?
Tutee: Moles.
John: Of?
Tutee: H_2.
John: Based on?
Tutee: This? [pointed to the equation she wrote on scratch paper]
John: You don't know that yet. What do you normally compare that to?
Tutee: Grams?
John: What do you compare this to in order to figure out what the limiting reactant is?
Tutee: Wait, this [pointed again; asked for clarification]?
John: That's what you're trying to figure out.
Tutee: You get this from this [pointed at parts of her problem-solving], so you're trying to find . . . the difference?
John: What does . . . ?

Consequently, there was often a Socratic quality to their exchanges. And, given that his tutee often lacked self-confidence, John tested her with additional questions and provided encouragement each step of the way. This was done in lieu of simply telling her the answer.

John also infused prompts throughout each and every tutoring session. Often, his prompts were followed by a question that continued her towards a particular answer. At

other points, John utilized a prompt, a question, or repeated an answer following an affirmation he gave his tutee. For example, when they discussed ionic compounds in session one, John prompted his tutee and followed with a question: “Remember when they’re together, they’re zero. When they’re apart is when you see the charges. These two came apart to form that [pointing at her work]. How would you write that?” He did this to help reinforce the student’s learning, as well as to move her to the next step in the process or a higher level of understanding a concept. In particular, John stated that he used prompts and reminders so that she would first try to solve a problem on her own. Additionally, he viewed them as a mechanism for helping her build self-confidence in her knowledge and abilities.

Interestingly, John actually incorporated silence and non-verbals (facial expressions) as prompts to his tutee. These were typically done to signal her that she needed to keep trying to solve a problem on her own or to go back and look at something in her notes to find specific knowledge or clues. After repeated observations, it was clear that his tutee did not mind this, and she even made comments that reflected she was aware of what he expected her to do.

Moreover, John did a good job of utilizing a variety of active learning strategies such as problem-solving, modeling, and RPT. Similar to Lisa’s sessions, there was a heavy emphasis placed on problem-solving, particularly since this was a major emphasis in the course and the tutee benefitted from seeing multiple ways a concept might be phrased through word problems. Problem-solving also enabled John to incorporate kinesthetic, visual and auditory learning with his tutee. Like the modeling, John had his

tutee do a fair amount of problem-solving and balancing equations on the dry erase boards at the tutoring table. He would set up a problem for her to work on, while she would go about solving it in front of him. Then, she would walk him back through each step explaining why she progressed from step-to-step the way she did. When she was off-base, John would ask clarifying questions at various levels to help her stop and evaluate her work or as a way to prompt her towards the correct path.

Reciprocal peer tutoring (RPT) was used on several occasions, particularly from session 3 on. RPT and active learning typically followed from question and answer periods or after John demonstrated something. It was evident that the repeated active learning that occurred was a way John could reinforce knowledge and help his tutee feel more comfortable with problem-solving. Likewise, she was better able to make connections following these exchanges. As a result, John was highly effective at helping scaffold concepts in his tutee's Chemistry course.

Similar to Lisa, there were very limited times where John used explanations. Usually, these were done to clarify missing knowledge she did not pick up correctly from class or had miswritten in her notes. Additionally, he incorporated some explanations to expand on her knowledge after multiple exchanges. Interestingly, there was only one occasion where John actually provided her with an answer—in session six. This occurred after numerous exchanges as he tried to help her understand how to use an ICE table, which is used for tracking how concentrations change in an equilibrium reaction (illustrated below).

John: And what else goes in here?
Tutee: Plus?
John: You don't have to put that in yet.
Tutee: Okay, so.
John: What's "A" at the start?
Tutee: [Did not respond. Facial cues inferred she was confused.]
John: You just dumped it in the water and it hasn't had a chance to change yet. Let's pretend . . . it hasn't dissolve yet, right?
Tutee: Right. So it's equal to O.
John: After an hour . . . What's the change going to be?
Tutee: Where is this coming in from? [pointed to the dry erase board]
John: [John answered and followed with a question] And is this going to be a + or -?
Tutee: [answered and clarified her logic]
John: Mmm-hmm. And what's the final going to be?
Tutee: [answered again, but chose incorrectly]
John: This one is 2-c. If you look down the line, you . . . [elaborated on his logic].
That's the change and that's the final amount [in her ICE table]
Tutee: Okay!

Overall, both learning center tutors articulated and demonstrated strong intentionality regarding the use of active learning strategies during their tutoring sessions. The major focus on scaffolding knowledge, as expressed by both tutors during the interviews, was manifest during the researcher's observations. Both consistently utilized a wide range of questions, prompts and hints, problem-solving, and RPT throughout their sessions. In addition, both tutors could increase or decrease the level of thinking required of their tutees based on the responses they received or when their tutees were confused. There were remarkably few times that the learning center tutors incorporated explanations. When they did, it was often after numerous exchanges back and forth about a concept or problem or to elaborate on an answer provided by a tutee.

This strong degree of scaffolding also related to the goal of fostering independence for their tutees, something that Lisa and John both specifically mentioned during their interviews as a major consideration in their tutoring. Fostering independence is also a specific student learning outcome of the learning assistance center. It is directly built into the evaluation rubrics that tutors use to provide feedback to their tutees regarding their academic behaviors and progress every third tutoring session. The researcher also believed this goal shared connections to Lisa's consistent commentary and behaviors regarding the solicitation of feedback from her tutees about *her* efficacy and the helpfulness of her strategies.

There were a number of common threads for Lisa and John regarding how their tutees responded to their methods and strategies. Both tutors shared that their tutees' enthusiasm and/or verbal feedback reflected that the tutoring was beneficial. Both agreed that their students were engaged in tutoring sessions. This was displayed through the tutees' active participation in the sessions and by asking lots of questions. Moreover, both stated that their tutees' ability to answer the tutors' questions correctly and teach concepts back was indicative that the tutoring strategies were effective. Correspondingly, when their tutees earned better grades, both felt that tutoring was a significant contributing factor. Lisa and John also remarked that their tutees displayed positive body language in terms of facial features and attentive posture. In particular, John believed his tutee's non-verbals conveyed that she felt supported, trusted, challenged and encouraged in the tutoring relationship.

Lisa was more deliberate in evaluating the effectiveness of her methods. Specifically, she said that she establishes expectations about giving and receiving feedback at the onset of each tutoring relationship. She invited and encouraged feedback throughout the span of her tutoring to ensure she was on target with her approaches. She emphasized with her tutees that she wanted to know if her strategies were helpful or not. Similarly, she explained that the learning center's regular feedback process enabled her to share feedback with the students and vice versa. The students' version [rubric] enabled them to share feedback anonymously with our professional staff. The professional staff, in turn, shared collective feedback with Lisa and the tutors a couple of times each semester.

Comparison of learning center and academic department tutor's strategies. On the surface, the types of questions that both sets of tutors asked, as well as the instructional strategies they employed, shared many similarities. However, there were distinct differences between the two sets of tutors based on the observations conducted by the researcher. Notably, both learning center tutors employed a wider variety and more frequent use of active learning opportunities for their tutees. Commonly, these included engaging in critical thinking exercises, having the tutee teach concepts back to the tutor (reciprocal peer tutoring), Socratic dialogue and questioning that required the student to reevaluate information and break concepts down, diagramming and modeling exercises, and problem-solving. Moreover, the learning center tutors incorporated academic skills in their sessions. One specific example involved examining test questions that were answered incorrectly and applying critical analysis to the multiple choice options in order

to eliminate possibilities and match the correct answer to the sentence stem. Additional conversations included suggestions on how to locate additional information and resources, employing more effective test taking strategies, not rushing through tests, learning how to assess the logic of word problems and identify the errors they made, and practicing additional word problems on their own time to help develop greater familiarity with how questions might be worded and to develop greater self-confidence.

Likewise, both learning center tutors frequently used questions, prompts, hints, Socratic questioning and dialogue rather than explanations or telling a student the correct information. Typically, if an explanation was involved, it was done: (a) to expand on a tutee's explanations or answers as way to provide more detailed background on a concept or reinforce the student's efforts; or (b) after several minutes using a variety of active learning strategies and tapping into different learning styles where it was evident that a key piece of information was lacking on the part of the student. Given the latter, both tutors then switched back to utilizing questions, prompts, and active learning methods to test knowledge and help students learn how to apply concepts.

In contrast, the academic department tutors frequently used explanations and "telling" information to tutees as common strategies, especially when there were larger numbers of students attending tutoring. When there were fewer students present, they typically employed knowledge and comprehension questions to help challenge their students to think about concepts. However, there were relatively few application and analysis questions observed over the span of seven observations of each department tutor. Additionally, there was only one clear-cut example of an academic department tutor

(Kelly) engaging in reciprocal peer tutoring with their tutees. During his interviews, Oscar conveyed that he rarely utilized RPT, primarily due to the time limitations of working with each tutee. He stated that he was more apt to use this one-on-one or in his private tutoring. Similarly, Kelly's description of her private tutoring indicated that she was more apt to employing this strategy in those more personalized settings.

Consequently, the active engagement of tutees by both learning center tutors combined with multiple methods, types of questions, and learning styles, was more likely to scaffold knowledge and produce greater learning (see Table 4).

Table 4

Comparison of Tutoring Strategies Employed by Departmental and Learning Center Tutors

Types of Questions Asked	
Learning Center Tutors	**Academic Department Tutors**
Clarification / simple check for understanding: Y/N questions / closed questions Prompts (questions)	Clarification / simple check for understanding: Y/N questions / closed questions Prompts (questions)
Knowledge Q	Knowledge Q
Comprehension Q	Comprehension Q
Application Q	Application Q
Analysis Q	Analysis Q
Verbal fill-in-the blanks	Verbal fill-in-the blanks
Socratic Q's (common)	Socratic Q's (rare; last session for Oscar)
Academic integrity check (is this homework or something that will be graded?)	

Instructional Methods

Learning Center Tutors	**Academic Department Tutors**
Analogies	Analogies

Clarification statements: Professor's intent Purpose of tutor's Q correct information	Clarification statements: Purpose of lab Clarifying steps in a lab procedure or what result should have been found
Corrects error in thinking	Corrects error in thinking
Demonstrates / models: Sequencing / steps How to solve a problem How to use Periodic Table	Demonstrates / models: Sequencing / steps How to solve a problem How to use Periodic Table Using calculator features
Drawings / visuals	Drawings / visuals
Examples (e.g., real life)	Examples (e.g., real life)
Explanations: Connection with previous material	Explanations: Purpose of lab Correct concept Connection with previous material Next steps in process / lab
Repeats information: Emphasis Material not understood first time (less common) Correct answers	Repeats information: Emphasis Material not understood first time Correct answers
Restates information / answer	Restates information / answer
Paraphrases or rephrases (e.g., when student is stuck or confused)	Rephrases Q's or information
Summarizes	Summarizes
Telling answer (rare): John did so on one occasion after about ten minutes of exchange	Telling answers: Correct solution and why it's right Correct formula to use Correct lab procedure How to correct mistake on lab worksheet Solve equation for tutee (on calculator) Writes in student's workbook

Active Learning

Learning Center Tutors	Academic Department Tutors
Acronyms	
Application: Tutee brainstorms real-life examples Apply equation correctly	Application: (e.g., Identifying hydrogen bonds)
Critical thinking:	

Why would this be false? Eliminate M/C options Identify elements of word problem Identify correct equation for solving Solve for missing parts of the equation Have tutees identify own mistakes	
Drawing: Diagrams Models	Drawing: Reaction
Explain logic / thoughts	
Has student clarify	
Have student find information in notes or textbook	
Hints	
Problem-solving	Problem-solving
Prompts: Active learning Reminders Redirecting student Encouragement (you can do this!) Verbal fill-in-the-blanks Write out your equations	Prompts: Next steps Hints Reminders Verbal fill-in-the-blanks Write out your equations
Quizzing tutee	
Reading out loud	Reading out loud
RPT	RPT (1 session by Kelly)
Scaffolding, combines: Different Q levels (Bloom's) Problem-solving Student reflection Anticipate student errors Connecting concepts	
Socratic dialogue	
Tutee develops session itinerary	
Writing out information, equations, etc.	

Academic Skills or Other

Learning Center Tutors	Academic Department Tutors
Referrals: Professor Academic skills	Referrals: Professor (by Kelly) Teaching Assistant
Critical thinking: Eliminate M/C options Independent problem-solving	

Encourage problem-solving (homework)	
Study skills / strategies: Also where to locate additional information or resources	Study strategies: Encourage text book reading Memorize certain information
Test taking tips: Not rushing Thoroughly read through test Q's	Test taking tips: Use periodic table to help you
Assessing students logic: Types of errors made	
Guidance on the advising process	

How Do Environmental Differences among Academic Department and Learning Center Tutors Impact Tutoring Sessions?

Learning center tutoring environment. The researcher also examined how environmental differences among learning center and academic department tutors impacted their tutoring sessions. He delineated this question into several components. First, the researcher made his own observations about the physical and social environment itself. Second, he asked the tutors several questions that would expand on his perspective, including: (a) What impacted your role as a tutor?; and (b) What else should I know about your tutoring experience that would help me to understand the process of being a learning center tutor and how you help people? How do I characterize you accurately?

In terms of the physical and social aspects of the tutoring environment, there were distinct differences between the learning center and the academic department. John met with his tutees in the learning center tutoring environment, which had nine tables that supported individual and small group tutoring sessions. There was an additional table that enabled tutors to utilize a computer connected to a 42" LCD television for accessing

online academic materials, software, and modeling concepts in a large, visual format. Four additional computers were available for tutors to access similar resources and submit tutoring session records (see Figures 1-6).

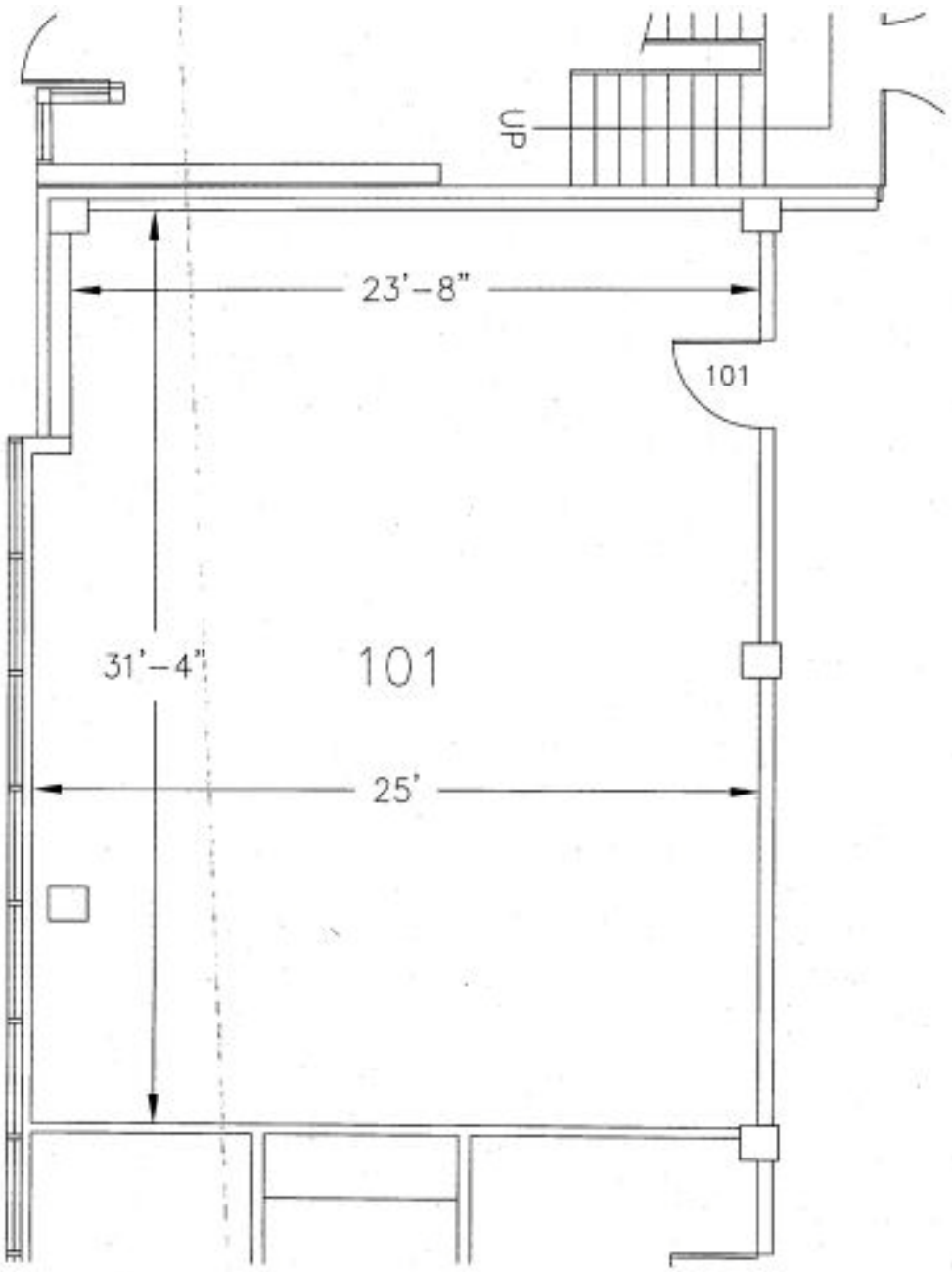


Figure 1. ***SSC Tutoring Lab Dimensions (783 Square Feet)***

Figure 2. ***Tutoring Lab (Photo 1)***

Figure 3. ***Tutoring Lab (Photo 2)***

Figure 4. ***Tutoring Lab (Photo 3)***

Figure 5. ***Tutoring Lab (Photo 4)***

Figure 6. ***Tutoring Lab (Photo 5)***

The entire length of one wall encompassed windows that provided ample, natural light for students. Textbooks, CD-ROMs, dry erase boards (at each table and mounted to one wall of the room) and markers, TI-84+ calculators, and a large-scale periodic table were additional resources available for all learning center tutors. The room was fully carpeted and measured just under eight hundred square feet. The cinder block walls were painted white, but decorated with Successories® posters, advertisements depicting the benefits of tutoring, plaques displaying "tutor of the year" awards, academic success strategies and suggestions, as well as some dry erase boards and the periodic table.

In many respects, the social environment was a product of the physical one. While the carpet did mitigate some of the noise created by conversations in the room, there was a noticeable elevation of noise when the room was full of tutoring sessions. This was

readily apparent during several of John's tutoring sessions. At certain times, the nearby conversations felt distracting to the researcher and sometimes interfered with the ability to distinctly hear certain parts of John's dialogue with his tutee. Interestingly, based on their body language, neither of them seemed to take much notice. The researcher was surprised by this, particularly given John's learning disability. Neither John nor his tutee ever commented negatively about the noise either during their sessions or during John's interviews.

Meanwhile, Lisa conducted her tutoring sessions in the university's library. Lisa stated that she chose the library for her tutoring because it was an "easy location that many students know as well as the resources it offers." She typically met her tutees on the fifth floor of the "tower," which was one of several floors approved by the library staff for group conversations and studying. Lisa purposefully chose this floor "because it holds the chemistry books and because it is a group session floor that is never too crowded or loud." Unlike the learning center location, the library tower environment consisted of a hodge-podge of small tables and chairs, comfy recliners, and booths reminiscent of cafeteria-style dining (which was where they originated from). The floors were a combination of tile and carpet, which echoed noise depending on the number of students present at any given time. There was sufficient natural light cast by a bank of windows on one side of the tower, as well as near the tower foyer situated by the elevators and central stairwell (see Figures 7-8). Lisa conducted her tutoring at one of the small group tables located in front of the traditional library stacks. The researcher found this space on par with the learning center tutoring space in terms of noise levels.

Figure 7. ***Library Meeting Space (Photo 1)***

Figure 8. ***Library Meeting Space (Photo 2)***

In terms of what factors impacted their tutoring role, John and Lisa emphasized a number of different things. One common factor involved the social interactions they have with tutees. Both stated that they have learned better ways of interacting with a diverse group of students through their position. Lisa emphasized that these social interactions have also enabled her to create more comfortable tutoring environments, develop greater patience levels, develop persistence in finding ways to meet students' learning needs, and assist tutees by suggesting appropriate ways to interact with faculty in respectful manners. John believed these social situations also enabled him to learn more about himself each time and determine what tutoring strategies were more effective.

Both John and Lisa mentioned important role models who have helped them in their roles. Specifically, Lisa interacted with her father, who is a chemist, and had the chance to dialogue about different ideas and ways to understand chemistry concepts. She shared that, ". . . I talk to him about a lot of stuff . . . He's like, 'Oh! Another way you could think about this . . ." John's role models included one of his research professors and a biology professor. The research professor had cultivated an ethos that enabled John to feel comfortable experimenting with his own ideas, which yielded greater self-confidence and independence for John as a learner. The biology professor modeled critical thinking and the use of open-ended questions during her lectures. Consequently, John stated that both styles have had an impact on his tutoring.

Additionally, both Lisa and John indicated that the structure provided to their tutees has positively impacted their role. Specifically, the use of a tutoring contract allowed them to establish role expectations for themselves and their tutees, as well as

setting boundaries regarding what was not permissible in tutoring (e.g., assisting directly with homework problems until after they have been graded). This latter aspect was particularly important to Lisa, notably in terms of abiding by the university's academic integrity policy. She has directly stated to some of her tutees, "Do *not* bring homework to me! . . . I won't do it, and I won't help you through it." Lisa stated that she took this seriously whether or not she was in tutoring or simply doing her own work. She stated that on more than one occasion she had even told her own classmates that she would not simply give them answers.

Moreover, having weekly appointments enabled both tutors to witness greater growth among their tutees. In particular, John noted that the weekly structure led to stability in the relationship and tutoring sessions, as well as creating comfort, trust, and support. Specifically, he commented:

> They know, then, after the first couple of sessions they know what to expect, they know what they need to do, and they know what it's going to be like when they get there. And, often by that time they know that you know what you're talking about.

Similarly, Lisa remarked that "by the very virtue of our type of tutoring, being appointment-based . . . you have the chance to form those relationships and it's easier to feel like you're making an impact on people." If the tutors were not working with the same slate of students over the span of the semester, this would not have been feasible.

Lastly, Lisa's own academic experiences have impacted her role. Notably, her own learning experiences have helped her determine helpful ways for students to understand certain concepts, model the use of library resources for tutees, enable her to

approach faculty members when she was unclear about concepts that students raised during tutoring sessions, find ways to interconnect concepts from other subjects in an interdisciplinary fashion, and relate those concepts back to students' existing knowledge.

John also mentioned some unique factors that impacted his tutoring role. In particular, his own learning disability (ADHD) sometimes inhibits global thinking and leads him "to focus . . . [on] one or two things rather than trying to cover everything all at once." Alternatively, one might argue that this helps tutors, like John, stay focused and provide better structure during the session. He did this by discussing what learning challenges the students were facing at the onset of the tutoring session and developing an informal game plan for the session's focus. John also stated that observing other learning center tutors has enabled him to glean ideas and approaches that he could use in his own sessions. John also does a fair amount of external reading in the fields of chemistry and biology. In doing so, he believed he could challenge tutees to think about how "the subject, itself, evolves over time." He also stated that this has sensitized him to helping students critically evaluate information sources. Lastly, he stated that supervision conversations were helpful in his development as a tutor. However, he found this more beneficial early in his career.

Two major themes developed from the questions about other aspects of the tutoring experience that would help the researcher accurately characterize their tutoring and how they help students: (a) tutoring benefits students; and (b) tutoring benefits tutors. In terms of the benefit to students, Lisa noted that tutoring positively impacted tutees' course knowledge, helped tutees develop self-sufficiency and independence as learners,

and sometimes helped them develop greater interest for a subject. She summed it up effectively by stating, “I feel like they get more out of tutoring than they thought they would.” In her own self-deprecating fashion, Lisa joked about the fact that “I get more excited about their test grades than they do,” which she said helped motivate her tutees to work harder. Lisa added that her passion for chemistry helped inspire learning and even made it more fun (particularly in comparison to traditional lecture modes):

> And they were, you know, they’re like, “Wow, you’re passionate about Chemistry!” You know what you’re talking about. Like, they became excited that I was able to help them. And, they would come with plenty of questions. I like seeing them be interested in something they thought was totally boring or find it fascinating, even if it’s a slight, small thing. If they find it fascinating, I think it’s cool . . . But, they’ve always told me . . . “Lisa, you’re such a nerd!” or “You’re such a geek!” And, I’m like, “Yes, I know! But, you like it, don’t you?!”

Lastly, Lisa described herself as a role model. By relating to students on a peer basis and sharing her own experiences in the subject, she helped tutees realize their own ability to pass a course or excel in it. John added that students also benefitted from the fact that the tutoring service was free to students and that having at least one hour of tutoring per week helped students improve their grades.

> John: But, uh, I just think that because the Learning Assistance Center is a program here on campus that’s designed to help students, you know, who may have never been in a college family or have no idea, you know, jumping from high school to college is like, the fact that they can come to the Learning Assistance Center, get a free tutor and then, you know, be able to sit with that tutor one hour a week at least . . . And, you know, that same person having that same instruction versus, you know, going somewhere else or having a different tutor every week . . .
> Geoff: So, the consistency with meeting with you every week helps form what for that relationship?
> John: That helps form stability, for one.

In terms of the benefits experienced by tutors, Lisa revealed that ". . . because it [Chemistry] is my major, it's reinforcing the general things, but it also forces me to look at it another way. And, maybe break down the problem differently than I would in my head." Essentially, tutoring has reinforced Lisa's own general knowledge, helped her examine concepts from different perspectives not previously considered, and enabled her to break concepts down in different ways to better meet a variety of learners' needs. John noted that tutoring helped him learn more about interactions with a diverse body of people (thereby improving his social skills), gain a stronger appreciation for educators' roles, helped him stay focused while maintaining a second job, and helped him improve his own grades through knowledge reinforcement. In particular, John proudly stated that he has maintained a 4.0 semester grade point average for the last five semesters that he has been employed as a learning center tutor. He noted that his academic success, better course knowledge, and tutoring experience also may help him gain entrance to a graduate program of his choice and increase his chances for being selected for a teaching assistant role. He attributed his success in the following way:

> The, going back and having to go over the old stuff over and over and over and over and over again! You know, it helps keep it cemented in your brain. So, when you take these, you know, 4 or 500 level courses, you haven't forgot the old stuff. So, you don't have to go back and review that. You have more time to cover the new stuff.

Both learning center tutors also disclosed some unique features of their tutoring. Lisa discussed the critical value she placed on relational communication to put her tutees at ease and reassure them that all questions were important.

> . . . I kinda just bring up random conversation; small talk. Ask them about their day, kind of like, you know, I'm not just here, I'm not going to talk down to you. You're also a college student or an adult. I'm not going to treat you any different. So, I more, like, become their buddy, but I'm also there to help them. So, that's how I feel, like, they get comfortable around me.

Correspondingly, she noted that her persistence was essential when helping find methods to help tutees who were struggling to understand particular concepts. Her goal was to ensure that they better understood the subject by virtue of their participation in tutoring. She also stated that she liked receiving feedback from students and did not view this in a threatening manner. Lisa remarked, "Most people get defensive. I don't. I take it and use it." Lisa believed this was essential in helping her improve her performance.

She also stated that being a peer had a distinct advantage over the status of graduate students and faculty. Based on her experience, she has found that some graduate students and faculty either talk above students in ways that do not foster conceptual understanding or that they have belittled students for their lack of subject understanding. She described one of her courses where the graduate instructor became really frustrated and said to the class, "Why don't you just get this?"

Lastly, Lisa described herself as being very passionate about her tutoring role.

> . . . When it comes to tutoring, I'm very serious about it. I get in what I call "my zone." I get very focused and . . . I want to make sure that they understand it [Chemistry]. And, I want to see the light bulb go off.

Given her positive experiences, she also encouraged other students to become tutors and contribute to the university community.

John shared that it was essential for tutors to recognize that they "are here to do their job, which is to help people along." He has witnessed this by virtue of seeing his tutees earn better grades and by assisting some with personal issues unrelated to tutoring. Whereas administrators or faculty might spend more time focusing on grade improvements and other statistics, John characterized it differently for the researcher. "You don't get to feel the impact that you have on each and every individual student" [the way I do]. John also stated that he was grateful that he had not encountered what he calls "serious issues," involving situations that might warrant outside intervention by agencies such as the university police.

These common themes and the unique features described by Lisa and John speak directly to the tutoring environment in terms of how each creates a social atmosphere conducive to learning. Although no tutor can directly change the physical environment, apart from strategically selecting locations that might afford more comfort, better lighting etc., they do have control over the atmosphere they help establish for the students they assist. Interestingly, both tutors alluded to the benefits of tutoring, relational communication, feedback, and peer status as impacting their tutoring. However, neither made overt statements to this effect. It is possible that both tutors may have simply assumed the researcher would inherently make this connection given their relationship with him.

Academic department tutoring environment. The researcher applied the same criteria to detailing the academic department tutoring environment. Moreover, there was one additional question asked of the academic department tutors: Was there any type of

coursework, prior tutoring experience, or guidance that influenced how you perform your role as a tutor? This was used to supplement insights provided by both learning center tutors regarding the impact that training may have had on their experience and performance as a tutor.

The academic department environment tutoring space was located in the university's relatively new science facility. It was situated at the end of the hallway on the second floor near a stairwell and an elevator. There was a large glass window that enabled students to see into or out of the room, while enabling others to see whether tutoring was available at a given time (in addition to the sign referencing tutoring walk-in hours throughout the week). The tutoring space consisted of two large tables pushed together in the center of a room that measured nearly three hundred seventy square feet (see Figures 9-12).

It abutted a second room that was used exclusively by the teaching assistants, who have their own cubicles and work materials inside. There were approximately fifteen chairs available in the room for students and tutors to use. There were no peripheral support materials or textbooks in view. While there were two windows on the back wall, most sunlight was blocked out by the shadow of the proximate academic building next door. However, the room was well lit using artificial light. The room was carpeted and the walls (drywall) were painted an institutional ecru-yellow color.

During the first observation of each tutor when there was only one student or a few present, noise levels were manageable and did not seem distracting to participants or the researcher. However, whenever there were more than five or six students present, the

compact space seemed to resonate with multiple conversations as students and the tutors discussed the lab experiments. There were two distinct sessions the researcher observed with Oscar, involving fourteen students on one occasion and seventeen on the other, when the noise levels made it very difficult for students—and the researcher—to process information and think clearly. Particularly in those situations, it was very easy to be distracted by other peoples' conversations and movement as students physically moved in and out of the space or grouped themselves with lab partners.

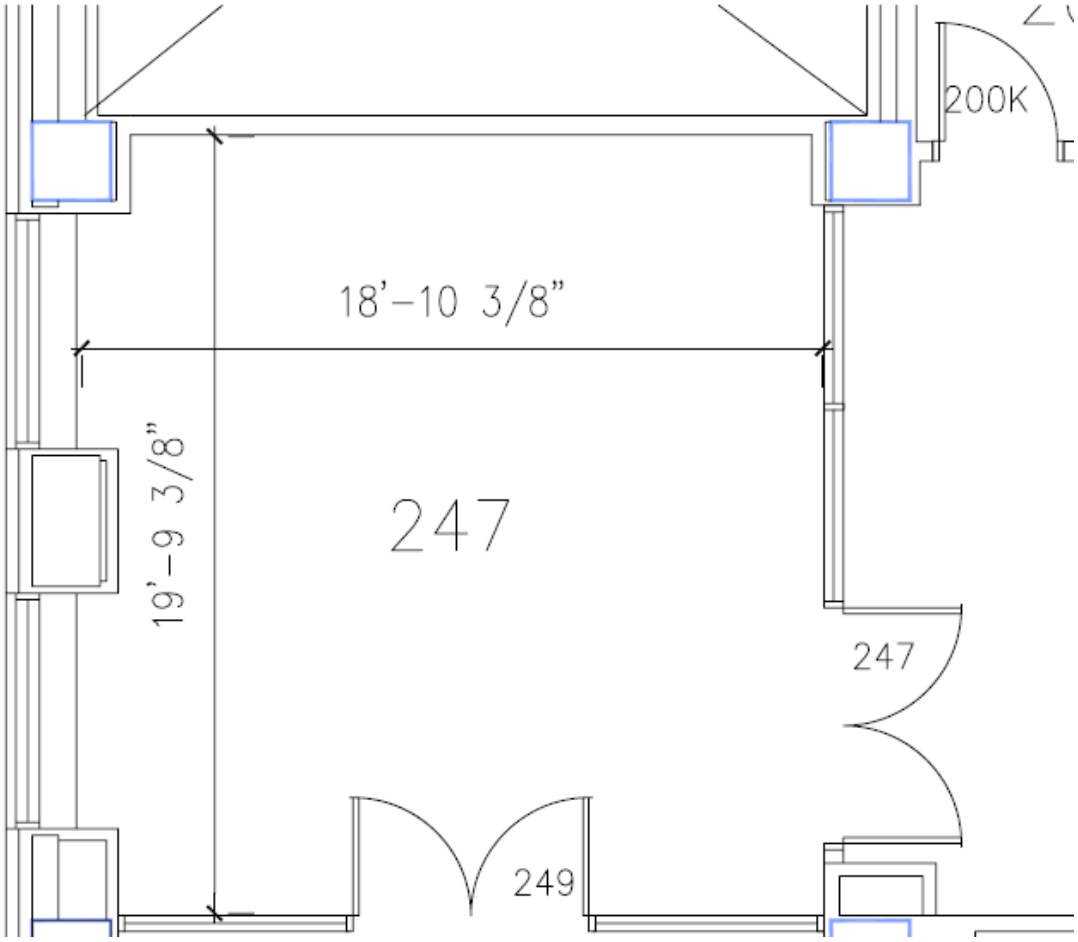


Figure 9. ***Dimensions for the Chemistry Department Tutoring Space***

Figure 10. ***Chemistry Department Tutoring Space (Photo 1)***

Figure 11. ***Chemistry Department Tutoring Space (Photo 2)***

Figure 12. ***Chemistry Department Tutoring Space (Photo 3)***

Both Kelly and Oscar identified some common prior experiences that influenced their performance as academic department tutors. Specifically, both tutored prior to their appointments as teaching assistants and walk-in tutors for the chemistry department. Kelly tutored in high school and in college. She noted that her approaches in high school and college consisted almost exclusively of explanations, questions, and helping students organize their concepts and information into a logical order. Kelly expressed that developing patience was one of the biggest hurdles between her previous experience and working at the chemistry department.

> Um, I'm not a patient person. And, for me, the first time I tutored it was very difficult for me to understand that someone else wasn't getting it. And, of course, when I started tutoring I was very young . . . So, it obviously got a little better in college . . . So, I think I've had to become a little more patient with those who, who do struggle with it more. And, I think part of it is because I've struggled with similar things.

Oscar tutored exclusively in his undergraduate program and believed his strategies were similar to the ones he now uses at the chemistry department.

Moreover, both cited their previous teaching experience as being beneficial. Kelly's teaching experience was based on her youth group experience at church. However, she believed that this was more applicable to her teaching assistant responsibilities than it was to tutoring. Likewise, she felt that her current responsibilities for teaching pre-lab benefited her TA role more than it did her tutoring. This was evident in her second interview when she remarked, ". . . also because I teach a class in which I have a huge range of students. And, actually, I think that's where I've been starting to relate to different ages. Um, as a teacher." Kelly believed that her desire to see her tutees succeed and her continuing efforts to develop patience (she admits that she is not a patient person by nature) have a greater impact on her tutoring.

Oscar taught two different courses. He taught a summer course in electronic circuitry at a nearby university as well as a computer course for disadvantaged high school students called "Love of Learning." Interestingly, the latter focused more on affective components that impact learning, including motivation. Oscar felt that these teaching experiences, combined with his own academic struggles stemming from his learning disability, sensitized him to the need to be patient with all students attending tutoring. He also indicated on several occasions that "even if it's a simple concept, I always assume that they don't know it." He stated that he simply tries to assist them based on what level of knowledge they demonstrate at the present moment.

Kelly and Oscar also had distinct thoughts about how their own academic experiences have impacted their performance as tutors. Kelly focused on how she learns best. “The teachers that . . . actually helped me learn were the ones who did ask questions” and required her to critically apply information and knowledge. She stated that she preferred to utilize a similar approach with tutees as a way to foster better understanding. Kelly noted that when professors did not employ such teaching strategies or never struggled with concepts themselves, they “couldn’t understand why I was having trouble, and so they didn’t know how to help.” Consequently, she reported having empathy for students who struggled with particular concepts or courses and inferred that this often connected back to a faculty member’s inability to present concepts in ways that students can understand them. Additionally, she was quite direct in stating that “I always felt that teachers who never struggle with the concepts are *bad* teachers. “Interestingly, Kelly’s actual tutoring strategies in walk-in tutoring did not always match up to her preferred approach. However, the strategies she described in her private tutoring opportunities did tend to mirror more active learning principles. She also recognized that her private tutoring sessions reflected stronger personal relationships than her walk-in tutoring ones.

Oscar noted on several occasions that the way he perceives information is often different than many students. He attributed certain learning struggles, particularly in calculus his senior year of college, to his learning disability. Consequently, he utilized tutoring himself during that time. He noted that he attended tutoring every single time it was offered for this course during his senior year. Apart from his own motivation to “get

it right, get it correct," Oscar noted that the tutoring involved "a lot of repetition, a lot of work . . . and the repetition seems to help me." Correspondingly, he felt that it was important that students maximize their attendance in order to overcome conceptual misunderstandings. Additionally, based on his learning challenges and the recognition that each learner is unique, Oscar believed it was important that tutors "change their way of teaching in order to . . . better help the student understand."

Moreover, this may be connected to repeated statements that underscored his frustration with his lab students generally not being attentive to walk-in tutoring times and availability despite repeated conversations with his lab sections, email invitations, and referencing the syllabi's inclusion of tutoring services. Despite this, Oscar stated his empathy for students "because some of them just don't know how to ask for help or they wait 'til the last minute." He also stated that his own positive experiences with faculty during his undergraduate career continue to guide him in approaching his students with patience. "I like the one-on-one interaction . . . if I had questions, I went to the professor." Likewise, the support he received from his undergraduate mentor significantly contributed to his academic self-esteem and desire to help his tutees find solutions to their learning challenges. In fact, she went so far as to tell Oscar that "she had picked me for a reason . . . that I was able to connect to the students in a way that her other teachers couldn't."

Additionally, both Kelly and Oscar elaborated on the facets of walk-in tutoring that impacted their tutoring. Notably, both perceived themselves as peers for the undergraduates attending walk-in tutoring. Both indicated that this inherently related to

their proximity in age to their tutees. Interestingly, Kelly also discovered during the course of the semester that she found it easier to relate to students who fit the criteria of being adult learners (defined by the university as being 24 years of age or older). She stated that they were more likely to take their academic responsibilities seriously and "because I can talk to them as an adult and I don't have to worry . . . quite as much about being . . . a role model." She sometimes found herself frustrated by some traditional-age students. Whereas "some . . . are very reasonable adults . . . others you can definitely see, like, 'Oh, they are *still* a teenager!'"

Likewise, both tutors articulated their sensitivity to the academic struggles experienced by their tutees. Kelly was more direct in citing communication barriers between students and faculty. She also noted that "sometimes the [lab] questions are just worded very poorly . . . sometimes I have no idea how to help them because *I'm* not even sure what it's looking for." Oscar also noted that learning challenges in the classroom or explanations presented by certain lab instructors impeded students' understanding of the purpose behind a lab or connecting with the big picture. When the researcher explored this issue further, Oscar shared that "in lectures that are like 80 students, it's . . . sort of threatening to go up to a professor" or "maybe they just don't want to admit to the teacher that they don't understand it."

Interestingly, both academic department tutors identified specific challenges inherent in walk-in tutoring during their interviews: time limitations during sessions, the format of walk-in tutoring, and the administration or structure of the program. Both Kelly and Oscar described feeling rushed during the bulk of their tutoring sessions. Their

descriptions were almost identical. Kelly described it as “teaching on the fly” and Oscar said, “I didn’t anticipate the walk-ins and . . . just being able to answer questions on the fly.” The sheer number of students asking for help at any given time limited their ability to spend significant time with any one student. Additionally, since students from any 100-level lab section could attend their tutoring and raise any number of questions, both tutors cited the challenge of having to spend time simply trying to determine the purpose of their questions or the lab assignment, especially when it involved other lab work that they did not teach. This meant having to spend time asking clarification questions and reading through their lab materials in order to determine what the students’ assignments required and how best to assist them.

However, by the end of the semester, Kelly stated “I’ve gotten a little faster at identifying the problem . . . at figuring out *what* exactly they don’t understand.” Oscar described his efforts at trying to focus the group on a common problem. Sometimes, he found this to be limiting, particularly when there were larger numbers attending tutoring. One time this was especially evident was in session six when seventeen students attended. Oscar’s attempts to find common ground “didn’t work because they were all at different stages of the lab assignment” or had different comprehension levels related to the concepts. Consequently, he and Kelly both felt that time constraints left them “flying by the seat of their pants.”

Correspondingly, the format of walk-in tutoring also presented certain challenges for both academic department tutors. Kelly noted that students’ ability to attend any walk-in tutoring session, regardless of whether it involved a tutor who served as a

teaching assistant for their lab, limited her ability to understand individual students' needs and, therefore, the efficacy of the tutoring sessions. "A lot of times, you'll get someone you've never seen before, never worked with before. And, you have to figure out what they're having trouble with." Kelly estimated that "probably four of my fifty students" actually attended her tutoring sessions, while the rest came from different lab sections. Regardless of who attended, though, she remarked that she was more apt to concentrate on assisting those students who repeatedly attended her tutoring sessions. "Because…then, if they're not coming back . . . I can't get caught up in, you know, their problems. And, I have too many students that I see." Her rationale was that students needed to demonstrate responsibility for their own academic success, and they could do so by taking advantage of the opportunity to attend other tutors' walk-in sessions.

Similarly, Oscar noted that he addressed tutees' individual questions as best he could, but felt that sheer numbers mitigated how effectively this occurred. He also described having little to no personal relationship with walk-in tutees and that he basically "got down to business" in order to maximize what time he had; a sentiment also echoed by Kelly. Oscar did mention that he was better able to judge body language with those students who attended tutoring more frequently. Both tutors indicated that their tutees tended to focus more on math calculations and factual information rather than conceptual or big picture perspectives. Consequently, both felt that this limited their selection of strategies and resulted in greater use of explanations to fill in knowledge gaps.

Kelly and Oscar both expressed similar concerns about the structure or administration of walk-in tutoring. Both cited that the lack of formal training and a structure for conducting walk-in tutoring created challenges. However, when pressed about ways to enhance this for walk-in tutors, both expressed reservations about any additional time commitments or expectations placed on them. Kelly stated that training was not practical "without a serious time commitment, which I don't think anyone has." In large part, she was referring to the other nineteen hours each week that the graduate tutors spend on teaching pre-labs and assisting students with their experiments.

Another challenge involved other teaching assistants who provided incorrect answers or information for students in their lab sections. This was particularly worrisome given that it affected the grading of assignments and how best to take into account that Kelly or Oscar's students received incorrect information. One situation even occurred with Oscar's teaching partner. Oscar remarked that the other teaching assistant "said she was going to take off for . . . the shade of pink" that one of their students wrote down for a lab answer instead of simply acknowledging that "pink" was the correct answer.

Finally, both Kelly and Oscar indicated that the department tutors tend to know their own labs best, particularly since they were the ones who provide instruction during the pre-lab. It was very challenging for them to try and figure out the purpose of lab questions or an experiment when it involved different lab sections, as noted previously. Moreover, neither tutor was aware of how to obtain supplemental material for other lab sections during the first two interviews. However, Oscar mentioned that resources were available during his third interview. But, he stated, "we're just not required to look at

them . . . it is a lot of, a lot of work to do that." Given that nineteen of their twenty hours each week is spent in lab instruction, it did not leave sufficient time to review other lab materials before arriving for their appointed tutoring hour.

Consequently, both department tutors proffered suggestions to help improve walk-in tutoring. Suggestions included: an orientation; a refresher course on other labs; having better access to course and lab syllabi from other labs; having a schedule of the other lab times and days (particularly for knowing when assignments were due); having a copy of the lab manuals for the other labs; having more time to review the other labs if they were expected to assist any 100-level lab student; front-loading tutors on days when homework and lab assignments were due; ensuring tutoring coverage when a teaching assistant was sick; and enhancing the lab manuals to incorporate questions that utilize visuals, example problems, and greater step-by-step instructions regarding what should occur in the experiment and why it happens.

Finally, both department tutors shared some common experiences that affected their tutoring. The first involved recurring student patterns. This included an emphasis on homework and lab questions rather than larger conceptual issues, a disconnection between lab assignments and the course concepts, and students' difficulty articulating what they were confused about (or, as Kelly phrased it, "they don't know what they don't know!"). Oscar also noted that most lab students did not acknowledge needing help, either in the lab or by coming to tutoring. Yet, despite these observations, both tutors were more positive about the students who chose to attend tutoring. They both echoed that those who attended generally wanted to do well and succeed. Oscar observed that

those students were typically earning better lab grades, tended to ask more questions, and demonstrated greater independent thought.

Research Question 2

2. What was the impact of tutor training on learning center tutors' practice?
    a. What was the impact on their behavior?
    b. What training had the most influence?
    c. What training had the least influence?

What Was the Impact on Their Behavior?

In order to understand how learning center tutors viewed the impact of training on their behavior, it was essential to understand how it increased their knowledge or learning in key ways. Table 5 lists the specific knowledge cited by both learning center tutors as a result of their participation in tutor training.

For Lisa, there were several important ways that training impacted her behavior. First, she said it helped her become more intentional with her strategies. Knowing what something was called and, more importantly, why it worked, enabled her to increase her effectiveness as a tutor. For example, during Lisa's first interview, she indicated that the tutor training on note taking methods enabled her to aid tutees who demonstrated poor note taking methods. "Cause I've encountered some *really* bad notes! And, so . . . I've shown them mine and how I do it. And, then I show them other ways that tutoring training has taught me."

Table 5

Knowledge Reportedly Gained through Tutor Training by Learning Center Tutors

Lisa	John
Learning styles	How to work with adult learners
How students learn (William Perry's theory of student development, critical thinking)	How students learn
Note taking strategies	How to scaffold knowledge
Types of strategies she could use in tutoring	Types of strategies he could use in tutoring
How to link concepts using different strategies	How to order his strategies and approaches
How to talk with tutees (relational communication) Make them feel comfortable Give them praise Build their confidence Reinforcement (feedback about seeing their growth and improvement in tutoring) Importance of non-verbal communication	
Value of experimenting with different strategies (i.e., see what's effective)	
Reduce answer-giving (less effective)	
Different ways to use techniques (e.g., scaffolding, Socratic questions)	
Utilizing Bloom's taxonomy for scaffolding knowledge and reducing repetition of certain questions	
Importance of setting clear goals and expectations	

During her second interview, Lisa cited additional ways that tutor training improved her efficacy, as noted below:

> Geoff: Okay. So, talk with me a little about how tutor training has impacted what you're doing work-wise in these first three sessions I've observed.

Lisa: Hmm… well a lot of it, I didn't know what I was doing. I just kind of, like, went with it.
Geoff: Mmm-hmm.
Lisa: And, tutor training told me what it actually is called.
Geoff: Okay.
Lisa: How to expand on it more. Show me other options to use, like scaffolding or, um, that Bloom's taxonomy, or something like that. Uh, different type questions other than the same ones I was using over and over again.
Geoff: Okay.
Lisa: Um, and then…how to link them depending on if they were a visual learner, or auditory, or they like to write it out themselves, or something like that, or highlight. Um, different activities, how to link the stuff together. Uh, I guess also how to, um, some of the sessions, how to talk to them.
Geoff: In what way?
Lisa: Um, how to make them feel comfortable. And, I mean, give them praise where they, where they know they need it. And keep building their confidence because I, I know lately, like, two of them have a test today. And, they're both really, really nervous about it. And, I'm like, "I think you'll be fine." And, I'm trying to, so, being able to talk to them in that way. And, know that I see a difference and tell them that. Um, also make them feel comfortable during the tutoring session, not feel awkward or something. Because I'm up here or… [inferred that she does not want students to think she's on a different level]. Some people are intimidated, so I learned that from tutor training. Um, and when doing practice problems, tutor training has told me to not be so up-front in the problem.
Geoff: How so?
Lisa: In other words, don't flip through the book for them.
Geoff: Okay.

Lisa: Don't find it in the book for them. Don't, um, let them think through a problem. Like, get them started. But, kind of like, step back and just go, "Uh-huh." "Yeah." "No, try again." Sort of thing.

Second, she was able to expand on the types of strategies she used in tutoring. Namely, Lisa cited the ability to scaffold knowledge and utilize different types of questions based on Bloom's taxonomy as two critical methods. For example, Bloom's taxonomy helped Lisa develop "different type[s of] questions other than the same ones I

was using over and over again." Third, she was better able to empower her tutees by incorporating active learning principles into her sessions. Not only did this reduce the tendency to lecture at tutees, but it also enabled her to gauge how effectively they understood the concepts being discussed.

Fourth, she was more deliberate in utilizing repetition in her sessions as a means of enhancing a student's long-term memory, particularly in terms of problem-solving. Lisa even framed this in the context of how she learned.

> I'll watch a professor. I'm like, "That totally makes sense." But, I go do my homework and it doesn't make sense. So, you have to do it yourself to get it in. It's kind of just repetition. And that's how you put it in long-term memory…I'll show one example. That's about as much as I'll go into the problem with them. And, then I start stepping back.

Fifth, Lisa was more deliberate in encouraging tutees to apply tutoring strategies and various academic skills suggestions on their own. By doing so, she stated that this would foster more independent learning on the tutees' part.

The researcher's observations supported Lisa's perceptions of how tutor training impacted her behavior and strategies in tutoring. Specifically, Lisa demonstrated intentionality in her tutoring by challenging her tutees' knowledge rather than simply assuming that they understood something. She did this by using specific types of questions, getting the tutee to brainstorm real-life examples or analogies, and filling in knowledge gaps. Consider the following two exchanges between Lisa and her tutee that illustrated these qualities:

Lisa: Where are you today?
Tutee: Thermodynamics. All he'll give me is the equations. Joules of ATM, and some confusing one about EK=1/2mv squared.
Lisa: Do you know what EK is? Have you looked through notes to try and determine what he means?
Tutee: Kind of. Some of it, I get what he means. I know kg in mass and volume; all that.
Lisa: What's V? What units for volume? Where else have you seen something like length over time?
Tutee: Lots of conversions.
Lisa: Like, what's one everyday thing?
Tutee: Miles per hour.
Lisa: Good. What's another word for speed?
Tutee: [Did not answer; non-verbals indicated she was processing Lisa's question]
Lisa: [After 10 seconds, Lisa responded] Velocity. Here it's meters/second. And, they're saying that mass is always measured in joules.
Lisa: Okay, we want to know if it's heat or work and what it does to the change in energy. If its work, it's what?
Tutee: Q + w.
Lisa: Is work being done or heat transfer?
Tutee: Work
Lisa: Work. [Restated for emphasis / reinforcement] Is it positive or negative work?
Tutee: [Pauses for a few seconds] Positive?
Lisa: Why? Why do you think that? You don't look positive in your answer.
Tutee: [Provides a detailed response to Lisa]
Lisa: Right. Your system stopped.

Moreover, Lisa demonstrated intentionality by having her tutee attempt to solve problems independently, as well as helping her identify her own mistakes. For example, this occurred at the start of session three when her tutee was confused about her solution for a sample problem involving titration and net precipitants:

Tutee: For problem number 1, find the molarity of the resulting ions. I calculated the number of moles of each ion and divided by the total, 175ml.
Lisa: [Nodded affirmatively]
Tutee: Okay, because me and my classmate were arguing about how to solve it. Is there another way to work this problem?

Lisa: So, 175ml. . . Looking at 1a or 1b?
Tutee: 1b.
Lisa: Well, you see you have liters right [correct] and concentration [pointed to specific parts of her practice problem] . But, those are solutions, mixtures. Ions are in solution. How did you break down the problem to find the four specific ions?
Tutee: I wrote out the equation and used the reactants to find the moles. After balancing it, I divided by l liter to get molarity.
Lisa: Okay.
Tutee: And then, on number 4, you can read it. I know my answers were like 1, 2, 3. I just want to make sure I was correct.
Lisa: [Read through her calculations]. So, how did you approach the problem?
Tutee: First I looked at solubility table and these two were not soluble. They wouldn't divide into the ions. They had the least conductivity. For A and C, both were soluble. I looked at how many ions they would have and thought it would come down to the number of ions they had.
Lisa: Here it says the conductivity boils down to the number of ions you have. Between A and C, if A had more ions, how would that affect the conductivity?
Tutee: [Student gave a detailed answer]. So, C had more. And, then on number 3. . . [continued her explanations]
Lisa: How would these break apart? That's molarity of salt and water.
Tutee: I remember what I did now. [Began erasing a mistake on her paper and rewriting the correct solution].
Lisa: Yep!

After the student responded halfway through, Lisa intentionally asked how her tutee approached the problem to better understand the logic she used to solve the problem. She used this in lieu of providing a yes or no response, or even giving an answer to the tutee. Lisa also asked questions that guided the tutee in the right direction by subtly hinting at where she needed to focus.

Additionally, Lisa consistently incorporated distinct strategies in her tutoring sessions. In fact, the researcher identified over twenty methods employed each session by both Lisa and John. However, since this study did not compare the types of strategies she employed when she first began tutoring compared to the present, it is unknown how

many new strategies have been incorporated as a result of tutor training. Similarly, the previous excerpts reflected Lisa's use of active learning with her tutees, particularly as it applied to problem solving, using logic to identify mistakes, and eliminating multiple choice options by employing critical thinking skills. Likewise, the researcher noted that her use of repetition manifested in two ways: (a) Lisa often repeated tutee's responses as a way to reinforce knowledge or a correct answer; and (b) Lisa utilized repetition by having them practice solving multiple problems centered on a common concept that her tutees were learning about in lecture. The latter approach increased the likelihood that her tutees would remember the logic and rules required to solve problems (i.e., encoding information in long-term memory), as well as helped them develop confidence in their abilities.

Finally, Lisa stated that she encouraged tutees to apply tutoring strategies and certain academic skills independently. One example that illustrated this occurred at the end of her second session:

> Lisa: Units would be?
> Tutee: Joules/grams Celsius?
> Lisa: Here?
> Tutee: No, degrees Celsius.
> Lisa: Right. You're solving for temperature. Does that make sense? You have to get the right relationship in your head first. A good way to practice this is to . . . [Gave a detailed suggestion on how to continue identifying units correctly].

For John, training impacted his behavior in three key ways. First, it improved his relational communication skills in ways that fostered better tutoring relationships and helped him understand when it was appropriate to use certain approaches based on the

development of trust in the relationship. For example, John explained a simple strategy that emerged from one training on communication skills:

> John: [Paused to think] Well, for one particular instance, I call students by their names more often now.
> Geoff: What impact does that have?
> John: It has a more personal connection. You know, instead of just referring to a person as tutee #2 [giggled], you know, by calling them their name, they feel that you have more of a connection, they feel that, perhaps, you care more about their personal outcome. And, they feel that you're there for them.
> Geoff: Okay.
> John: Versus just being there because you're being paid.

Furthermore, during his third interview, he remarked that, ". . . if I didn't have the tutor training, I could have still had all that experience [face to face tutoring], but not without developing anywhere as near as well as I did in terms of being able to read body language and such."

Second, tutor training enhanced the type of strategies he employed with respect to asking questions along Bloom's taxonomy. John believed that "it's actually a pretty decent guide because . . . based on the level that they are on, you can slowly try to push them up one level at a time [towards] the next one." Third, training helped him develop new ways to model information for students. And, fourth, it helped him develop advanced scaffolding techniques.

> And, like, since I was learning more, based on both experience and the training sessions about how people thought, I could . . . kind of manipulate it in a way to where it might fit the scaffolding. And, they could understand a little bit better. And, so they'd move up to things.

By this, John meant that he was better able to navigate between strategies, thereby increasing the level of knowledge acquired by his tutees.

The researcher's observations also supported John's thoughts on how tutor training impacted his behavior. For example, John stated that training helped him improve his relational communication in knowing when it was appropriate to incorporate certain approaches once trust had been established. This was evident in session three when John used both a non-verbal gesture and alluded to the fact that he wanted his tutee to figure out the solution to a problem independently.

John: How much NH3 do you have?
Tutee: Don't you subtract this from that?
John: Mmm-hmm.
Tutee: 56.56 moles?
John: [Pinched his lips and twisted them as if turning a key to lock a door]
Tutee: What does that mean?
John: I'm keeping my lips shut!
Tutee: Okay! [Seemed to understand that John wanted her to figure the solution out on her own]
John: [After 30 seconds, John saw she was struggling; prompted her with a new question] Which one is. . .?
Tutee: That one . . . Oh no! It would be 2!
John: There you go!

Similarly, the researcher saw evidence that John incorporated activities that tapped into his tutee's learning style. Specifically, the one tutee John was observed with during all six tutoring sessions preferred visual types of activities to help her understand the course concepts. In turn, John consistently used the dry erase board to model problem solving techniques and to have her demonstrate her knowledge by applying her knowledge to additional practice problems. During one of his debriefing interviews, John

stated that this mode was more effective because “she’s a visual learner, so simply saying it won’t work as well.” Although this did overlap in some ways with his third belief that tutor training helped him develop new ways to model information, this was the primary mode observed during this study.

Finally, John asserted that tutor training enabled him to develop advanced scaffolding techniques. Interestingly, none of the tutor training sessions incorporate the term “advanced scaffolding” when scaffolding is presented to tutors. Tutors are specifically taught: what scaffolding is; what it involves; Lev Vygotsky’s zone of proximal development in learning concepts more effectively; and how to intentionally scaffold knowledge by incorporating different levels of knowledge, different learning styles, varying levels of support that help move the student to more independent demonstrations of their knowledge, and the role of reciprocal peer tutoring.

Yet, despite the incorporation of this adjective, John’s assertion that he effectively navigated between different strategies to help scaffold a student’s learning was evident in the researcher’s observations. In the following excerpt from session five, John incorporated: knowledge, comprehension and application questions; modeling; problem-solving; processing time for the tutee to attempt the problem independently; and reciprocal peer tutoring.

John: If you have a jug of NAOH here, what unit are you going to measure out of it?
Tutee: Um, what do you mean?
John: If you scoop it up, put it in a scale, what do you measure the units in?
Tutee: Grams.
John: What’s this in [pointed to one part of the problem]?
Tutee: Moles.

John: Over?
Tutee: Moles over. . . Um, either volume or liters.
John: Liters is volume. It's liters in this particular situation. How much do you have?
Tutee: .5L.
John: [Modeled on the dry erase board to show what had been given]
Tutee: [Began calculating again; processed her thoughts out loud while she worked]
John: [Leaned back a little bit in his chair; watched her moves intently; leaned in again]
John: What units would that be [pointed to one part of her problem]?
Tutee: Um. . . [writes out her answer]
John: [Nodded no] You multiplied this by liters and . . . [continued brief reminder]
Tutee: So, just moles?
John: Yeah except. . . Capital M is molarity. And what's that [pointed to problem] moles of?
Tutee: [Answered question, but then seemed unsure] Um, I don't know. How would I explain it?
John: What are you measuring sodium hydroxide in?
Tutee: Grams?
John: Mmm-hmm. Grams of?
Tutee: Oh.
John: [Watched her set up the equation correctly]
Tutee: I'm canceling moles out.
John: You had your units right. You just had the wrong numbers.
Tutee: Okay. 18.02?
John: [John flipped to the periodic table to verify the answer] It is 22.49.
Tutee: Oh, I wasn't thinking the wrong thing.
John: Now explain it to me. How would you make a 500ml solution of sodium hydroxide?

Tutee: Um, well, you'd take the 500 ml and . . . [tutee walked John back through the whole process to solve this problem, step-by-step]

Following this particular exchange, John continued by having his tutee work through three more problems before the end of the tutoring session. This continuous practice and reinforcement, coupled with the various strategies, questions, active learning, encouragement and support, and opportunities for his tutee to explain her knowledge all

culminated in scaffolding the course concepts for this tutee. She began at a basic level of understanding and could clarify her logic independently by the end of the session.

What Training Had the Most Influence?

The researcher split this question into two components: (a) how tutors viewed training as being helpful; and (b) what specific training sessions had the most relevance to them. Lisa viewed tutor training positively and characterized the impact it had on her when she first began versus later in her employment. At the beginning, ". . . it served like as a guide. Because I was really new to it and I didn't know a lot of this. Different techniques to use and . . . it helped kind of build my confidence as a tutor." At the more advanced levels of tutor training, it presented a review of certain strategies, provided reinforcement of knowledge and strategies, offered tutors additional resources for their sessions through the learning center's Blackboard site.

John viewed tutor training as being helpful by reviewing techniques in the context of multiple training sessions, providing different ways of examining concepts, by engaging tutors in role plays that appealed to his learning style, offering him the opportunity to observe and learn from peer tutors and using their ideas in his own sessions, and by covering concepts at a pace that made knowledge acquisition easier. In particular, John believed that the training format, which offered weekly tutor trainings that covered one topic at a time, prevented tutors from being overwhelmed with too much information up front and "because it gives you a time to actually try out in a few [tutoring] sessions what you've learned in the previous ones [trainings]." By structuring training to cover ten topics over the course of a semester, John thought he had sufficient

time to process the topics and be able to apply them directly in his sessions. Additionally, he remarked that the trainers' positive attitudes, communication styles, and knowledge were far more important than who actually facilitated his training sessions.

In terms of the actual training topics that had the most influence, there was only one that was mentioned by both tutors: Bloom's taxonomy. Both tutors indicated this training enabled them to ask tutees a variety of questions that tapped into different levels of knowledge. Additionally, it was a key component of their ability to help scaffold knowledge by moving up and down Bloom's levels. The other sessions that the tutors cited as being most valuable are included in Table 6.

Table 6

Influential Training Topics Reported by Learning Center Tutors

Lisa	John
Bloom's taxonomy	Bloom's taxonomy
Learning styles	Targeted populations: 1st generation students Student-athletes
Critical thinking	
Scaffolding	
Socratic Q's/open-ended Q's	
Student development theory	
Study skills techniques	
Adult learners	
Communication skills	
Giving feedback	
Motivational strategies	

What Training Had the Least Influence?

Interestingly, there were no training sessions that John and Lisa commonly felt did not benefit their tutoring. Lisa felt that the training on student-athletes was less pertinent to her role since she has not worked with this population. Likewise, she did not find the inclusion of how to deal with students who might display suicidal thoughts (during referral skills training) as helpful because "I've never encountered somebody like that . . . and so, I kept it in the back of my mind . . ." Lastly, Lisa thought the first training session on tutor sessions steps, that outlines MacDonald's approach to structuring tutoring sessions in *The Master Tutor*, was less helpful for her style. Specifically, she remarked, "I just kind of go with what they come with . . . just because I don't have time to make up an outline for each person." Instead, she adapted to what the tutees presented and selected strategies to fit their needs.

John, on the other hand, found the training on disability services less useful, in part, because he already knew a fair amount about the services and learning disabilities in general. Additionally, he shared that

> . . . we find out where the office was, and they have good information. I think there could have been a lot more exploring about how you . . . could handle students in those situations . . . and, we were never really given a lot of instruction about . . . particular cases.

Additionally, although he liked the training on learning styles, he felt that it lacked specific ways to apply each learning style to subject content. Finally, John suggested that the trainers reduce some of the lecture format used in some trainings and expand on the last two training sessions involving cognitive scaffolding. For the latter, he suggested that

the tutors design an entire training session themselves, which they currently do but in an abbreviated fashion given that they only have ten to fifteen minutes to present their session in small groups to their peers.

Themes

As stated in Chapter III, the researcher identified four types of themes based on Creswell's (2005) approach to qualitative research. These were broken out into four types: (a) ordinary themes that the researcher expected to find based on the research literature and/or his experience; (b) unexpected themes that spoke to some new aspect of scaffolding, particularly as it related to non-trained tutors; (c) hard-to-classify themes that tended to stand alone or not group well; and (d) major and minor themes.

There were several ordinary themes that emerged for academic department tutoring. First, students typically attended walk-in tutoring right before an assignment was due. This was similar to the researcher's experience with walk-in tutoring at the learning center years ago. When the learning center conducted walk-in tutoring, students often indicated that they liked the flexibility offered by walk-in tutoring. However, this did not translate into consistent attendance. At the end of a semester, some students reported that they misjudged their ability to do well without additional assistance from someone like a tutor. A similar observation was specifically mentioned by Oscar during his first interview when he stated, ". . . most students really don't, I guess they don't want to acknowledge that they need the help." Similarly, both department tutors also stated that only a few of their respective lab students opted to use tutoring services.

Consequently, as a whole, students failed to take full advantage of the academic department tutoring.

Second, the academic department tutors employed fewer strategies than the learning center tutors. In particular, they were more apt to utilize explanations, especially when there were more than four tutees present during a tutoring session. In terms of question asking, both department tutors most commonly utilized knowledge and comprehension level questions with tutees. Interestingly, both academic department tutors thought they used more strategies than they actually did, as based on the researcher's observations.

Likewise, there were several ordinary themes that emerged about learning center tutoring. First, both learning center tutors developed more personal relationships with their tutees. They knew more about their tutees' background and experiences, as well as having a stronger sense of their academic needs and learning styles. Second, based on direct observation, they were more apt to engage tutees in active learning and reciprocal peer tutoring. Third, the learning center tutors were more likely to incorporate Bloom's taxonomy by adjusting the level of knowledge in their questions based on how well their tutees understood the concepts being discussed. Fourth, both learning center tutors thought that the structure of their tutoring increased the efficacy of their sessions. Specifically, they referred to the weekly sessions, tutoring contract, and consistent slate of tutees as being valuable in helping students learn more effectively. Lastly, both learning center tutors solicited feedback from their tutees regarding their strategies. They

did not rely solely on non-verbal communication or the accuracy of tutees' responses to gauge their effectiveness.

There were a number of unexpected themes that emerged during the course of this research study, particularly as it related to both sets of tutors, the tutoring environments, and the tutor training for learning center tutors. In terms of the academic department tutoring environment, there were significantly more students attending walk-in tutoring services (at least for the two research participants) than the researcher anticipated. The fact that there were no attendance limits during a particular tutoring session meant that an unlimited amount of tutees could attend all at once. During several observations, the tutors and the researcher both felt that this created a frenetic environment and the sense that tutors were unable to spend quality time addressing each tutee's needs appropriately, despite their intentions to do otherwise. Moreover, both department tutors felt pressured in creating sufficient time for each tutee. The researcher believed this may have mitigated how effectively an academic department tutor could scaffold knowledge. Additionally, based on most tutees' infrequent attendance, there was less opportunity to develop a personal relationship with their tutors. Many tutees only attended one or two sessions and only a few students attended on a regular basis. This also limited how well the academic department tutors knew the students' learning styles and academic needs.

The additional student load experienced by both department tutors resulted from the fact that tutees from any 100-level lab session could attend tutoring, not just the ones from that particular tutor's lab section. This often resulted in greater time being spent by the tutor trying to figure out the purpose of the lab assignment and questions.

Correspondingly, the uncertainty of whether there were academic support materials for the other labs, coupled with the lack of available time to read those materials, meant that more time was spent trying to ascertain the specific purpose and steps involved in a particular lab.

On the whole, several unexpected themes emerged regarding the academic department tutors themselves. Notably, there was less emphasis on the use relational communication by the department tutors. This does not imply that they were not respectful, polite, or attentive to their students. In fact, they employed good non-verbal communication, were friendly, and actively engaged with their tutees. Rather, there was an almost exclusive focus on the lab material and the students' questions. Oftentimes, this was a direct result of how many students were present for tutoring.

Additionally, both department tutors used similar questions and instruction as the learning center tutors. However, they did not employ these strategies as frequently as the learning center tutors, nor did they ask questions above the comprehension level as frequently as the learning center tutors. Likewise, they did not incorporate the wide variety of active learning strategies and academic skills that the learning center tutors emphasized.

On the flip side, an unexpected theme that emerged for the learning center tutoring environment involved noise levels. Specifically, during some observations, there were higher noise levels generated by multiple tutoring conversations at nearby tables. While the researcher was previously aware of this fact, he was surprised that the tutor and

tutee seemed to effectively tune out the distraction. This contradicted some feedback that had been received from semester tutoring evaluations in past semesters.

In terms of the learning center tutors' strategies, an unexpected theme involved their ability to clearly articulate how they scaffold knowledge and that they made deliberate connections between scaffolding and fostering independent learning with their tutees. While this is a significant component of tutor training, particularly for experienced tutoring staff, the researcher was surprised by the depth of knowledge and intentionality expressed by the tutors in this regard.

The final unexpected theme related to tutor training for the learning center tutors. The training format appealed to both learning center tutors, particularly in terms of the frequency of trainings, helping them develop self-confidence, and by fostering connections between training concepts through multiple training sessions. Additionally, both learning center tutors believed that Bloom's taxonomy was the most influential training in terms of learning how to structure their questions with tutees along different levels of knowledge and thinking.

There was only one hard-to-classify theme that emerged for the researcher. Specifically, it remained unclear whether or not the students who utilized academic department tutoring retained information or if they simply used the tutoring sessions to find answers for their lab assignments. This directly relates to the academic department tutors not engaging as often in active learning exercises and reciprocal peer tutoring. Similarly, since interviewing students was not part of this research design, there was no way to be entirely sure of their motivation anyway.

Finally, there were several major themes that emerged during the study. In terms of tutor training, there were four specific elements that emerged. First, both learning center tutors believed that tutor training improved their use of active learning in tutoring sessions. Second, the tutors were more knowledgeable about tutoring strategies, had more strategies to select from, and were more intentional in their use of tutoring strategies. Third, the learning center tutors reported that training enabled them to acquire strategies and skill sets that helped foster independent learning among their tutees. Fourth, training helped both tutors learn how to scaffold knowledge with their tutees.

Next, both learning center tutors employed a wider range of questions, instructional methods, active learning strategies and academic skills instruction compared to the academic department tutors. They were much more likely to engage in these methods than the use of explanations. In addition, both learning center tutors clearly articulated the benefits that tutoring provided for tutees as well as for themselves.

Another major theme that emerged was that both academic department tutors seemed to care just as much about their tutees' success as the learning center tutors. However, both department tutors acknowledged that the irregular attendance by most students limited how well they knew their tutees' academic needs and limited the development of a more personal relationship. Kelly acknowledged that she placed more emphasis on helping those students who repeatedly came to tutoring. This was also a product of her knowing that students could attend any department tutor's walk-in session.

Lastly, both groups of tutors had specific experiences that impacted their tutoring style. The academic department tutors relied heavily on their own academic experiences

and what strategies helped them learn concepts effectively, as well as their prior tutoring experiences before graduate school. Interestingly, both department tutors developed stronger tutoring relationships in their previous tutoring roles or when they conducted private tutoring as opposed to walk-in tutoring. In contrast, tutor training and some of the learning centers' role models, such as certain faculty and even a parent, were influential for this group.

Summary

This study presented important information pertaining to both academic department and learning center tutors' perceptions of how tutoring unfolded, how they assist tutees and the specific strategies they employed, how students responded to their methods and strategies, what factors impacted their tutoring roles, and how tutor training impacted learning center tutors' roles. It was also the first known example of research that examined critical differences and similarities between academic department and learning center tutors in a naturalistic setting.

While both academic department tutors employed many of the same questioning and instructional techniques that the learning center tutors used, they did so less frequently, did not use as many higher level thinking questions, and relied more on explanations as part of their instructional approach. Likewise, there were significantly fewer demonstrations of active learning and academic skills instruction among the department tutors. This result supported previous research studies that demonstrated tutor training resulted in more effective tutoring sessions and greater student learning.

The use of relational communication was also distinctly different among the two types of tutors. Both learning center tutors utilized relational communication to get to know their tutees, to foster trust, and to build relationships that enabled them to challenge their tutees' academic efforts. In contrast, the academic department tutors were less apt to engage their tutees in relational communication. Major obstacles that limited the use of this included having to manage larger groups of tutees during a session, the pressure of time to address each tutee's concerns, and the absence of training to emphasize the value of relational communication for enhancing the quality of tutoring relationships.

The structure of academic department walk-in tutoring versus the regular, weekly commitment for tutoring present in a learning center also resulted in different experiences for both the tutors and the students. Regular attendance enabled the learning center tutors to better understand their tutees' learning styles, academic needs, and select strategies to assist them. Walk-in tutors experienced greater challenges with being prepared for the variety of questions they received given that any student enrolled in one of three levels of lab coursework could attend their tutoring sessions. Understandably, since both department tutors were more familiar with their own labs, it took longer to determine the purpose and processes utilized in different lab coursework.

Chapter V presents the conclusions, implications, and suggestions for future research based on the findings documented in this chapter.

CHAPTER V

DISCUSSION AND IMPLICATIONS

This chapter presents discussion and implications of the findings based on the research questions in Chapter IV. Recommendations are presented for practice, policy and future research.

This study was undertaken to develop a better understanding of the instructional strategies used by learning center and academic department tutors, how training impacted the selection and use of particular strategies and the resulting scaffolding that occurred during tutoring sessions. The researcher was especially interested in what transpired during academic department tutoring sessions and how department tutors selected strategies to assist tutees understand course concepts. This was critical given that no known research has compared both groups in naturalistic tutoring environments over time, nor how environmental differences may impact the tutoring process itself. Moreover, the researcher wanted to develop a better understanding of how cognitive scaffolding occurred during tutoring, particularly given the difference of tutor training for learning center tutors.

Discussion

The research literature on tutoring has focused predominantly on studies emanating from learning centers rather than academic departments. One of the major emphases pertained to benefits associated with peer tutoring. Peer tutoring offered

students the opportunity to work with others similar in age and status (Cohen, 1986; Marsh, 2001; Maxwell, 1991) as well as offering cost efficiency for campuses (Beasley, 1997; Boylan et al., 1995; Dvorak, 2004; Lidren & Meier, 1991; MacDonald, 1993; Marsh, 2001; Maxwell, 2001; Riggio et al., 1991). It has been shown that peers behaved more like colleagues rather than appearing superior (Johansen et al., 1992), fostered non-threatening environments and opportunities to achieve academic goals (Dvorak, 2001), and enabled question-asking outside of traditional lectures (Graesser et al., 1995).

A second emphasis focused on the benefits afforded by programs that emphasized tutor training for their staff (Boylan et al., 1997; Chadwick & McGuire, 2004; Dvorak, 2004; Fantuzzo et al., 1989; Graesser et al., 1995; Marsh, 2001; Maxwell, 2001; Reichert & Hunter, 2006; Schleyer et al., 2005). In particular, the process of scaffolding knowledge has been shown to play a significant role in how well students learn and apply knowledge (Chi, 1996). Consequently, tutor training is now considered the norm at college and university learning centers (Marsh, 2001). However, no research had been conducted on how tutor training informed the instructional strategies chosen by trained tutors, regardless of who offered the tutoring. Similarly, no research was found regarding how academic department tutors, who often do not receive training, assist their students or what experiences they draw from to conduct their tutoring sessions.

One possible reason that less focus has been placed on academic department tutoring stems from tutoring being a secondary responsibility to serving as teaching assistants for classes and labs. Moreover, faculty commonly selected graduate assistants based solely on their grade point average, GRE scores, past area of study and interview

performance (Savage & Sharpe, 1998). Savage and Sharpe (1998) estimated that less than 50% of colleges and universities had any type of formal training in place for teaching assistants, with only three institutions that specifically incorporated a teacher training component. Likewise, there was only one previous study found by the researcher to emphasize environmental considerations in tutoring (Honkimäki & Tynjälä, 2007). However, this study focused on graduate students in Finland and did not characterize the actual tutoring environment itself or its impact upon the tutors and participants.

Roscoe and Chi (2007) recommended research that cuts across tutoring format and structure, such as appointment-based versus walk-in tutoring, to help broaden the understanding of how tutoring unfolds. Similarly, researchers (MacDonald, 1993; Roscoe & Chi, 2007) emphasized the need to develop a better understanding of what tutor training aspects and training topics have yielded the greatest benefit for tutors' thinking, behaviors and methods. These deficits in the research literature regarding academic department tutoring, the types of strategies employed by department tutors, what tutors drew from to assist students, and how the tutoring environment impacted their tutoring were key reasons for this research study.

The researcher used a case study design that incorporated elements that were both instrumental and collective in nature. Specifically, this study examined the nature of tutoring instruction for both trained and non-trained tutors in two different environments (appointment-based tutoring sponsored by the university learning assistance center and walk-in tutoring sponsored by the Chemistry department), the types of instructional strategies that each employed, how the tutoring environment impacted tutoring, how

training informed the selection of strategies by learning center tutors, and the resulting scaffolding that occurred in their tutoring sessions. The researcher chose this type of case study design because it enabled him to examine a specific issue that was broader in scope than the people studied and because it involved multiple cases to help explain the research issue (Creswell, 2005; Stake, 1995). Moreover, it facilitated a richer examination of how tutoring unfolded in these different environments. The literature review and data collection chapters in this study provide greater context for answering the research questions below.

Research Question 1: *What instructional methods were used by learning center tutors and academic department tutors, and how did they differ?*

What happened in academic department tutoring sessions?

The academic department tutoring offered by the Chemistry department focused on walk-in services for 100-level coursework and labs. Tutor observations and interviews revealed that the emphasis of tutoring was on helping students with lab assignments and homework problems. The structure of the Chemistry department's tutoring enabled tutees from any 100-level lab session to attend any tutoring session they chose, not just their particular tutor's tutoring times. Consequently, both department tutors (Kelly and Oscar) stated that only a handful of their respective lab students opted to use tutoring services, whereas most of their tutees originated from other labs and lab sections. This often resulted in greater time being spent by the tutor trying to figure out the purpose of the lab assignment and questions. Consequently, many students failed to take full advantage of the academic department tutoring offered to them. Infrequent tutoring attendance also

limited how well the academic department tutors knew the students' learning styles and academic needs.

Overall, attendance numbers fluctuated between walk-in tutoring sessions. Surprisingly, there were significantly more students attending walk-in tutoring services (at least for the two research participants) than the researcher anticipated. Moreover, the fact that there were no attendance limits during a particular tutoring session meant that an unlimited amount of tutees could attend at one time. During several observations of each department tutor, there were anywhere from six to seventeen tutees in attendance. The tutors and the researcher both felt that such large attendance numbers created a frenetic environment and resulted in the tutors being unable to spend quality time addressing each tutee's needs appropriately. Similarly, this raised a concern for the researcher regarding the efficacy and academic value gleaned by students using tutoring in such an environment.

Notably, there was less emphasis on using relational communication by the department tutors compared to the learning center tutors. Yet, they were respectful, polite, and attentive to their students. There were even times that humor was used in their communication style. In fact, they employed good non-verbal communication, were friendly, and actively engaged with their tutees. Of the two department tutors, Oscar was much more patient with his students and gave them sufficient processing time during tutoring. In fact, one major theme that emerged for the department tutors was that they expressed just as much concern for their tutees' academic success as the learning center tutors did. Researchers have positively remarked that such qualities typically make for

effective tutors (Bobko, 1984; Dvorak, 2001). Despite this, there was an almost exclusive focus by both tutors on the lab material and the students' questions. In fact, greetings at the onset of tutoring were typically absent. Commonly, this focus was a direct result of how many students attended tutoring. Both department tutors acknowledged that irregular attendance by most of their students limited the development of a more personal relationship.

One of the department tutors, Kelly, did most of the talking rather than her tutees. This was consistent with the research literature regarding communication strategies employed by inexperienced or insufficiently trained tutors, which resulted in greater conversational dominance by the tutor (Chadwick & McGuire, 2004). Early in Kelly's tutoring, when she asked questions she typically employed comprehension questions, followed by knowledge questions. If one refers to Bloom's taxonomy for increasing the levels of knowledge requisite in learning, this actually followed the inverse pattern by lowering the knowledge level. Over the span of her observations, she was more effective in covering different levels.

Interestingly, the department tutors used questions and instruction similar to those used by the learning center tutors. However, they did not employ these strategies as frequently as the learning center tutors, nor did they ask questions above the comprehension level as frequently as the learning center tutors. Likewise, unless tutees made an obvious error in their responses, the academic department tutors were more likely to accept the tutees' affirmations that they understood something without verifying the accuracy of such statements. This mirrored Graesser and Person's (1994) concerns

about tutors accepting student affirmations when knowledge may not exist. One interesting pattern that emerged was that the department tutors were more apt to utilize explanations when attendance numbers increased (particularly when there were more than four tutees present). Roscoe and Chi (2007) described this as knowledge telling, which contrasts with knowledge building.

Likewise, their use of active learning strategies and academic skills was much more limited than the learning center tutors. However, both department tutors thought they used more strategies than actually were observed by the researcher. Overall, the department tutors employed fewer strategies compared to the learning center tutors. This was consistent with findings in the research literature, which showed that untrained tutors were typically limited to a few helping strategies including question answering, giving explanations, and using collaborative problem-solving (Graesser et al., 1995).

Moreover, although both department tutors could essentially describe what methods they used, there was an appreciable difference from the learning center tutors in terms of knowing the value of specific strategies and how to integrate them effectively in tutoring. However, this was not unexpected given that neither department tutor had received training in these areas. Both department tutors stated that in lieu of training they relied heavily on their own academic experiences and strategies that helped them learn concepts effectively, as well as their prior tutoring experiences before graduate school. Given the tutoring methods described by tutors and observed by the researcher, these department tutoring sessions could be characterized as more passive in nature. A common problem resulting from such learning is that tutors and tutees merely explain

information back and forth rather than engaging in critical thinking or scaffolding (MacDonald, 1991).

Additionally, neither department tutor solicited feedback from students regarding what strategies were helpful and why, nor what strategies were less helpful. Instead, both department tutors made assumptions about what strategies were successful, which was based on their tutees responding accurately and their non-verbal communication. Since there were fewer students who repeatedly attended walk-in tutoring and personal relationships with these tutees were not as well developed, soliciting feedback may be less of a focus for the department tutors conducting walk-in tutoring. This approach may also stem from the lack of a formal feedback process for the academic department.

What happened in learning center tutoring sessions?

Both learning center tutors conducted weekly, appointment-based tutoring at this university. Tutees were provided with one hour of assistance if they were in an individual tutoring format or two hours per week if they were in a small group of two to three students. The small groups were characterized by students being co-enrolled in the same course section number to ensure that the faculty and course content were the same. The learning center tutors retained the same slate of tutees for the entire semester unless a student opted to drop the services or withdrew from the course. One tutor (John) conducted his sessions in the learning center while the other (Lisa) conducted her sessions in the university library. Both locations were approved tutoring sites for learning center staff.

Several key themes emerged during the span of observations and interviews with the learning center tutors. First, both learning center tutors developed more personal relationships with their tutees. They knew more about their tutees' background and experiences, as well as having a stronger sense of their academic needs and learning styles compared to the academic department tutors. As an example, Lisa remarked that relational communication put her tutees at ease and reassured them of the value of their questions. Research has shown that tutors who demonstrate patience, care, and sensitivity were more effective in their roles (Bobko, 1984; Dvorak, 2001), as were those who were flexible, took time to build rapport, and served as academic role models (Dvorak, 2001). These more personal relationships reflected a greater use of relational communication in tutoring sessions given the consistency of working with the same students each week.

Second, direct observation revealed that tutors were more apt to engage tutees in active learning and reciprocal peer tutoring (RPT). Such engagement typically involved problem solving, having the tutee model or demonstrate, and having the tutee re-teach a concept from start to finish. The use of RPT has been shown to enhance cognitive gains (Fantuzzo, Riggio, Connelly, & Dimeff, 1989; Riggio et al., 1991; Rittschof & Griffin, 2001). Likewise, active engagement and instruction on how to use strategies independently created self-sufficiency among tutees (MacDonald, 2004). Third, both learning center tutors utilized Bloom's taxonomy by adjusting the knowledge level of their questions in response to how well their tutees understood the concepts being discussed. They demonstrated adeptness at increasing or decreasing the level of questioning, as well as including prompts, hints, and clarifications during their sessions.

The use of prompts supported by course content knowledge has been shown to scaffold knowledge successfully (Chi, 1996). Fourth, both learning center tutors stated that the structure of their tutoring sessions increased their efficacy. Specifically, they referred to the weekly sessions, tutoring contract, and consistent slate of tutees as being valuable in helping students learn more effectively. This expands on MacDonald's (1993) remarks that tutors' ability to assign specific tasks helped students focus on course content and reduced socializing.

Lastly, both learning center tutors solicited feedback from tutees regarding their strategies. They did so in contrast to both academic department tutors, who were more likely to rely exclusively on non-verbal communication or the accuracy of tutees' responses to gauge their effectiveness. Engaging in feedback is promoted in both journal articles (Cohen, 1986; Dvorak, 2004; Marsh, 2001; Maxwell, 2001; Medway, 1991; Rings & Sheets, 1991) and research studies (Johansen et al., 1992; Kassab et al., 2005; MacDonald, 1993). In terms of assessing a tutee's knowledge, such feedback illustrated Vygotsky's emphasis on social interactions to foster cognitive gains (Rittschof & Griffin, 2001). This also reinforced the notion that having similar peer status fostered information sharing and greater use of feedback (Cohen, 1986).

The learning center tutors also reported that the process of tutoring benefitted them as well as their tutees. Both stated that tutoring reinforced their own knowledge, which was consistent with previous studies that demonstrated the benefits to tutors (Annis, 1983; Beasley, 1997; Bobko, 1984; Dvorak, 2001; Fantuzzo et al., 1989; Lidren & Meier, 1991; Loke & Chow, 2007; Medway, 1991; McKellar, 1986). Additionally,

Lisa revealed that tutoring helped her examine the subject matter from different perspectives and learn how to break concepts down to better meet the different learning styles of her tutees. John stated that tutoring aided him in learning more about interactions with a diverse range of students, develop a stronger appreciation for educators' roles, helped him stay focused, and improved his own grades.

How and why did tutors choose the particular methods they used?

Both academic department tutors relied primarily on questions, prompts, explanations and problem solving as their primary methods. Observational data showed that these tutors frequently used explanations and "telling" information when there were larger numbers of students attending tutoring. When there were fewer students present, they typically employed knowledge and comprehension questions to help challenge their students to think about concepts. However, there were relatively few application and analysis questions observed. More important, though, was their rationale for why certain strategies were used.

Kelly discussed her rationale for using three strategies in particular: question-asking, providing explanations, and problem-solving. She cited that question-asking helped tutees: understand the "why" behind a concept; understand specific lab concepts and steps; think about the whole equation; consider steps in a process; determine how parts relate to one another; build connections with other concepts; use and apply knowledge; build self-confidence; and process concepts from start to finish. Ideally, she thought this method, coupled with problem-solving, helped her tutees practice and so they could repeat the process again on homework or tests. In contrast, she thought

explanations were necessary to provide information in new ways or terminology that students were likely to understand, to help tutees understand rules and how to apply information, and so tutees understood what a specific equation involved.

In comparison, Oscar described his rationale for both passive and active learning strategies. Passive learning (e.g., explanations, repetition, connecting concepts from lab with the class, analogies, and visuals), was used to: provide real-life examples; describe relationships between facts or concepts; provide specificity when questions and analogies were ineffective; reinforce understanding; and provide step by step instructions. He also valued passive strategies to compensate for times when students were unable to connect course concepts with lab assignments and when lab manuals did not go into as much depth.

Oscar's rationale for active learning strategies (e.g., prompts, hints, and question-asking) included guiding students towards the right answer, evaluating the accuracy of their knowledge, forcing them to explain their logic, and redirecting their efforts. He stated that the most effective approach with tutees involved asking them questions followed by providing explanations or having them write something down. Oscar explained how problem-solving could be used to help students apply concepts correctly, identify their own errors, and help groups focus on common challenges. Oscar also alluded to the benefits of reciprocal peer tutoring, which included developing a better understanding of material and identifying one's own knowledge gaps.

The rationale for employing both active and passive learning strategies by the academic department tutors in this research study sheds light on the fact that they

intuitively grasp the benefits of employing particular methods. However, this was insufficient in translating into actual practice on a regular basis. Given that both department tutors had prior experience in tutoring before their positions in graduate school, and neither demonstrated consistent use of active learning with their tutees, the researcher believed that tutor training, direct supervision, and observational feedback would be essential for helping them enhance their efficacy and their tutees' learning experiences.

In contrast, the learning center tutors in this study described a broad range of strategies during their interviews. These strategies primarily emanated from their training experience and what seemed successful for them as a student. Both tutors emphasized that their strategies focused on actively engaging their tutees in the learning process rather than simply providing answers or explanations each time they raised a question or ran into a confusing concept. There was a discernable connection between their strategies and the ability to scaffold knowledge for their tutees. This was confirmed during the researcher's observations in order to triangulate the data and confirm what actually transpired during their tutoring sessions. Both tutors frequently used questions, prompts, hints, Socratic questioning and dialogue rather than giving tutees explanations or telling answers. Notably, the observational data included specific examples of the learning center tutors identifying fragmented answers and uncertain responses or hesitation (Graesser et al., 1995), not trusting yes/no feedback, and incorporating detailed questions (Graesser & Person, 1994) as mechanisms for reducing passive learning and knowledge telling in favor of active learning and knowledge building. Similarly, both learning center

tutors consistently discussed key ideas and the basic principles that comprise them, how concepts interrelated, challenged tutees to locate their own mistakes whenever possible, and promoted tutees' interpretations of the course material using their own words. Such activities have been shown to promote greater learning for students (Graesser et al., 2002; Roscoe & Chi, 2007). Modeling and direct instruction of strategies for independent use also creates greater self-sufficiency (MacDonald, 2004).

When explanations were used, they involved two types: (a) expanding on a tutee's explanations or answers to provide more detailed background on a concept or reinforce the student's efforts; and (b) providing key information that was lacking following several minutes using a variety of active learning strategies and tapping into different learning styles. Afterwards, both learning center tutors returned to more active learning strategies and questioning to build knowledge and test for accuracy.

Question-asking, modeling, and cognitive scaffolding were three strategies that both learning center tutors described in detail. They stated that question-asking: ensured that a tutee fully understood a concept; reinforced subject matter and helped encode information in long-term memory; promoted greater review of course concepts; and facilitated different perspectives for examining concepts. Modeling was employed to show tutees how problems were solved in a step-by-step fashion and examined from different angles. Modeling typically preceded independent problem-solving on the part of the tutees.

Lisa expanded on these three techniques by sharing how she determines strategies in the first place. Selections were made based on: soliciting feedback from her tutees;

experimenting to see what works for a tutee; self-evaluating the effectiveness of a strategy, particularly by means of a tutee's facial expressions and whether or not she or he can answer questions correctly and explain concepts back to her accurately; expanding on the use of certain strategies with more than one tutee; alternating between strategies to see what seems most effective for a particular tutee; and selecting strategies based on what worked well for her as a student in learning certain concepts.

Interestingly, scaffolding was the one strategy that both tutors discussed in the greatest detail. Specifically, they valued scaffolding for the ability to: build knowledge and connections between concepts; provide support and challenge; expand on previously held knowledge; elicit better understanding of course concepts; ensure connections between concepts; verify the accuracy of a tutee's knowledge; foster independent thinking about subsequent steps and how to identify mistakes; relate concepts to current topics; see patterns; reduce test anxiety; interact and process knowledge and information, particularly through RPT; and learn how to apply knowledge independently and in different situations or contexts. Notably, fostering independence was a goal for both learning center tutors.

As previously noted, the researcher's observations confirmed the learning center tutors' use of scaffolding in their tutoring sessions. In particular, the ability to break concepts down into simpler ideas and parts and expanding them again to convey a big-picture perspective (Cromley & Azevedo, 2005; Dvorak, 2004; Sutton, 1998), coupled with continuous assessment of the person's level of understanding (Puntambekar & Hübscher, 2005) were hallmarks of cognitive scaffolding. This directly related to the

active learning nature of strategies employed by learning center tutors in this study. It also reinforced previous research that demonstrated significantly greater cognitive scaffolding occurred among more experienced tutors compared to less experienced ones (Cromley & Azevedo, 2005).

One additional noteworthy theme was that both academic department and learning center tutors remarked on the unique learning needs and challenges faced by some college students with learning disabilities. Both of the male tutors (one tutor from each environment) disclosed that they had a learning disability, which sensitized them to what other students experienced in and out of the classroom. Moreover, both groups of tutors also confirmed that they drew upon their own academic experiences and learning styles to assist tutees with concepts. If they learned a concept more easily through one mode, they were likely to help their tutees in a similar fashion.

How did environmental differences among academic department and learning center tutors impact tutoring sessions?

The major facets related to environmental differences included the physical environment, the administrative structure of the two types of tutoring services (walk-in tutoring for the department versus weekly, appointment-based tutoring for the learning center), and the impact of prior experience for the department tutors versus tutor training for the learning center tutors.

In terms of the physical environment, the learning center, the library, and the academic department were all affected by elevated noise levels. However, this varied tremendously depending on the number of tutees attending tutoring at a given time.

While the researcher was previously aware of the impact created by multiple tutoring sessions held in the learning center, he was surprised to see that both the tutor and the student seemed unaffected by the noise levels. This contradicted some feedback received by other learning center tutors during prior semester evaluations. One possible explanation is that this generation of students is better adapted to cope with multiple stimuli and distractions. Another is that these two students were simply better at focusing on the coursework than other students might be.

The most dramatic environmental effects were felt in the academic department. The researcher believed this was a product of the physical space being the smallest of all three locations. When more tutees attended, the increased noise levels from multiple conversations coupled with the reduced room for physical movement made it difficult for both the tutor and the researcher. Both department tutors believed that larger numbers of tutees detracted from their ability to find common ground for all students to work on and to physically move around the room, and, therefore, limited the quality of time and attention for each tutee. The researcher found those tutoring sessions chaotic and difficult to process everything that was occurring. Since the researcher was a non-participant observer, it was challenging to follow the conversations when tutors moved around the room or moved out of hearing range.

The administrative structure of the program also impacted tutoring sessions. For both learning center tutors, the use of tutoring contracts established clear role expectations and attendance guidelines. Similarly, the weekly appointment structure with each tutee fostered better tutor relationships, greater course knowledge and improvement,

and better grades. This corresponded with Lidren and Meier's (1991) findings that one hour of peer tutoring per week produced academic improvements, as well as other research demonstrating better academic success and course grades when tutoring is received from trained tutors (Boylan et al., 1997; Chadwick & McGuire, 2004; Fantuzzo et al., 1989; Schleyer et al., 2005). While the impact of tutoring on students' grades was not explored in this study, the tutors demonstrated awareness of their tutees' grades and noted when improvements occurred. Observational data supported the tutors' beliefs that the structure fostered better relationships and course knowledge. In large part, this stemmed from greater time working with each person in comparison to department tutoring.

For the academic department tutors, the structure of their walk-in tutoring actually may have hindered active learning. Specifically, when more tutees were present, it resulted in less use of open-ended questions and selection of different tutoring strategies compared to times when only a few tutees attended. The time limitations of serving numerous students also limited the depth of the conversations that occurred. It also created greater stress for the tutors who were cognizant of the need to get to as many people as possible in a short span of time. Additionally, rather than being able to focus on one course at a time, the department tutors often had students from multiple course sections and levels attending. This resulted in greater time being spent trying to figure out what the students were doing in their lab, the purpose of the lab, and how best to guide the tutees. On the other hand, one may validly argue that walk-in tutoring formats afford students the flexibility of attending tutoring when they need assistance rather than

obligating them to a weekly tutoring commitment. However, without the benefit of grade analyses, this would be conjecture.

Additionally, tutor training imparted specific strategies and knowledge that enabled both learning center tutors to scaffold their tutees' learning more effectively. This was evident in the learning center tutors' interview responses as well as the observational data. Specifically, both learning center tutors incorporated strategies that went beyond rote learning methods and fostered stronger connections for their tutees. This supported previous research that demonstrated significant gains in student learning and knowledge when scaffolding was used by tutors (Chi, 1996) and when tutors employed critical thinking questions, challenged tutees' beliefs and knowledge, and required them to explain their logic (Graesser et al., 2002).

In contrast, the academic department tutors did not clearly demonstrate cognitive scaffolding in their sessions. The researcher attributed this to the absence of training on such tutoring strategies. Baxter Magolda and Rogers (1988) synthesized this by noting that the process of having students work together does not necessarily produce critical thinking. Moreover, research has demonstrated significant academic improvements among tutees when the tutors have been trained on relational communication strategies for as little as thirty minutes (Chadwick & McGuire, 2004).

The impact of prior experience for both department tutors was manifest in prior teaching experience and private tutoring experience. Both department tutors stated that these opportunities helped them develop confidence in their ability to ask questions, use explanations, and help students organize their information into a logical order. However,

neither department tutor had ever received training on how to effectively tutor. Although both department tutors provided rich information about their previous experiences and how that guided their current tutoring practices, the researcher found that it was insufficient for expanding their actual use of more diverse tutoring strategies. Consequently, their strategies were more limited in scope compared to the learning center tutors. This also limited their ability to scaffold knowledge effectively, which is echoed by Roscoe and Chi (2007) who described knowledge telling rather than knowledge building and by Graesser et al. (1995), who demonstrated that untrained tutors relied on fewer helping strategies. In contrast, richer data was gleaned from the learning center tutors regarding how tutor training impacted their roles (discussed in research question two).

Moreover, it is distinctly possible that the overall differences observed by the researcher have more to do with variations in experience and length of tenure than setting. Specifically, Lisa and John (the learning center tutors) had greater experience and served longer as tutors than either of the department tutors. However, the researcher believed that the academic department tutors performed better than he anticipated given the limited scope of knowledge about department tutoring proffered in the research literature, the lack of training for performing their roles, and the difference in experience levels.

Consequently, the researcher recommended that the Chemistry department incorporate tutor training to assist their staff. Emphasis on topics such as relational communication, tutoring strategies, Bloom's taxonomy, and cognitive scaffolding can

significantly benefit the tutors, improve their approaches with tutees, bring greater intentionality to the tutoring sessions, and help them address key issues unique to the walk-in structure provided by their department. Whereas tutor training is viewed as a best practice by researchers (Dvorak, 2004; Marsh, 2001; Maxwell, 2001; Reichert & Hunter, 2006), the real benefit to the department would come in the form of increased academic success levels and higher grades for students receiving tutoring from trained tutors (Boylan et al., 1997; Chadwick & McGuire, 2004; Fantuzzo et al., 1989; Schleyer et al., 2005) and perhaps higher retention rates (Boylan et al., 1997).

In particular, such training would help the department tutors who indicated that their use of explanations stemmed from tutees focusing on specific lab questions and homework rather than broader concepts. Training could offer valuable insight into how to utilize reflective questions, incorporate different levels of questions, and structure dialogue in ways that minimize the use of explanations and knowledge telling. Similarly, department tutors could develop greater skills in facilitating discussions on key ideas, principles and relationships and how to help students identify errors and misconceptions, which has also been shown to improve student learning (Roscoe & Chi, 2007). Additionally, it may help the academic department tutors develop greater confidence in their ability to help tutees (Beasley, 1997; Johansen, Martenson & Bircher, 1992; Loke & Chow, 2007), similar to the description provided by the learning center tutors. Practice and reflection time would be valuable facets of such training. Challenges to implementing such training includes time limitations for faculty and the graduate tutors themselves, a lack of training experience for faculty, and the fact that the tutoring role is

secondary to the emphasis placed on graduate students serving as teaching assistants for the labs.

In terms of department tutoring, the combination of environmental factors along with the emphasis on utilizing more passive learning methods, incorporating questions primarily at the knowledge and comprehension levels, and engaging more in explanations or knowledge telling raised additional questions for the researcher: (a) How well did the students learn when larger numbers of tutees attended tutoring, particularly when feedback was not present or provided?; (b) Did walk-in tutees place more emphasis on how to complete the assignment or get the answers for their lab worksheets than understanding the inherent concepts?; and (c) If feedback was not provided when tutees attended for shorter time spans, did walk-in tutors accurately gauge student learning based on a student's non-verbals or ability to answer questions correctly? Because the tutors, rather than the tutees, were the focus of this research, it is not possible to answer these questions from the data collected in this study.

Finally, a minor theme that emerged during one of the learning center tutor interviews (John) related to supervision. He stated that supervision conversations were helpful in his development as a tutor. However, John found this more beneficial early in his career when the feedback he received about his tutoring approaches and strategies was used to make adjustments to his style. This contradicted the recommendations of Norton (2001), who proffered that supervision becomes more vital with increasing experience. It was conceivable that Norton approached this perspective differently than a tutor might because of her researcher status. Just as tutees begin the tutoring process by

relying more on their tutors and end the process by demonstrating greater independence, a tutor may benefit from closer guidance and supervision when they first begin tutoring and have more questions about policies, strategies, and handling challenging situations compared to when they have been employed for multiple semesters and have participated in multiple training levels. Therefore, for the tutor the role of the supervisor changes from instructor to consultant. In John's case, this change occurred as he developed greater self-confidence as a tutor and as he operated more independently given the foundation of knowledge and feedback he had received earlier in his position.

Research Question 2: *What was the impact of tutor training on learning center tutors' practice?*

What was the impact on their behavior?

Several themes emerged regarding the training received by both learning center tutors. First, the learning center tutors reported improved use of active learning strategies. Second, they were more knowledgeable about tutoring strategies, had more strategies to select from, and were more intentional in their use of tutoring strategies. Third, the tutors stated that training enabled them to foster greater independent learning among their tutees. Fourth, training helped both tutors learn how to scaffold knowledge effectively. Notably, while scaffolding is a significant component of tutor training at this university, particularly for experienced tutoring staff, the researcher was surprised by the depth of knowledge and intentionality expressed by the tutors in this regard.

The researcher's observations supported the learning center tutors' remarks regarding how training impacted their behavior. Specifically, they demonstrated intentionality by challenging their tutees' knowledge in multiple formats, incorporated

different levels of questioning along Bloom's taxonomy, incorporated more active learning and tutoring strategies compared to the academic department tutors, and engaged tutees in identifying their own mistakes and misunderstandings. Their relational communication was stronger (Chadwick & McGuire, 2004) compared to both academic department tutors, and it enabled them to know when certain approaches were likely to be successful once trust and rapport had been established. Overall, the combination of these factors allowed for greater scaffolding of knowledge.

What training had the most influence?

Both learning center tutors believed that Bloom's taxonomy was the most influential training in terms of learning how to structure their questions along different levels of knowledge and thinking, how to enhance questioning techniques (Maxwell, 2001), and how to be intentional with question phrasing and clarification (Medway, 1991).

Additionally, several aspects emerged from both learning center tutors that corresponded with benefits described in the research literature. Lisa reported that training served as a behavioral guide for her tutoring, helped her develop self-confidence in her tutoring style (Beasley, 1997; Johansen et al., 1992; Loke & Chow, 2007), provided knowledge reinforcement (Bobko, 1984; Medway, 1991), provided more strategies to draw from, offered continuous review of certain strategies, and gave tutors additional resources through the learning center's Blackboard site.

John stated that training exposed him to diverse people and improved his communication skills (Beasley, 1997; Bobko, 1984; Lidren & Meier, 1991), helped him

review tutoring techniques and strategies, provided different ways of examining concepts, and engaged him in different instructional methods—especially role plays that appealed to his learning style (Baxter Magolda & Rogers, 1988; Boylan et al., 1995; Brandwein & DiVittis, 1985). Training also offered him the opportunity to observe and learn from peer tutors and incorporate their ideas in his own sessions (Boylan et al., 1995).

An unexpected theme emerged regarding the tutor training format, which offered one training topic per week for ten weeks of the semester. The format appealed to both learning center tutors particularly in terms of the frequency of trainings, the opportunity to practice strategies and develop self-confidence, and because it fostered connections between training concepts during multiple training sessions. John specifically remarked that the training format: (a) provided a reasonable pace for greater knowledge acquisition; (b) prevented him from feeling overwhelmed by too much information; (c) reviewed concepts regularly to ensure information was retained; and (d) enabled him time to process training information and apply it in the context of his tutoring sessions.

What training had the least influence?

Interestingly, there was no common thread among the tutors regarding this question, save for the possibility of each tutor's experience in working with certain populations. For example, Lisa indicated that she found the information on assisting student-athletes and those experiencing suicidal thoughts as being least helpful. However, she admitted this was due to not having the opportunity to serve students with these experiences. In contrast, John indicated that the training on disability services was least helpful. However, in large part, this was due to John's own experience with a learning

disability and prior knowledge about ways to best provide support to those with learning disabilities. Apparently, tutors find least useful that information in training that they believed they already knew or that they had not had the opportunity to use. If so, what portions of training are least useful will be highly idiosyncratic based upon each tutor's prior experiences and the experiences that each will have during tutoring, which cannot be predicted. Consequently, this question did not provide as much rich data as the researcher had hoped.

Revisiting Trustworthiness Concerns

Given the importance of trustworthiness in qualitative research and the implications of conducting backyard research as one part of this study, the researcher thought it would be helpful to revisit the steps he took to minimize bias. In particular, since the learning center tutors both worked for the researcher, several key steps were taken. First, the researcher ensured that both learning center tutors (as well as the academic department tutors) were made aware of how and when to report ethical concerns that might arise. He shared contact information for both the director of the learning center and the Office of Research Compliance. Second, six observations were conducted with both tutors to triangulate information collected during the formal interviews. This was done as a way to ensure that the researcher did not show favoritism towards the learning center tutors over the academic department tutors, as well as to reduce the possibility of making assumptions about actual strategies employed during their tutoring sessions. It also enabled the researcher sufficient time to ensure that no new data might present itself with respect to either strategies or the impact of environmental

factors. Third, debriefing interviews with all of the tutors following each formal observation enabled the researcher to conduct member checking while the tutoring sessions were fresh in each tutor's mind. This helped reduce the possibility that tutors might mistakenly recall aspects of their tutoring that did not actual occur in their sessions. It also enabled the researcher to point out discrepancies between what each tutor stated during their interviews and what occurred in their actual tutoring sessions.

Finally, the researcher was very intentional in selecting an instrumental case study for this research. He was focused on adding to what was previously known about tutoring across different environments and the role that training or previous experience had on tutoring sessions. This would not have been possible with other research designs such as survey research. The value of expanding the research literature about academic department tutoring, in particular, was of foremost concern as opposed to trying to prove whether one type of setting or group of tutors was more effective than another.

Limitations

The coding schema used by the researcher was quite helpful in terms of identifying strategies. It was applicable for determining what occurred with both academic department and learning center tutors. However, it was less helpful in terms of identifying training knowledge. The researcher garnered richer details and data from the interviews regarding tutor training as opposed to applying the coding for observational purposes. Therefore, the researcher recommended not employing the training codes as part of the coding schema for future studies or practice.

Similarly, the research question regarding which tutor training session had the least impact proved to be limiting. Neither learning center tutor in this study provided the rich, qualitative data the researcher thought it might. Although this might be a product of having a highly effective training format and training topics, it also is distinctly possible that the learning center tutors were reluctant to appear critical of the training given the researcher's supervisory role with them. Likewise, given that only two learning center tutors were part of this case study, the small number of respondents may have limited the usefulness of this question.

A third limitation experienced during this research involved the challenge of clearly discerning what occurred in departmental tutoring when numerous students were present. Specifically, this occurred during the sixth observation of one tutor. There were eleven to twelve students present at any given moment, and seventeen were present during the hour-long expanse of the tutoring session. It was possible that other strategies were present that the researcher simply could not hear. However, given the scope of seven distinct observations of this tutor, the researcher believed there was a minimal chance that something new transpired.

Implications for Practice

Although qualitative research does not lend itself to generalizations as quantitative research can, this research did provide valuable considerations for the experience of this particular campus and its participants. For example, based on the experiences of the academic department tutors in this study, the researcher recommended that the Chemistry department consider the value of incorporating tutor training into their

program. This recommendation will enhance the efficacy of department tutors in multiple ways. First, it will enable them to transition from greater reliance on passive learning, such as explanations, to more active learning strategies that engage tutees in their coursework or lab assignments. Doing so also helps tutors more accurately gauge whether their tutees truly understand the concepts they are learning or if the tutees have misjudged the scope of their knowledge. Second, it will help tutors develop stronger relational communication with their tutees. The advantages of doing so include fostering greater trust with tutees, enabling a better understanding of their academic needs, and perhaps yielding greater attendance given that students form a more personal relationship with their tutor. Third, training can help tutors improve their consistency in using certain strategies at key times. By knowing how to take full advantage of concepts such as learning styles and varying the rigor of open-ended questions, department tutors would hopefully increase the level of scaffolding that can occur during their sessions.

Moreover, it would be advantageous for the Chemistry department to re-examine the structure of walk-in tutoring. Based on both the tutors' interviews and observational data collected, several recommendations are presented. First, provide an orientation for graduate tutors that covers: (a) how to structure tutoring sessions; (b) how to deal with the challenges of facilitating learning when multiple students attend tutoring; and (c) how to access lab resources for other labs not facilitated by a particular tutor. Second, consider additional tutoring staff at key points during the week, such as when assignments are due. This may help assuage the challenge of serving larger groups of students who have waited until the deadline to seek assistance on their labs or homework assignments. It

will also facilitate greater time for each tutee in attendance. Third, discuss the ramifications of allowing tutees from any lab session to attend an open tutoring time rather than one facilitated specifically by a tutor from their level. Requiring tutees to attend tutoring sessions facilitated by a graduate assistant from their lab level will help reduce the tutors' challenge of discerning what concepts are being covered by a given lab, the intent of certain lab questions, and reduce the amount of time tutors spend on having to ask clarification questions due to the lack of familiarity with a lab they do not teach. Finally, conduct a grade analysis that compares the performance of tutoring participants and non-participants. Are there advantages afforded by a student's participation in tutoring? Does the structure of tutoring positively contribute to student success, detract from it, or have no impact?

Implications for Future Research

One hard-to-classify theme that emerged was whether or not the students who utilized academic department tutoring used the tutoring sessions simply to find answers for their lab assignments or if they were truly interested in learning the concepts. Given that the two academic department tutors did not engage as often in active learning exercises and reciprocal peer tutoring, and that this was not a specific research focus, the researcher recommends that this aspect be examined in future studies. A study of students who seek tutoring, possibly using surveys or focus groups, could explore this and other issues related to the impacts of tutoring on tutees and what tutees are seeking from tutoring.

Since this study did not compare tutors' strategies over time, it would be interesting to discern what strategies tutors employ when they first begin tutoring compared to when they have received varying amounts of training and accrued face-to-face experience working with tutees. In what ways do their strategies change? At what point do tutors effectively scaffold knowledge for their tutees? What accounts for tutors who demonstrate knowledge building with their tutees from an early point in their position versus others who require more time to master such abilities?

Additionally, the researcher recommends the use of different methodological approaches and a larger cohort of learning center tutors to address the research question regarding what training topics had the least impact on their behavior and why they found it less useful. Surveys, focus groups, and document analysis (particularly of training evaluations) may help illustrate tutors' perceptions of this question. Moreover, if focus groups were used, the researcher recommends selecting someone external from the tutoring program to facilitate this question in the hopes of generating richer data.

Finally, it would be valuable to learn how common academic department tutoring is across colleges and universities. Similarly, is it equally common for department tutoring and learning center tutoring to coexist on a college campus? If so, what are the reasons for such practices? Do students benefit academically in terms of grades and GPAs? Is there an impact on retention and graduation rates based on participation in tutoring? If they do not show demonstrable advantages for students, would the institution be better served by incorporating training (if it is not present) for department tutors,

shifting funding and personnel to a learning center, or outsourcing tutoring service? To date, no known study has examined these questions.

Summary

Tutoring conducted in university learning centers and academic departments shared a common goal of providing academic assistance for students with their coursework. Yet, the manner in which services were provided varied greatly, as did the structure of tutoring sessions and the impact of environmental factors. Furthermore, this case study revealed important information regarding what strategies academic department tutors and learning center tutors used in their respective tutoring sessions, the rationale for implementing particular strategies, what experiences helped department tutors perform their roles, and how training specifically impacted the behaviors of tutors and informed their selection of tutoring strategies. This was the first known research to examine academic department tutoring from this perspective and in a naturalistic setting.

Moreover, tutor interviews and observational data supported previous research regarding the types of strategies provided by learning center tutors, the impact that training has on the efficacy of tutoring sessions, and how knowledge building methods utilized by tutors can scaffold knowledge in undergraduate learners enrolled in lower-level Chemistry coursework.

BIBLIOGRAPHY

Altbach, P. G. (2005). Harsh realities: The professoriate faces a new century. In P. G. Altbach, R. O. Berdahl, & P. J. Gumport (Eds.), American higher education in the twenty-first century: Social, political, and economic challenges (2nd ed.) (pp. 287-314). Baltimore: Johns Hopkins University Press.

Annis, L. F. (1983). The processes and effects of peer tutoring. *Human Learning, 2,* 39-47.

Bailey, G. K. (2006). *Quality in university learning assistance centers.* Unpublished manuscript, The University of North Carolina at Greensboro.

Baxter Magolda, M. B., & Rogers, J. L. (1988). Peer tutoring: Collaborating to enhance intellectual development. *College Student Journal,* 288-296.

Beasley, C. J. (1997, February). Students as teachers: The benefits of peer tutoring. In R. Pospisil & L. Willcoxson (Eds.), *Learning through teaching* (pp. 21-30). Proceedings of the 6th Annual Teaching Learning Forum, Murdoch University, Perth, Australia. [Online]. Retrieved February 15, 2008 from http://lsn.curtin.edu.au/tlf/tlf1997/beasley.html.

Benjamin, E. (1997). *Some implications of tenure for the profession and society* [Electronic version]. Retrieved November 26, 2005, from the American Association of University Professors website: http://www.aaup.org/Issues/tenure/Ebten2.htm.

Bobko, E. (1984). The effective use of undergraduates as tutors for college science students. *Journal of College Science Teaching, 14,* 60-62.

Boylan, H. R., Bliss, L. B., & Bonham, B. S. (1997). Program components and their relationship to student performance. *Journal of Developmental Education, 20*(3), 2-6.

Boylan, H. R., Bonham, B. S., & Bliss, L. B. (1994). Characteristic components of developmental programs. *Research in Developmental Education, 11*(1), 1-4.

Boylan, H. R., Bonham, B. S., Bliss, L. B., & Saxon, D. P. (1995). What we know about tutoring: Findings from the national study of developmental education. *Research in Developmental Education, 21*(3), 1-4.

Brandwein, A. C., & DiVittis, A. (1985). The evaluation of a peer tutoring program: A quantitative approach. *Educational and Psychological Measurement, 45,* 15-27.

Bruce, J. E., & Trammel, J. (2003). Impact of paired tutoring and mentoring. *The Learning Assistance Review, 8*(2), 21-28.

Chadwick, S. A., & McGuire, S. P. (2004). Effect of relational communication training for tutors on tutee course grades. *The Learning Assistance Review, 9*(2), 29-40.

Chi, M. T. H. (1996). Constructing self-explanations and scaffolded explanations in tutoring. *Applied Cognitive Psychology, 10,* S33-S49.

Cohen, J. (1986). Theoretical considerations of peer tutoring. *Psychology in the Schools, 23,* 175-186.

Cole, M., John-Steiner, V., Scribner, S., & Souberman, E. (1978). In L.S. Vygotsky, *Mind in society: The development of higher psychological processes.* Cambridge: Harvard University Press.

College Reading and Learning Association. (2009). *Current certified tutor training programs.* [Online]. Retrieved February 1, 2009, from http://www.crla.net/itpc/current_certifications.htm.

College Reading and Learning Association. (2008). *ITPC certification requirements.* [Online]. Retrieved December 7, 2008, from http://www.crla.net/itpc/certification_requirements.htm.

Colvin, J. W. (2007). Peer tutoring and social dynamics in higher education. *Mentoring and Tutoring, 15*(2), 165-181.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2005). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* NJ: Pearson Prentice Hall.

Cromley, J. G., & Azevedo, R. (2005). What do reading tutors do? A naturalistic study of more and less experienced tutors in reading. [Electronic version]. *Discourse Processes, 40*(2), 83-113.

Dvorak, J. (2004). Managing tutoring aspects of the learning assistance center. *Research for Educational Reform, 9*(4), 39-51.

Dvorak, J. (2001). The college tutoring experience: A qualitative study. *The Learning Assistance Review, 6*(2), 33-46.

Fantuzzo, J. W., Dimeff, L. A., & Fox, S. L. (1989). Reciprocal peer tutoring: A multimodal assessment of effectiveness with college students. *Teaching of Psychology, 16*(3), 133-135.

Fantuzzo, J. W., Riggio, R. E., Connelly, S., & Dimeff, L. A. (1989). Effects of reciprocal peer tutoring on academic achievement and psychological adjustment: A component analysis. *Journal of Educational Psychology, 81*(2), 173-177.

Fishbein, H. D., Eckart, T., Lauver, E., Van Leeuwen, R., & Langmeyer, D. (1990). Learners' questions and comprehension in a tutoring setting. *Journal of Educational Psychology, 82*(1), 163-170.

Graesser, A. C., & Person, N. K. (1994). Question asking during tutoring. *American Educational Research Journal, 31*(1), 104-137.

Graesser, A. C., Person, N. K., & Magliano, J. P. (1995). Collaborative dialogue patterns in naturalistic one-to-one tutoring. *Applied Cognitive Psychology, 9,* 495-522.

Graesser, A. C. Person, N. K., & Hu, X. (2002). Improving comprehension through discourse processing. *New Directions for Teaching and Learning, 89,* 33-44.

Griffin, M. M., & Griffin, B. W. (1998). An investigation of the effects of reciprocal peer tutoring on achievement, self-efficacy, and test anxiety. *Contemporary Educational Psychology, 23,* 298-311.

Haley, J. (2003). An investigation of tutor motivation through survey research. *The Learning Assistance Review, 8*(1), 15-22.

Hendleman, W. J., & Boss, M. (1986). Reciprocal peer teaching by medical students in the gross anatomy laboratory. *Journal of Medical Education, 61,* 674-680.

Hock, M. F., Deshler, D. D., & Schumaker, J. B. (1999). Tutoring programs for academically underprepared students: A review of the literature. *Journal of College Reading and Learning, 29*(2), 101-122.

Honkimäki, S., & Tynjälä, P. (2007). Study orientations in different tutoring environments: University language students' first two years. *Mentoring and Tutoring, 15*(2), 183-199.

House, J. D., & Wohlt, V. (1990). The effect of tutoring program participation on the performance of academically underprepared college freshmen. *Journal of College Student Development, 31,* 365-370.

House, J. D., & Wohlt, V. (1989). The effect of student and tutor gender on achievement of academically underprepared students in mathematics and science. *Journal of Instructional Psychology, 16*(4), 192-198.

Johansen, M. L., Martenson, D. F., & Bircher, J. (1992). Students as tutors in problem-based learning: Does it work? *Medical Education, 26*(2), 163-165.

Jordan, P., Phillips, M., & Brown, E. (2004). We train teachers: Why not supervisors and mentors? *Physical Educator, 61*(4), 219-221.

Kassab, S., Abu-Hijleh, M. F., Al-Shboul, Q., & Hamdy, H. (2005). Student-led tutorials in problem-based learning: Educational outcomes and students' perceptions. *Medical Teacher, 27*(6), 521-526.

King, A., Staffieri, A., & Adelgais, A. (1998). Mutual peer tutoring: Effects of structuring tutorial interaction to scaffold peer learning. *Journal of Educational Psychology, 90*(1), 134-152.

Koenig, K. M., & Endorf, R. J. (August 2003). *Study of TA's ability to implement the Tutorials in Introductory Physics and student conceptual understanding.* Proceedings of the American Association of Physics Teachers Physics Education Research Conference, Madison, WI.

Kowalsky, R., & Fresko, B. (2002). Peer tutoring for college students with disabilities. *Higher Education Research & Development, 21*(3), 259-271.

Kyvik, S., & Smeby, J-C. (1994). Teaching and research: The relationship between the supervisor of graduate students and faculty research performance. *Higher Education, 28*(2), 227-239.

Lake, D. A. (1999). Peer tutoring improves student performance in an advanced physiology course. *Advances in Physiology Education, 21*(1), S86-S92.

Landrum, R. E., & Chastain, G. (1998). Demonstrating tutoring effectiveness within a one-semester course. *Journal of College Student Development, 39*(5), 502-506.

Lidren, D. M., & Meier, S. E. (1991). The effects of minimal and maximal peer tutoring systems on the academic performance of college students. *Psychological Record, 41*(1), 69-77.

Loke, A. Y., & Chow, L. W. (2007). Learning partnership—the experience of peer tutoring among nursing students: A qualitative study. *International Journal of Nursing Studies, 44*(2), 237-244.

MacDonald, L. T. (2004). Learning strategies for college learning centers. *Research for Educational Reform, 9*(4), 61.

MacDonald, R. B. (1991). An analysis of verbal interaction in college tutorials. *Journal of Developmental Education, 15*(1), 2-12.

MacDonald, R. B. (1993). Group tutoring techniques: From research to practice. *Journal of Developmental Education, 17*(2), 12-18.

Marsh, S. R. (2001). The history of tutoring in American higher education. *Journal of the National Tutoring Association, 1*(1), 19-36.

Maxwell, J. A. (2005). *Qualitative research design: An interpretive approach* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Maxwell, M. (2001). Peer tutoring: An overview; history and research on program effectiveness. *Journal of the National Tutoring Association, 1*(1), 8-18.

Maxwell, M. (1991). The effects of expectations, sex, and ethnicity on peer tutoring. *Journal of Developmental Education, 15*(1), 14-18.

McKellar, N. A. (1986). Behaviors used in peer tutoring. *Journal of Experimental Education, 54*(3), 163-167.

McKinney, K. (n. d.). *Active learning.* [Online]. Retrieved December 13, 2008, from Illinois State University, Center for Teaching, Learning, and Technology: http://www.cat.ilstu.edu/additional/tips/newActive.php

Medway, F. J. (1991). A social psychological analysis of peer tutoring. *Journal of Developmental Education, 15*(1), 20-26, 32.

Merriam-Webster Online Dictionary. (2008). *Facilitator.* [Online]. Retrieved November 22, 2008, from Merriam-Webster Online Dictionary Web site: http://www.merriam-webster.com/dictionary/facilitator.

Merrill, D. C., Reiser, B. J., Merrill, S. K., & Landes, S. (1995). Tutoring: Guided learning by doing. *Cognition and Instruction, 13*(3), 315-372.

Miami-Dade County Public Schools. (2007). *Instructional strategies.* [Online]. Retrieved January 31, 2009, from Miami-Dade County Public Schools Web site: http://inclusion.dadeschools.net/In%20Minitis/Instructional%20Strategies/define.htm.

Miles, W. F. S. (1998). Tenure, promotion, and pig-killing. [Electronic version]. *Change, 30*(5), 30-32.

Moust, J. C., & Schmidt, H. G. (1994). Effects of staff and student tutors on student achievement. *Higher Education, 28*(4), 471-481.

Mynard, J., & Almarzouqi, I. (2006). Investigating peer tutoring. *ELT Journal, 60*(1), 13-22.

National Teaching and Learning Forum. (1999). *Benjamin Bloom's taxonomy on cognitive behaviors.* [Online]. Retrieved November 1, 2006, from http://www.ntlf.com/html/lib/faq/bl-ntlf.htm.

Nelson, R. R. (1995/1996). Peer tutors at the collegiate level: Maneuvering within the zone of proximal development. *Journal of College Reading and Learning, 27*(1), 43-51.

Norton, J. (2001). What tutors want from training. *Journal of the National Tutoring Association, 1*(1), 37-55.

Person, N. K., Graesser, A. C., Magliano, J. P., & Kreuz, R. J. (1994). Inferring what the student knows in one-to-one tutoring: The role of student questions and answers. *Learning and Individual Differences, 6*(2), 205-229.

Person, N. K., Kreuz, R. J., Zwann, R. A., & Graesser, A. C. (1995). Pragmatics and pedagogy: Conversational rules and politeness strategies may inhibit effective tutoring. *Cognition and Instruction, 13*(2), 161-188.

Puntambekar, S., & Hübscher, R. (2005). Tools for scaffolding students in a complex learning environment: What have we gained and what have we missed? *Educational Psychologist, 40*(1), 1-12.

Reichert, C., & Hunter, C. A. (2006). Tutor selection: A four-tier approach to success. *The Learning Assistance Review, 11*(1), 27-36.

Rheinheimer, D. C. (2000). Gender matching, floor effects, and other tutoring outcomes. *Journal of Developmental Education, 24*(2), 10-28.

Riggio, R. E., Fantuzzo, J. W., Connelly, S., & Dimeff, L. A. (1991). Reciprocal peer tutoring: A classroom strategy for promoting academic and social integration in undergraduate students. *Journal of Social Behavior and Personality, 6*(2), 387-396.

Rings, S., & Sheets, R. A. (1991). Student development and metacognition: Foundations for tutor training. *Journal of Developmental Education, 15*(1), 30-32.

Rittschof, K. A., & Griffin, B. W. (2001). Reciprocal peer tutoring: Re-examining the value of a co-operative learning technique to college students and instructors. *Educational Psychology, 21*(3), 313-331.

Roscoe, R. D., & Chi, M. T. H. (2007). Understanding tutor learning: Knowledge-building and knowledge-telling in peer tutors' explanations and questions. *Review of Educational Research, 77*(4), 534-574.

Saunders, D. (1992). Peer tutoring in higher education. [Electronic version]. *Studies in Higher Education, 17*(2), 211-218.

Savage, M. P., & Sharpe, T. (1998). Demonstrating the need for formal graduate student training in effective teaching practices. *Physical Educator, 55*(3), 130-137.

Schleyer, G. K., Langdon, G. S., & James, S. (2005). Peer tutoring in conceptual design. *European Journal of Engineering Education, 30*(2), 245-254.

Smith, C., & Bath, D. (2003). Evaluation of a networked staff development strategy for developmental tutor trainers: Benefits, limitations and future directions. *International Journal for Academic Development, 8*(1/2), 145-158.

Smith, C., & Bath, D. (2004). Evaluation of a university-wide strategy providing staff development for tutors: Effectiveness, relevance, and local impact. *Mentoring and Tutoring, 12*(1), 107-122.

Somekh, B., & Lewin, C. (Eds.). (2005). *Research methods in the social sciences.* London: Sage Publications.

Stake, R. E. (1995). *The art of case study research.* London: Sage Publications.

Sutton, S. M. (1998). Advocacy and social scaffolding: A paradigm for motivating underachieving students. *Dissertation Abstracts International, 1049,* A5904.

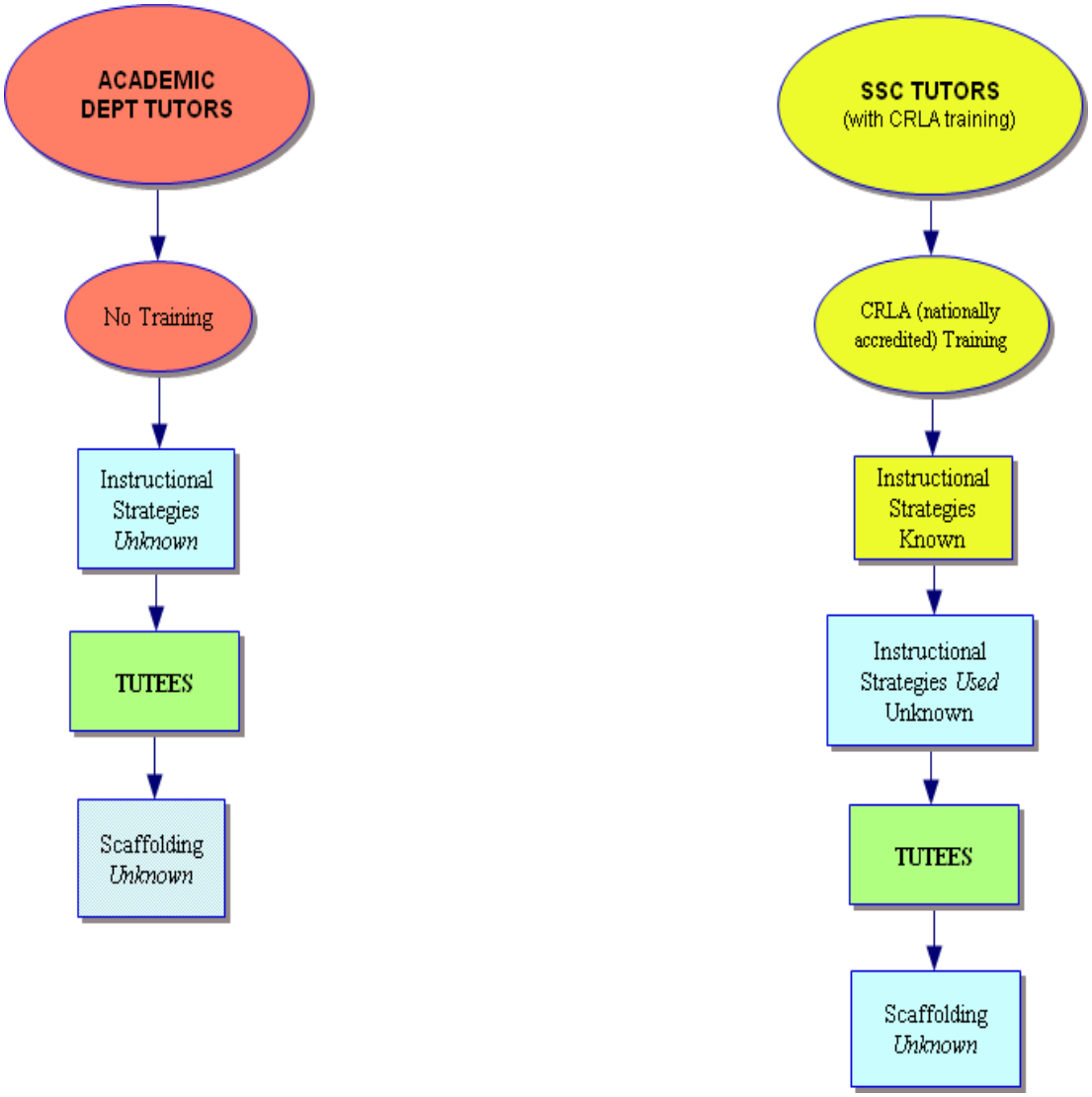
Topping, K. J. (1996). The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher Education, 32*(3), 321-345.

Topping, K. J. (2005). Trends in peer learning. *Educational Psychology, 25*(6), 631-645.

Vogel, G., Fresko, B., & Wertheim, C. (2007). Peer tutoring for college students with learning disabilities: Perceptions of tutors and tutees. *Journal of Learning Disabilities, 40*(6), 485-493.

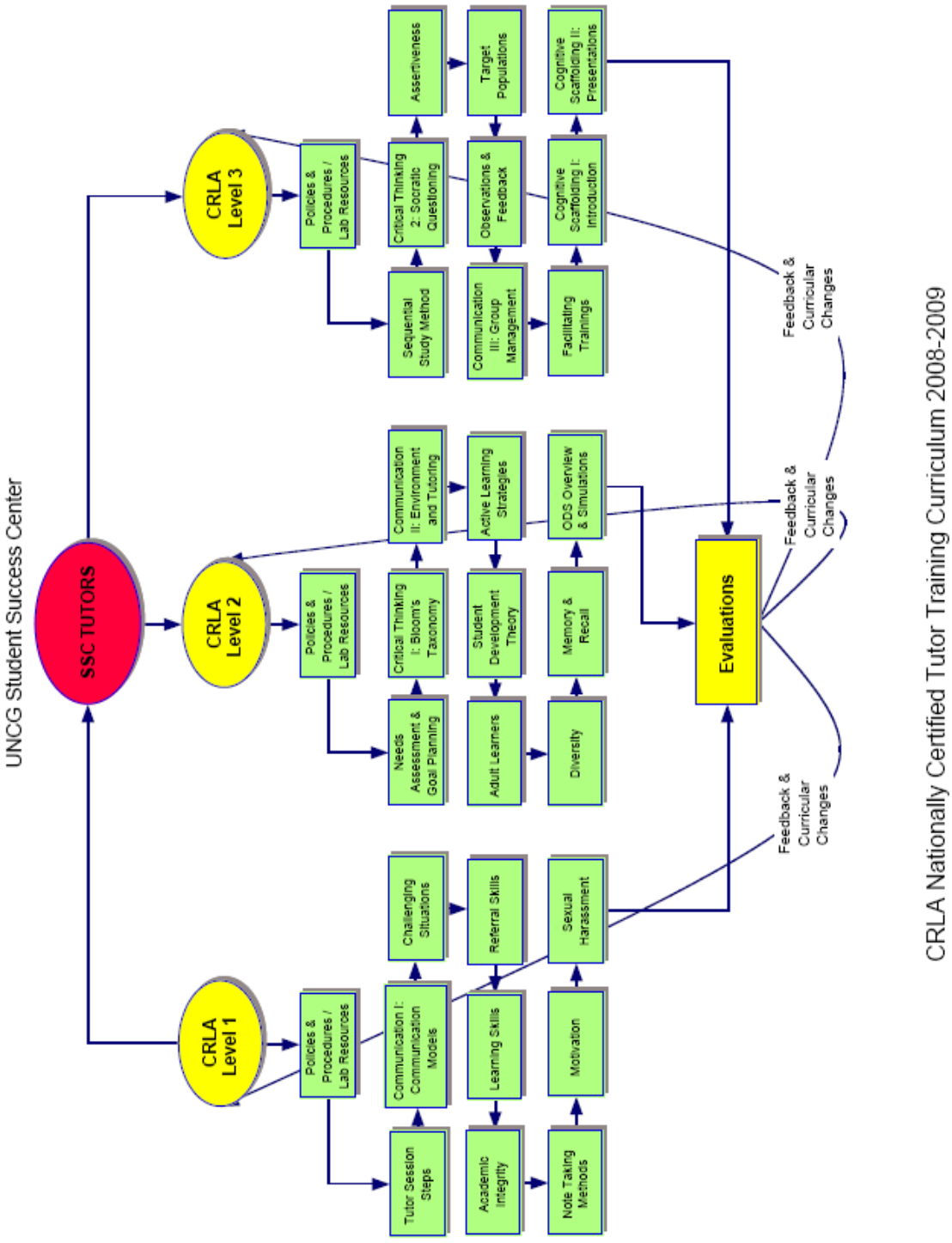
Appendix A

Conceptual Framework



Appendix B

Tutor Training Curriculum



Appendix C

Interview Protocol—First Interview

TUTORING STRATEGIES: A CASE STUDY COMPARING LEARNING CENTER TUTORS AND ACADEMIC DEPARTMENT TUTORS

Time of Interview: TBD Date of Interview: TBD
Place: Meeting Room, Elliott University Center
Interviewer: Geoff Bailey
Tutor: John [pseudonym]
Position of Interviewee: LAC tutor

This interview is part of the researcher's dissertation. The purpose of my study is to compare the nature of tutoring instruction offered by LAC tutors with tutors hired by academic departments on campus. For this proposal, two LAC tutors and two academic department tutors will be interviewed.

The interviewer will be using a semi-structured, one-on-one interview with data collected through handwritten notes and via a digital recorder. The digital recorder will be transcribed verbatim following the interview. The interviewee's name will not be used or notated in the transcription in order to protect confidentiality. Rather, a pseudonym will be used to identify the tutor. Likewise, the commentary provided by the interviewee will not be used in any way for supervision or employment purposes for LAC tutors (again, to protect the tutor's rights and encourage the freedom to speak freely). The transcription will be used solely for this dissertation. If the tutor feels otherwise at any time, s/he has the right to stop participation in this dissertation and notify the Student Success Center Director immediately about her/his concerns. This interview will take anywhere from 20-45 minutes.

(*Turn on digital recorder*)

Questions: (The actual form is adjusted to provide space for handwritten notes, commentary, or insights on the part of the interviewer.)

1) How would you characterize your tutoring sessions (i.e., what happens in your sessions)?
2) How do you help college students (tutees) with their content questions (from lecture, from their readings, etc.)?
    a. To elicit more detail, if needed, incorporate probe such as "Could you explain what you mean in more detail?" This will get at specific techniques/strategies used by the tutor.
3) How do you select particular methods? Why those particular methods?
4) How do your tutees respond to your methods and strategies?
5) How does tutor training impact the way you work with tutees? (Skip with academic department tutors)
    a. What training has the most influence?
    b. What training has the least influence?
6) Academic Department tutors: Have you had any type of coursework, prior tutoring experience, or guidance that influences how you perform your role as a tutor?
7) What do you think impacts your tutoring role? (for example, does your age, experience, or previous instructional experience impact your tutoring role?)

8) Is there anything else you think I should know about your tutoring experience that would help me to understand the process of being a tutor or how you can impact or help people?

Thank the tutor for their time and participation in this interview. Remind s/he that the information from the interview will remain confidential and be used solely for educational purposes. Turn off the digital recorder.

Appendix D

Interview Protocol—Second Interview

TUTORING STRATEGIES: A CASE STUDY COMPARING LEARNING CENTER TUTORS AND ACADEMIC DEPARTMENT TUTORS

Time of Interview: TBD Date of Interview: TBD
Place: Meeting Room, Elliott University Center
Interviewer: Geoff Bailey
Tutor: John [pseudonym]
Position of Interviewee: LAC tutor

This interview is part of the researcher's dissertation. The purpose of my study is to compare the nature of tutoring instruction offered by LAC tutors with tutors hired by academic departments on campus. For this proposal, two LAC tutors and two academic department tutors will be interviewed.

The interviewer will be using a semi-structured, one-on-one interview with data collected through handwritten notes and via a digital recorder. The digital recorder will be transcribed verbatim following the interview. The interviewee's name will not be used or notated in the transcription in order to protect confidentiality. Rather, a pseudonym will be used to identify the tutor. Likewise, the commentary provided by the interviewee will not be used in any way for supervision or employment purposes for LAC tutors (again, to protect the tutor's rights and encourage the freedom to speak freely). The transcription will be used solely for this dissertation. If the tutor feels otherwise at any time, s/he has the right to stop participation in this dissertation and notify the Student Success Center Director immediately about her/his concerns. This interview will take anywhere from 20-45 minutes.

(*Turn on digital recorder*)

Questions: (The actual form is adjusted to provide space for handwritten notes, commentary, or insights on the part of the interviewer.)

9) How would you characterize the first few tutoring sessions I have observed (i.e., what happened in your sessions)?
10) How did you help your tutees with their content questions (from lecture, from their readings, etc.)?
    a. To elicit more detail, if needed, incorporate probes such as "Could you explain what you mean in more detail?" "What methods, activities or strategies did you use?"
11) How did you select those particular activities, methods, and/or strategies? Why those particular methods?
12) How do your tutees respond to your methods and strategies? Are there differences among your tutees? In what ways?
13) Learning Center tutors: How has tutor training impacted your first few tutoring sessions?
    a. What training had the most influence?
    b. What training had the least influence?
14) Academic Department tutors: In what ways have your coursework, prior tutoring experience, or guidance influenced how you performed as a tutor during these observed sessions?
15) What do you think impacts your tutoring role? (for example, does your age, experience, or previous instructional experience impact your tutoring role?)

16) Is there anything else you think I should know about your tutoring experience that would help me to understand the process of being a tutor or how you can impact or help people?

Thank the tutor for their time and participation in this interview. Remind s/he that the information from the interview will remain confidential and be used solely for educational purposes. Turn off the digital recorder.

Appendix E

Interview Protocol—Third Interview

TUTORING STRATEGIES: A CASE STUDY COMPARING LEARNING CENTER TUTORS AND ACADEMIC DEPARTMENT TUTORS

Time of Interview: TBD Date of Interview: TBD
Place: Meeting Room, Elliott University Center
Interviewer: Geoff Bailey
Tutor: John [pseudonym]
Position of Interviewee: LAC tutor

This interview is part of the researcher's dissertation. The purpose of my study is to compare the nature of tutoring instruction offered by LAC tutors with tutors hired by academic departments on campus. For this proposal, two LAC tutors and two academic department tutors will be interviewed.

The interviewer will be using a semi-structured, one-on-one interview with data collected through handwritten notes and via a digital recorder. The digital recorder will be transcribed verbatim following the interview. The interviewee's name will not be used or notated in the transcription in order to protect confidentiality. Rather, a pseudonym will be used to identify the tutor. Likewise, the commentary provided by the interviewee will not be used in any way for supervision or employment purposes for LAC tutors (again, to protect the tutor's rights and encourage the freedom to speak freely). The transcription will be used solely for this dissertation. If the tutor feels otherwise at any time, s/he has the right to stop participation in this dissertation and notify the Student Success Center Director immediately about her/his concerns. This interview will take anywhere from 20-45 minutes.

(*Turn on digital recorder*)

Questions: (The actual form is adjusted to provide space for handwritten notes, commentary, or insights on the part of the interviewer.)

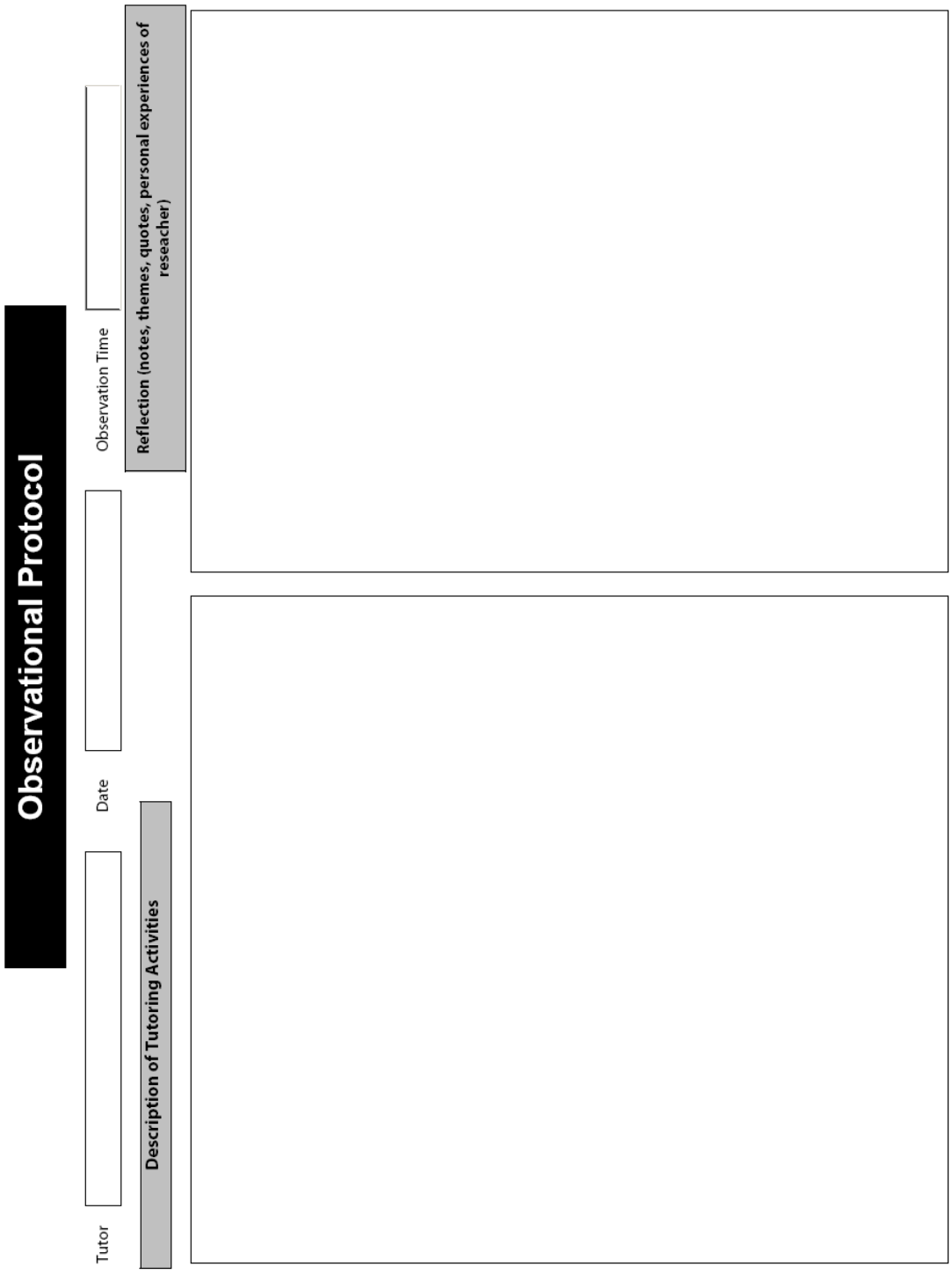
17) How would you characterize your tutoring sessions? Has anything changed since I first began observing you? If so, what specifically?
18) What are all the ways you have helped your tutees with their content questions (from lecture, from their readings, etc.)?
    a. To elicit more detail, if needed, incorporate probes such as "Could you explain what you mean in more detail?" "What methods, activities, or strategies did you use?"
19) How did you select particular methods during your tutoring sessions? Why did you choose those particular methods?
20) How did your tutees respond to your methods and strategies? Were there differences among tutees? What were these differences?
21) Learning Center tutors: How did tutor training impact the way you worked with tutees?
    a. What training has the most influence?
    b. What training has the least influence?
22) Academic Department tutors: In what ways have your coursework, prior tutoring experience, or guidance influenced how you performed as a tutor during these observed sessions?
23) What has impacted your tutoring role? (for example, does your age, experience, or previous instructional experience impact your tutoring role?)

24) Is there anything else you think I should know about your tutoring experience that would help me to understand the process of being a tutor or how you impacted or helped people?

Thank the tutor for their time and participation in this interview. Remind s/he that the information from the interview will remain confidential and be used solely for educational purposes. Turn off the digital recorder.

Appendix F

Observational Protocol



Appendix G

Debriefing Protocol

TUTORING STRATEGIES: A CASE STUDY COMPARING LEARNING CENTER TUTORS AND ACADEMIC DEPARTMENT TUTORS

Study # 09-0109

This debriefing protocol will serve as a guideline for the researcher following each tutor observation. The questions are meant to aid the researcher in better understanding why the tutors used specific strategies during their tutoring sessions. Due to the nature of qualitative research and what may transpire during the actual observation, it is possible that additional questions may be generated that cannot be anticipated a priori.

1. Tell me about the strategies or methods you used during your session.
2. Why did you choose these particular strategies?
3. Given this particular session, are there other strategies that you might have employed to assist this student? (i.e., in hindsight, is there anything you would have done differently during this session?)
4. The researcher may use information / data from one of the interviews and compare this with the strategies actually employed during the session (e.g., Are there discrepancies or inconsistencies? Does the tutor adhere to what they say they typically do during a tutoring session?)

Appendix H

Questions and Methods Matrix

Research Questions	Interviews	Non-Participant Observation	Debriefing Interviews following Observations
1. What instructional methods were used by learning center tutors and academic department tutors, and how did they differ?	✓	✓	✓
a. What happened in academic department tutoring sessions?	✓	✓	✓
b. What happened in learning center tutoring sessions?	✓	✓	✓
c. How and why did tutors choose the particular methods they use?	✓	✓	✓
d. How did environmental differences among academic department and learning center tutors impact tutoring sessions?	✓	✓	✓
2. What was the impact of tutor training on learning center tutors' practice?	✓	✓	
a. What was the impact on their behavior?	✓	✓	
b. What training had the most influence?	✓		
c. What training had the least influence?	✓		

Appendix I

Codes

(Updated coding based on qualitative project in CUI/730)

CATEGORY/INDIV CODES	CODE
TUT: Tutor Experience	TUT-EXP
TUT: Tutor Identity	TUT-ID
STR: Strategies – General	STR-GEN
STR: Strategies – Homework	STR-HW
STR: Strategies – Active Learning	STR-AL
STR: Strategies – Academic Skills	STR-AS
STR: Strategies – Assertiveness	STR-ASS
STR: Strategies – Cognitive Scaffolding	STR-CS
STR: Strategies – Communication	STR-COM
STR: Strategies – Critical Thinking (Bloom's)	STR-CTB
STR: Strategies – Critical Thinking (Socratic)	STR-CTSQ
STR: Strategies – Disability Services	STR-DIS
STR: Strategies – Feedback	STR-FDBK
STR: Strategies – Goal Planning	STR-GOAL
STR: Strategies – Group Management	STR-GM
STR: Strategies – Hints & Prompts	STR-HP
STR: Strategies – Learning Styles	STR-LS
STR: Strategies – Memory & Recall	STR-MEM
STR: Strategies – Motivation	STR-MOT
STR: Strategies – Needs Assessment	STR-NEEDS
STR: Strategies – Note Taking	STR-NOTE
STR: Strategies – Special Populations	STR-POP
STR: Strategies – Reflective/open-ended Q's or	STR-Q
STR: Strategies – Relational Communication	STR-RC
STR: Strategies – Reading	STR-READ
STR: Strategies – Referral	STR-REF
STR: Strategies – Sequential Study Method	STR-SSM
STR: Strategies – Session Steps	STR-STEP
STR: Strategies – Study Skills	STR-SS
STR: Strategies – Summarizing	STR-SUM
STR: Strategies – Time Management	STR-TM
TKN: Training Knowledge – Active Learning	TK-AL
TKN: Training Knowledge – Academic Integrity	TK-AI
TKN: Training Knowledge – Academic Skills	TK-AS
TKN: Training Knowledge – Adult Learners	TK-ADLT
TKN: Training Knowledge – Assertiveness	TK-ASS
TKN: Training Knowledge – Cognitive Scaffolding	TK-CS

TKN: Training Knowledge – Communication	TK-COM
TKN: Training Knowledge – Critical Thinking (Bloom's)	TK-CTB
TKN: Training Knowledge – Critical Thinking (Socratic)	TK-CTSQ
TKN: Training Knowledge – Disability Services	TK-DIS
TKN: Training Knowledge – Diversity	TK-DIV
TKN: Training Knowledge – Feedback	TK-FDBK
TKN: Training Knowledge – Goal Planning	TK-GOAL
TKN: Training Knowledge – Group Management	TK-GM
TKN: Training Knowledge – Hints & Prompts	TK-HP
TKN: Training Knowledge – Learning Styles	TK-LS
TKN: Training Knowledge – Memory & Recall	TK-MEM
TKN: Training Knowledge – Motivation	TK-MOT
TKN: Training Knowledge – Needs Assessment	TK-NEEDS
TKN: Training Knowledge – Note Taking	TK-NOTE
TKN: Training Knowledge – Special Populations	TK-POP
TKN: Training Knowledge – Reflective/open-ended Q's	TK-Q
TKN: Training Knowledge – Reading	TK-READ
TKN: Training Knowledge – Referral	TK-REF
TKN: Training Knowledge – Sequential Study Method	TK-SSM
TKN: Training Knowledge – Session Steps	TK-STEP
TKN: Training Knowledge – Student Development Theory	TK-SDT
TKN: Training Knowledge – Study Skills	TK-SS
TKN: Training Knowledge – Summarizing	TK-SUM
TKN: Training Knowledge – Time Management	TK-TM