

Enhancing Supplemental Instruction at Brevard Community College:
A Review of Peer Tutoring, Its Effectiveness on Learning Outcomes, and the
Costs and Methods of Implementation

Submitted by
Dale McGinnis, Lecturer

Science Department
Palm Bay Campus

August 17, 2012

Abstract

The results of the 2011 student survey conducted by Brevard Community College's Quality Enhancement Program Subcommittee indicated deficiencies and gaps in tutoring services offered at BCC. In response to these survey results, and as part of the reaffirmation process for Brevard Community College's accreditation through the Southern Association of Colleges and Schools, this white paper constitutes part of a larger Quality Enhancement Plan. The intention herein is to review present tutoring services available, make recommendations for enhancing the quality of those services, and propose a supplemental program, peer tutoring.

Peer tutoring's efficacy as a supplemental instructional strategy is demonstrated by reviewing other contemporary tutoring strategies such as conventional human tutoring and intelligent tutoring. That review is followed by a discussion of four recent studies that have reported on peer tutoring programs at the post-secondary level. The many benefits of implementing a peer tutoring program at Brevard Community College are made manifest and some of the potential costs in terms of student remuneration are identified.

A discussion of the many, complex social dynamics that can arise in peer tutoring programs are then considered followed by a recommendation for implementing a comprehensive tracking and assessment system designed to monitor academic gains as a measure of program effectiveness. Ultimately, recommendations are outlined for implementing a single-campus, subject-specific, pilot program that eventually could be followed by college-wide implementation of a peer tutoring program.

Introduction

“Tell me and I forget, show me and I remember, involve me and I understand” (Gardiner, 1996).

In 2011, Brevard Community College’s (BCC) Quality Enhancement Program Subcommittee conducted a voluntary online survey of BCC students to answer three questions. Those questions were:

1. What should Brevard Community College do to help you be more successful as a student?
2. What have you experienced at Brevard Community College or another institution that you feel has helped you succeed as a student?
3. What obstacles to your success as a student have you encountered at Brevard Community College?

Seven hundred thirty-six students responded to the survey. Approximately five percent (42 students) specifically stated that tutors and tutoring services were a positive influence on their education and success. Given the present economic climate, perhaps it is no wonder that “free tutoring” was the most frequently cited positive. However, twice that amount, ten percent (74 students), specifically mentioned tutors or the tutoring services available at BCC as a negative in at least one of their responses to the questions. Almost two percent (12 students) specifically cited tutors or tutoring services as an obstacle to their success.

These survey results were obtained by using Microsoft Excel to search the student responses for the terms “tutor,” “tutoring,” “learning lab,” “math lab,” and other possibly misspelled derivations. After the data were axially coded (Glaser and Strauss, 1967; Strauss and Corbin, 1998; Colvin, 2007), student responses revealed three general areas of opportunity for enhancing the quality of tutoring services: “more access,” “more tutors,” and “more resources.” Table 1 subdivides those three areas into specific response categories and lists the number of students responding in each category.

**Table 1: Opportunities for Enhancing the Quality of Tutoring
Based on Results of the 2011 Quality Enhancement Program Online Survey**

Opportunities for Enhancement	Specific Student Responses Categories	Number of Respondents
More access	Reduce the need for appointment setting and increase the availability of drop-in tutoring hours	14
	Extend hours, days, and locations tutoring is available	4
More tutors	Subject not specified	10
	Science	6
	Math	4
	“Other than science and math”	3
	Chemistry	3
	History	2
	Computer	2
	Biology	1
Humanities	1	
More resources	More resources for tutoring	3
	More highly trained tutors with subject-specific expertise	3
	Better awareness of services available	1
	Different types of tutoring	1
	Online tutoring for distance learning students	1

Three particularly thoughtful responses stood out from the rest. Not only did those responses capture the overall tone of students responding in the negative, but those responses also provided more nuance than the typical student responses recorded, e.g., “more tutors,” or simply, “tutors.”

Those three responses are summarized below:

- Students need more tutors who “have [a better] knowledge of the material,” and who are able to work with students in a “one on one,” rather than a “group tutoring,” environment.
- Students need more tutors because “the math lab ... is like a fast-paced assembly line with tutors only having a few minutes with each student.”
- Students need more tutors for “all courses, especially math and science, where students can work with senior level student volunteers or tutors to review specific problems ... [and peer tutors] would get service learning hours if they proctored such situations.”

Clearly there is an opportunity, if not a genuine need, to enhance the offerings of our Learning Labs in terms of human tutor expertise and availability. For example, the Palm Bay campus has but a

single science tutor on staff so perhaps it is not coincidence that according to the survey data (Table 1) the various sciences are the subjects receiving the most student requests for additional assistance.

A personal interview conducted with the science tutor on the Palm Bay campus, Ms. Kate Lee-Keenan, revealed two primary opportunities for enhancing tutoring services there. The first is increasing student visitation through development of novel strategies for promoting student (and faculty) awareness of the Learning Lab and the student services offered therein (Kate Lee-Keenan, personal communication, July 10, 2012). A second, but monumentally important, opportunity for the Learning Lab is the implementation of a comprehensive tracking and evaluation system for student progress and learning outcomes as a result of tutoring.

“Traditionally, goals and outcomes of academic support centers have been based on what the program or center will do, not what students will be able to do after having received services” (Hendriksen et al., 2005). At present, there is no consistent program or method in place for assessing the effectiveness of tutoring at the Learning Lab. Without such a system, not only are we unable to identify and fix potential deficiencies in our current offerings, but we will be unable to assess the effectiveness of any quality enhancements we may seek to implement in our offerings of supplemental instruction. Implementing a system to track and assess effectiveness is the first and most important step we must take in continuously assuring the quality of current and future supplemental instructional services.

Looking beyond these opportunities for enhancing the current, conventional tutoring options available to our students, there are other, supplemental strategies we should consider implementing and such is the focus of this report. As we seek to make these enhancements, we must keep in mind that today we are experiencing a paradigm shift in the way students receive their education. The title of one forward-looking study alliteratively captured the essence of this shift: “From Sage on the Stage to Guide on the Side” (King, 1993).

“In most college classrooms, the professor lectures and the students listen and take notes. The professor is the central figure, the "sage on the stage," the one who has the knowledge and transmits that knowledge to the students, who simply memorize the information and later reproduce it on an exam--often without even thinking about it. This model of the teaching-learning process, called the transmittal model, assumes that the student's brain is like an empty container into which the professor pours knowledge. In this view of teaching and learning, students are passive learners rather than active ones. Such a view is outdated and will not be effective for the twenty-first century, when individuals will be expected to think for themselves, pose and solve complex problems, and generally produce knowledge rather than reproduce it” (King, 1993).

According to Hanford (2012), “the fact that people learn better when they're actively engaged is one of the central findings from an explosion of cognitive research conducted over the last several decades.” Additionally, an extensive body of research demonstrates that “peers are often considered the most powerful influence in undergraduate education, even more so than advisers and instructors” (Colvin, 2007). Thus, the new paradigm for educators, and the path to success for students, should be to actively engage students with their peers and guide them in building new knowledge from acquired information.

Topping (2005) describes a strategy known as Peer Tutoring (PT) that is consistent with this new paradigm and has other benefits too. According to Topping (2005), PT is “the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions.” Anyone can be a peer tutor so long as they are possessed of the requisite knowledge and trained how to communicate it interactively. One study demonstrated that “students with disabilities are capable of serving as [peer] tutors” (Telescan, et al., 1999). Additionally, PT is a self-renewing process and as such is a sustainable program. As Topping (2005) noted, “there is no better apprenticeship for being a helper than being helped” (Topping, 2005).

It is clear PT has many potential benefits as a potential supplemental program at BCC. Therefore, the intent herein is to explore a set of representative PT programs at post-secondary institutions similar to BCC and by doing so, to answer the following three questions:

1. In what ways have peer tutoring programs been implemented at the post-secondary level?
2. In what ways have peer tutors been compensated?
3. In what ways have learning outcomes been affected and how have they been measured?

Literature Review

“It is useful to remember that the lecture system evolved largely because of the scarcity of hand-copied books in medieval universities, prior to Gutenberg’s invention of moveable type in the fifteenth century. The few books in existence were usually in possession of the masters and doctors who taught in those institutions. It was natural under such conditions for the teacher who controlled the source of knowledge to fall into the habit of lecturing to his students. These lectures often consisted of nothing more than the doctor reading from his book while his students took notes. The strength of this pattern of academic culture is reflected in the fact that the Latin word *legere* (past participle, *lectus*), meaning “to read,” became synonymous with teaching” (Pulliam, 1963).

For generations, the classroom lecture has been much maligned as an outdated and ineffective method for educating our students yet today it still flourishes as the primary means of educating students in colleges and universities, especially in introductory courses (Friesen, 2011; Hanford, 2012). Decades of research have shown that it is “impossible for students to take in and process all the information presented during a typical lecture ... particularly in introductory courses” (Hanford, 2012). This large and growing body of research further suggests that traditional lecturing at the undergraduate level is ineffective as it does not inspire the “creative thinking, investigative, and collaborative problem-solving,” skills critical to the success of new graduates (Wood and Gentile, 2003).

Learning will never be restricted to the classroom only. However, so long as conventional lecturing remains a primary means of instruction, supplemental pedagogies extending beyond the classroom will continue to play a dominant and vital role in education. Enter the tutor.

Conventional Human Tutoring

Tutoring has been called the “shadow education system,” because like a shadow, tutoring exists only as a result of mainstream education’s existence, society’s focus tends to be on the mainstream and not its shadow, and “the features of the shadow system are much less distinct than those of the mainstream system” (Bray, 1999). Those indistinct features are revealed when one considers the many defining characteristics of who or what tutors are and the various forms tutoring may take.

Although there are similarities, tutoring is not mentoring and the two are occasionally confused in the educational literature (Topping, 2005). “Tutoring is a widely used academic assistance program that is aimed at improving retention and persistence” (Brooks, 2006).

Alternatively, mentoring is “an encouraging and supportive one-to-one relationship with a more experienced worker ... in a joint area of interest ... characterized by positive role modeling, promotion of raised aspirations, positive reinforcement, open-ended counseling, and joint problem-solving [and is] often targeted to disadvantaged groups” (Topping, 2005).

In a 2010 study of students who made use of faculty or staff-provided Conventional Human Tutoring (CHT) services at Western Washington University, Cooper (2010) found that students “regularly gained more academically than simply help with an individual class [and that] students who visited [the tutoring center] more than 10 times per quarter had approximately 10% higher rates of persistence and approximately 0.2 points higher average GPA's than students who infrequently visited or who do not visit [the tutoring center] during their first year of college.”

The literature is replete with studies confirming the efficacy of CHT. In their study of the free-of-charge tutoring services offered at the Learning Center on the campus of Northampton Community College in Bethlehem, PA, Hendriksen et al. (2005) found that “tutored students achieve higher grade point averages, course passing rates, course completion rates, and short-term retention rates.”

Furthermore, in their analysis of retention rates among a “cohort of first-time, full-time, degree-seeking undeclared freshmen at a medium-sized university in Pennsylvania,” Reinheimer and

Mackenzie (2011) noted that “students at risk of dropping out of college due to GPA issues, academic background, poor decision-making skills, and other factors” are positively affected by institutional tutoring services. The findings of Hendriksen et al. (2005), Cooper (2010), and Reinheimer and Mackenzie (2011) are all supported by an extensive body of research that clearly shows the effectiveness of CHT but more broadly, that “tutoring as a whole has been demonstrated to improve student learning across a variety of subjects and age groups” (Cooper, 2010).

“Clearly, community college students have unique characteristics when compared to university students” (Fike and Fike, 2008). Yet as Wild and Ebbers (2002) note, unfortunately most of the research on retention rates, including the impact of tutoring, “is based on traditional-age students in the residential settings of universities.” As compared to the typical university student, the typical community college student is more likely to be older, in an ethnic minority, part-time, and under-prepared for college, especially with respect to competency in basic skills (Fike and Fike, 2008). Furthermore, since an estimated 41% of students entering community college are underprepared with respect to basic skills as compared to 29% of all students entering college, (Fike and Fike, 2008), and since “in the spring of 2011, there were a total of 813 [first time in college] students enrolled at Brevard Community College, out of which 509 or 62.61% required prep level course work,” (Smith-Burrell, 2011), the greater relative importance of CHT programs at BCC, for example, is apparent.

Intelligent Tutoring Systems (ITS)

The work done by VanLehn (2011) is described by that study’s author as a “progress report,” on the state and quality of modern intelligent tutoring systems and a review of their effects on learning outcomes as compared to the alternatives of CHT and “no tutoring.” It is worth noting that the study evaluated academic gains only and did not quantitatively consider the dimensions of student motivation and efficiency. A review of Van Lehn’s (2011) study is included herein for the purposes of demonstrating that the current state of intelligent tutoring systems are not in any way superior to

CHT and thus should not be a primary focus for potential enhancements to BCC's tutoring services. Additionally, there is much to be learned for potential peer tutors, involved faculty, and program advisers from Van Lehn's (2011) study since the areas where human tutors seem to fall short of their machine counterparts illuminate some of the pitfalls to be avoided when tutoring.

VanLehn (2011) distinguishes two general categories of tutoring, "Human Tutoring," and "Intelligent Tutoring," which is computer-based. Generally speaking, today there are two basic types of intelligent tutoring, those that "give students immediate feedback and hints on their answers," and those that give "students an electronic form, natural language dialogue, simulated instrument panel, or other user interface that allows them to enter the steps required for solving the problem" (VanLehn, 2011). The former are encountered in the literature under various names such as "Computer-Aided Instruction," "Computer-Based Instruction," "Computer-Aided Learning," and "Computer-Based Training," while the latter are known simply as "Intelligent Tutoring Systems," (ITS), systems that are able to sense or interpret "the intermediate steps that are normally written on paper or enacted in the real world" (VanLehn, 2011). In this study, VanLehn (2011) did not distinguish among types of human tutoring and essentially treated them monolithically. However, it is evident that the focus of VanLehn's (2011) many comparisons was ITS vs. CHT.

It is "commonly believed that human tutors are more effective than computer tutors when both teach the same content," and this, therefore, begs two questions: "what are human tutors doing that computer tutors are not doing and why does that cause them to be more effective" (VanLehn, 2011). To discover the answers, VanLehn (2011) analyzed nine separate hypotheses as to why CHT is often assumed to be superior to ITS.

In VanLehn's (2011) first hypothesis, the assumption is that human tutors can "infer an accurate, detailed model of the student's competence and misunderstandings." However, VanLehn (2011) found that "human tutors operate just like many computer tutors," since "human tutors do not seem to infer an assessment of their tutee that includes misconceptions, bugs, or false beliefs, nor do

they seem to be able to use such an assessment when it is given to them.” This hypothesis does not explain why either CHT or ITS should be considered superior to each other.

In the second hypothesis, the assumption is that human tutors “are better at selecting tasks that are just what the individual student needs in order to learn.” However, VanLehn (2011) cites several studies suggesting that while “human tutors select tasks using a curriculum script ... computer tutors use curriculum scripts just as human tutors do [and thus] on this argument, computer tutors should be more effective than human tutors.” This is the only of VanLehn’s (2011) hypotheses that confer possible advantage to ITS as compared to CHT thus highlighting the importance of appropriate task selection by human tutors.

In the third hypothesis, the assumption is that human tutors “use sophisticated strategies,” such as “Socratic Irony,” “The Inquiry Method,” and “Reciprocal Teaching” (VanLehn, 2011). However, VanLehn (2011) cites 17 separate studies all suggesting such strategies are “rarely used,” by “human tutors in many task domains with many degrees of expertise.” Thus, sophisticated tutoring strategies are not an explanation for the superiority of either CHT or ITS.

In the fourth hypothesis, the assumption is that “human tutoring allows mixed initiative dialogues, so that the student can ask questions or change the topic” (VanLehn, 2011). Although in most ITS “student initiative is highly constrained,” VanLehn (2011) reviewed CHT dialogs and found that “students take the initiative more than they do in classroom settings [although] the frequency is still low.” Thus, “learners’ greater control over the dialog is not a plausible explanation for why human tutors are more effective than computer tutors” (VanLehn, 2011). This hypothesis confers no clear advantage to either CHT or ITS.

In the fifth hypothesis, the assumption is that “human tutors usually have much broader and deeper knowledge of the subject matter ... than computer tutors” (VanLehn, 2011). However, VanLehn (2011) found that although this is often the case, human tutors “sometimes do not articulate

it during tutoring, and when they do it does not appear to cause significantly larger learning gains.”

Thus, Hypothesis 5 does not explain the superior efficacy of either CHT or ITS.

In the sixth hypothesis, the assumption is made that human tutors are better than intelligent tutors in “increasing the motivation of the students” (VanLehn, 2011). According to VanLehn (2011), “even though motivational tactics ... are common in human tutoring, they do not seem to have a direct effect on learning.” In fact, there is evidence that “motivational tactics such as praise, the warm body effect, or false positive feedback are common in human tutoring,” but “they do not seem to have a direct effect on learning” (VanLehn, 2011). Thus, human tutor-inspired motivation does not “provide a plausible explanation for the superiority of human tutoring over computer tutoring” (VanLehn, 2011).

In the seventh hypothesis, the assumption is that “the frequent feedback of human tutoring makes it much easier for students to find flaws in their reasoning and fix their knowledge” (VanLehn, 2011). VanLehn (2011) cites several studies confirming that “human tutors encourage students to explain their reasoning as they go and usually intervene as soon as they hear incorrect reasoning.” Alternatively, when using Intelligent Tutoring, “students can produce a multi-minute-long line of reasoning that leads to an incorrect answer, and then have great difficulty finding the errors in their reasoning and repairing their knowledge” (VanLehn, 2011). Thus, the capability of human tutors to more effectively provide feedback, and provide it quickly, confirms the superiority of human tutoring in at least this one dimension.

In the eighth hypothesis, the assumption is that human tutors are able to scaffold their students’ reasoning (VanLehn, 2011). Scaffolding was defined by Chi et al. (2001) as follows:

“a kind of guided prompting that pushes the student a little further along the same line of thinking, rather than telling the student some new information, giving direct feedback on a student’s response, or raising a new question or a new issue that is unrelated to the student’s reasoning ... The important point to note is that scaffolding involves

cooperative execution or coordination by the tutor and the student ... in a way that allows the student to take an increasingly larger burden in performing the skill” (Chi et al., 2001).

VanLehn (2011) cites 18 separate studies confirming that scaffolding is commonly employed by human tutors and one study (Chi et al., 2001) demonstrating that “experiments manipulating its usage suggest that [scaffolding] is an effective instructional method.” Thus, scaffolding is a “plausible explanation for the efficacy of human tutoring” (VanLehn, 2011).

VanLehn’s ninth hypothesis is not an alternative hypothesis to the preceding eight hypotheses, rather, it “could be combined with any of the eight hypotheses to provide a deeper explanation of the difference between human and computer tutoring” (VanLehn, 2011). This hypothesis is known as The ICAP Framework and was first described by Chi et al. (2001). The ICAP Framework is a “predictive model ordered by effectiveness as interactive \geq constructive $>$ active $>$ passive” (VanLehn, 2011). It addresses the impact of the tutor’s behaviors on learning by classifying “observable student behaviors” into the aforementioned categories (VanLehn, 2011). VanLehn (2011) concluded that the ICAP Framework is “complementary with all the other [hypotheses and poses] a plausible explanation for the efficacy of human tutoring.”

VanLehn’s (2011) examination of the majority of these hypotheses (the first, third, fourth, fifth, and sixth) demonstrated no clear advantage to either tutoring strategy. Further, VanLehn (2011) states:

“[W]hen compared to “No Tutoring,” the effect sizes of answer-based tutoring systems, intelligent tutoring systems, and adult human tutors are believed to be $d = 0.3$, 1.0 , and 2.0 respectively. This review did not confirm these beliefs. Instead, it found that the effect size of human tutoring was much lower: $d = 0.79$. Moreover, the effect size of intelligent tutoring systems was 0.76 , so they are nearly as effective as human tutoring” (VanLehn, 2011).

Based on the measured effect size and a difference of only 0.03 standard deviations between CHT and ITS, VanLehn (2011) concluded that “within their limited area of expertise, currently available [ITS] seem to be just as good as human tutors.” Given the demonstrated effectiveness of ITS, the study recommends that ITS “should be used to replace homework, seatwork, and perhaps other activities” (VanLehn, 2011).

It is worth noting that a clear advantage to human tutoring is demonstrated in the seventh and eighth hypotheses and these advantages seem to be “completely free of contravening evidence” (VanLehn, 2011). Further, “even though the vast majority of tutors in a school’s system have modest domain knowledge, have no training in pedagogical techniques, and rarely use the sophisticated tutoring strategies” employed by ITSs, “human tutors produce impressive learning gains (between .4 and 2.3 standard deviation units over classroom teachers” (Graesser et al., 2001). Since VanLehn’s (2011) seventh and eighth hypotheses both speak to the variables of student motivation and efficiency and since VanLehn’s (2011) conclusions were admittedly not rooted in an analysis of these two dimensions, the superior efficacy of human tutoring, at the very least, cannot be readily dismissed. As such, enhancing human tutoring services at BCC should remain our focus.

Human tutoring is often recognized only as VanLehn (2011) monolithically defined it, to wit, as “an adult subject matter expert working synchronously with a student.” Synchronous human tutoring is a face-to-face method that can be done “as a supplement to the students’ classroom instruction or as a replacement [and is also one that] can teach new content ... or be purely remedial” (VanLehn, 2011). However, there are two commonly employed methods of human tutoring that do not meet VanLehn’s (2011) definition. First, as access to the internet has increased so have the physical and temporal disconnects that exist between distance learning students and their instructors. This has brought about a rise in “Asynchronous Tutoring,” in other words, tutoring that happens in internet forums, email, and increasingly in what are known as “Virtual Learning Environments,” (Godwin-Jones, 2012) such as the ANGEL Learning Management System used by BCC.

Second, the notion that a tutor must be a subject matter expert, or simply removed from the student's peer group, has become antiquated. In fact, it has been almost 30 years since Stahl et al. (1983) presented a detailed account of the "historical roots of peer and cross-age tutoring" in a paper they refer to as a "basic primer for practitioners and researchers [of PT]." Today, even a cursory review of the educational literature confirms that the practice of receiving tutoring from one's peers has a long history and has been steadily increasing in prevalence in the decades since Stahl et al.'s (1983) report.

Peer Tutoring (PT)

"Imagine two students sitting next to one another, Mary and John. Mary has the right answer because she understands it. John does not. Mary's more likely, on average, to convince John than the other way around because she has the right reasoning.' But here's the irony: 'Mary is more likely to convince John than [a professor or tutor]. She's only recently learned it and still has some feeling for the conceptual difficulties that she has whereas [a professor or tutor] learned the idea such a long time ago that he can no longer understand why somebody has difficulty grasping it.' That's the irony of becoming an expert in your field, 'it becomes not easier to teach, it becomes harder to teach because you're unaware of the conceptual difficulties of a beginning learner'" (Hanford, 2012).

The preceding passage from Hanford (2012) illustrates a specialized form of peer tutoring known as "Peer Instruction." Peer Instruction is "a widely used pedagogy in which lectures are interspersed with short conceptual questions designed to reveal common misunderstandings and to actively engage students in lecture courses," (Fagen et al., 2002). Fagen et al. (2002) describe this novel approach to physics education as taken by Eric Mazur, PhD. at Harvard University. According to Hanford (2012), Mazur has inverted the standard model where students attend lecture and consult the reading for reinforcement and clarification. Instead, Mazur requires his students to read first and

then, using a web-based monitoring system, answer several questions about the reading prior to coming to class. Mazur uses those student responses to determine what material is most confusing to the students and then he designs a set of multiple choice questions for answering in class. The following passage describes the essence of a pure peer instruction approach as practiced by Dr. Mazur:

“Mazur begins class by giving a brief explanation of a concept he wants students to understand. Then he asks one of the multiple-choice questions. Students get a minute to think about the question on their own and then answer it using a mobile device that sends their answers to Mazur’s laptop. Next, he asks the students to turn to the person sitting next to them and talk about the question. ... Once the students have discussed the question for a few minutes, Mazur instructs them to answer the question again. Then the process repeats with a new question” (Hanford, 2012).

According to Hanford (2012), “many more students choose the right answer after they have talked with their peers [and by] the end of the semester, students have a deeper understanding of the fundamental concepts of physics than they did when Mazur was just lecturing.” Hanford (2012) further notes that peer instruction “has proven effective in a range of subjects from psychology to philosophy.”

While Peer Instruction is a classroom-contained and highly specific methodology, the practice of receiving education from one’s peers is more generally known as Peer Tutoring (PT). PT is “characterized by specific role-taking as tutor or tutee, with high focus on curriculum content and usually also on clear procedures for interaction, in which participants receive generic and/or specific training” (Topping, 2005). Simply stated, PT is one student teaching another in a school setting (Allen, 2011). Allen (2011) identifies and defines three common types of PT extant today:

- “Cross-Age Tutoring” – Older students act as tutor to younger students.
- “Cross-Ability Tutoring” – Students with a greater mastery of the subject matter act as tutor.
- “Reciprocal Tutoring” – Students of the same age or ability switch between tutor and tutee.

“Cross-Age and Cross-Ability peer tutoring models are often used interchangeably in research studies,” (Dame, 2012). Thus, differentiating the relative effectiveness of either can be difficult in the course of a literature review. Dame (2012) further states that since “age and ability are highly correlated variables Cross-Ability peer tutoring better identifies most studies termed Cross-Age studies.” Dame (2012) further states that “research suggests that [Cross-Ability PT] is more advantageous than reciprocal peer tutoring.”

No matter which type of PT is employed, the potential benefits are obvious for the tutee. However, as notable physicist Frank Oppenheimer once observed, “the best way to learn is to teach, the best way to teach is to keep learning, and ... what counts in the end is having had a shared, reflected experience” (Delacôte, 1998). One simply cannot impart understanding to another unless one is already possessed of such understanding, regardless of the concept or subject matter at hand. This means there are benefits to the tutor as well as the tutee in a PT relationship but those benefits are not always obvious.

According to Topping (1996), benefits to the tutor in a PT relationship include the “meta-cognitive skills of planning, monitoring and evaluating and the associated use of declarative, procedural and contextual knowledge; and the cognitive processes of perceiving, differentiating, selecting, storing, inferring, applying, combining, justifying and responding.” Topping (1996) expands on this by saying “just preparing to be a peer tutor has been proposed to enhance cognitive processing [as] the act of tutoring itself involves further cognitive challenge, particularly with respect to simplification, clarification, and exemplification.”

Lildren and Meier (1991) wrote that “there is a lack of conclusive evidence to provide the rationale for the widespread implementation of effective peer tutoring programs in college settings.”

This is no longer the case. “The research evidence is clear that [PT] can yield significant gains in academic achievement,” (Topping, 2005). Also, although they are “difficult to measure and not encountered as reliably as academic gains,” PT can bring about an increase in “transferable social and communication skills and in affective functioning [that can result in] considerable added value for no more input” (Topping, 2005).

“Community colleges need to know if peer tutoring and the programs that involve peers working together are focused on the institutional, program, and student-desired outcomes because they are used as measures of effectiveness of the institution” (Brooks, 2006). Although there are sporadic reports in the literature of PT yielding no significant effects on learning outcomes, Topping (2005) reports there are many more studies that “certainly demonstrate high effect size at low delivery cost.” This point simply emphasizes “the importance of appropriate selection of method for purpose and context, and the need to quality assure implementation” (Topping, 2005). As already discussed, quality assurance in supplemental instruction can only be achieved by tracking outcomes and measuring effectiveness.

Compared to the cost of employing professional tutors as faculty or staff, it would seem self-evident that a PT program would not necessarily be as costly. This point will be made clear in the following reviews of studies that illustrate some of the non-monetary forms of compensation (e.g., academic credit, elevated status, etc.) that exist to supplement or replace a student stipend. An older study (Levin et al., 1987) is worth mentioning here as it is still frequently cited in the educational literature today where the costs of PT are discussed. Levin et al. (1987) compared PT to Computer-Assisted Instruction and found PT “to be more cost-effective than Computer-Assisted Instruction, and ... more cost-effective than reducing class size.”

It is for these reasons, all grounded in an extensive body of research, that institutions of higher learning have begun utilizing PT with “increasing frequency to aid in student learning, motivation, and empowerment” (Colvin, 2007). In the following pages, the findings of several relevant studies of

Cross-Ability PT will be presented. In conducting a search of the literature for recent studies with high applicability to BCC, the findings of Dame (2012) were confirmed and are worth noting here:

“The vast quantity of educational research is overwhelming; not that it is intimidating, but frustrating since hundreds of articles must be scoured to yield a single methodologically sound study. The fact that each study is unique with regard to student characteristics, variations in terminology, supplemental instruction methods, or another variable highlights the importance of continuing research. Narrowly focused, additional research is necessary to investigate the impact that supplemental instruction has on student achievement” (Dame, 2012).

A Review of Four Peer Tutoring Programs

Mynard and Almarzouqi (2006) evaluated a PT program at a women’s university in the United Arab Emirates that originated in 2001. Although the setting of such a study may seem to have little relevance for community college students in Florida, the focus of the study was on students learning remedial English and facing the same “challenges common to many first year students such as being unsure of what is expected of them and possessing only a limited awareness of strategies for learning” (Mynard and Almarzouqi, 2006).

The PT program analyzed by Mynard and Almarzouqi (2006) is based on a PT pilot program developed and reported on by Beasley (1997) as it occurred at Murdoch University in Perth, Australia. Essentially, Beasley (1997) recruited “second and third year students who had achieved good grades ... to act as peer tutors to first year students” in two historically difficult classes, *Principles of Commercial Law* and *Introduction to Accounting*. Beasley’s (1997) pilot study paired individual tutors with individual tutees and was accomplished in the following manner:

“Notices were posted around the university calling for ‘Successful 2nd & 3rd year ... students for a pilot peer tutoring program.’ Peer tutors were promised an initial two

hour training workshop, on-going support, a final de-briefing workshop, some remuneration (\$50-\$75 book vouchers), and ‘a useful and enjoyable experience that will enrich your resume and enhance your future employability.’ Potential peer tutors were required to submit a very brief CV detailing their ... academic record, past employment record, and what they personally hoped to gain from the peer tutoring program” (Beasley, 1997).

Potential tutees needing help in both of these courses were identified with the cooperation of the faculty teaching them and the opportunity to participate in a PT pilot program was advertised directly via classroom visitation at the beginning of the semester. Peer tutors in Beasley’s (1997) pilot program initially received training on learning styles via a two hour workshop designed to elicit a “discussion of the roles and responsibilities of students and tutors and the aims and objectives of tutoring.” The workshop was preceded by the issuance of reading assignments on these topics for the prospective peer tutors so as to promote and consolidate discussion with the faculty overseeing the pilot program. Additionally, peer tutors met with the faculty teaching both courses where they received content-specific advice and were “provided with extensive support teaching material (including "model" or suggested answers to past assignment and exam questions)” (Beasley, 1997). Further, Beasley (1997) states that:

“It was stressed that the peer tutor's role was to act as a "facilitator" and guide. Peer tutors should be extra and non-threatening resource personnel who could encourage students' skill development, independence and confidence and thereby complement the teaching endeavors of their mainstream unit lecturers and tutors. The peer tutors' role was not to "give answers" to the students. Rather, their role was firstly, to help develop the students' thinking and understanding of the course content, tasks, and lecturers' expectations, and secondly, to help students develop appropriate strategies for dealing effectively with these” (Beasley, 1997).

Throughout the duration of the pilot program, tutors informally met with faculty advisers to “monitor the tutees' progress, share ideas and strategies, and address any problems or concerns that had emerged” (Beasley, 1997). At the program’s conclusion, tutors were verbally debriefed by faculty advisers. Additionally, both tutors and tutees were required to complete a questionnaire that allowed for a qualitative and quantitative analysis of the program’s success. Beasley (1997) describes the questionnaire as follows:

“The tutors' and tutees' questionnaires were parallel in form and comprised 12 and 11 questions respectively which asked the participants to rate the success of the sessions on a five point scale, whether the tutee's study skills, knowledge of the subject, and confidence had improved as a result of the sessions; suggestions for improvement of the scheme; and whether they would be prepared to participate in a similar scheme in the future. In addition, the tutors' questionnaire asked for details of any problems encountered and how they were dealt with; what they felt they had learned or gained from the program; whether they had found the initial training helpful; and any advice they might have for future peer tutors. The tutees' questionnaire, on the other hand, also asked for the number and average length of the sessions, as well as reflections on the least and most useful features of the sessions” (Beasley, 1997).

The pilot study lasted two semesters with increased participation by tutors and tutees in the second semester that Beasley (1997) attributes to student and faculty enthusiasm stemming from “the perceived success of the program in semester one.” Qualitatively, it was “clear that both the tutors and tutees involved in the scheme in both semesters were overwhelmingly enthusiastic about the experience” (Beasley, 1997). Beasley (1997) further states that tutee results in both semesters were “very good with the majority of students passing with credits and distinctions, and in some cases high distinctions.” Also, the peer tutors not only “improved and revised their knowledge of the subject

matter and improved their teaching and communication skills,” but they “gained personally from the experience, in confidence and a greater sense of self-worth” (Beasley, 1997).

Quantitatively, although no data is given for the previous failure rates for either course, out of 51 possible grades, only one failure was recorded. That student was enrolled in both courses yet passed only one citing “personality problems” with her tutor as the reason. Beasley (1997) concludes that “the benefits of peer tutoring are many, both for peer tutors and tutees. While schemes such as this may involve some organizational difficulties and investment of time and money, the positive learning outcomes are considerable.”

Mynard and Almarzouqi (2006) confirmed the efficacy of Beasley’s (1997) pilot program at Murdoch University by reporting similar positive results at the women’s university in United Arab Emirates. Mynard and Almarzouqi (2006) found that “the most significant benefit mentioned by all of the tutors echoes what Beasley (1997) claims is a major benefit of peer tutoring—that tutors learn from teaching.” However, “the tutees seemed largely unaware of ... how exactly they were benefiting” (Mynard and Almarzouqi, 2006). The reasons for this may stem from Mynard and Almarzouqi’s (2006) findings that students needing help “tended to have low metacognitive awareness, i.e. awareness of the learning process, and little knowledge of learning strategies, which contributed to the academic difficulties that tutees were experiencing.” Their final recommendations for improvement to the program were as follows:

“... raising awareness of the aims of the program to tutees; providing ongoing training and assistance for tutors; limiting the areas in which tutors offer help, i.e. by focusing on strategy training and language practice through reading, listening, and speaking; and involving faculty so that tutees are more likely to be active participants, and receive assistance at the right level and in the area they need” (Mynard and Almarzouqi, 2006).

Werner (2008) describes a successful PT program where the student tutor is actually embedded in the classroom with faculty and tutees and not stationed in a learning lab or some other auxiliary space. Unfortunately, Werner (2008) offered no quantitative data to demonstrate the success of the program. However, the program's success is clearly indicated by the anecdotal evidence provided by faculty, student tutors, and tutees.

Although “teacher education, training, and preparation have long and widely been considered the domain of the four-year college and university” since 2005 Westchester Community College in Valhalla, New York has utilized a PT program in their introductory English courses called the Student Tutor Education Program (STEP) in which they identify future teachers and recruit them as peer tutors (Werner, 2008). According to Werner (2008), STEP is “helping to redefine the personal, academic, and professional identity of the two-year college student and reshape conventional notions about the community college itself vis-à-vis teacher education” (Werner, 2008).

Werner (2008) describes STEP as follows:

“STEP is an independent study in English instruction and tutoring. Its target population consists of undergraduate students who have distinguished themselves in Composition and Literature 1 with strong written and oral communication skills, and who have at least a potential interest in becoming a teacher. Under the supervision of a STEP faculty mentor, these students observe and participate in the instruction of a basic writing or composition and literature class, meet regularly with the instructor to discuss issues in writing instruction, and tutor students both in the mentor's class and at the writing center” (Werner, 2008).

To participate as a peer tutor in the STEP program, students must undergo a highly selective and rigorous process. Among the requirements are “compelling academic credentials, including a grade point average of 3.5 or better” (Werner, 2008). Faculty in the English department work to identify their “most outstanding candidates” and submit those candidates' applications, transcripts,

and samples of their writing to a committee of STEP faculty advisers (Werner, 2008). To date, more than half of the Westchester Community College English Department faculty members (11 members) have served on the advising committee.

Before embarking on their in-class duties, STEP tutors must spend a five week period, two hours per week, working in the college's writing center in which half of their time is devoted to training via workshops with faculty and staff. The other half of their time in the writing center is spent "shadowing a senior tutor in live tutoring sessions" (Werner, 2008).

After their training period, the tutors are still expected to work two hours per week in the college's writing center. Additionally, they begin their work as "in-class tutors under the direct supervision of the STEP faculty mentor" for two hours per week (Werner, 2008). While the role a STEP tutor may take in the classroom is "determined by the tutors' comfort level, initiative, and ability," the role of the tutor is broad and there are many responsibilities potentially assumed by a STEP tutor (Werner, 2008). Werner (2008) states that STEP tutors' duties can include:

"shadowing" the instructor in one-to-one writing conferences, tutoring specific students, going over student papers, explaining teacher comments, leading small-group discussions, conducting mini-lessons for students who share difficulty with a particular problem, or even planning and delivering an entire lesson-or more than one" (Werner, 2008).

Over the course of a semester, STEP tutors meet with their assigned faculty mentor for one hour per week whereupon they "fulfill a variety of reading and writing assignments about teaching and tutoring English" (Werner, 2008). For their efforts, they are compensated in the form of three general education credits and a "check in the amount of \$500 as the Academic Challenge Award, in recognition of their talents and achievements in the field of writing and writing instruction" (Werner,

2008). Since the pilot program debuted, 30 students have served, all successfully, as student tutors (Werner, 2008).

While the three PT programs reviewed thus far (Beasley, 1997; Mynard and Almarzouqi, 2006; Werner, 2008) were either pilot programs or simply not yet fully developed programs, the peer tutoring program at Henry Ford Community College (HFCC) in Dearborn, Michigan is well established. According to their website:

“HFCC's Tutoring Services will be among a handful of Michigan community colleges completing the rigorous and exceptional standards required to be certified by the College Reading and Learning Association's International Tutor Training Program Certification (CRLA-ITTPC) review board. Certification is a nine-month process for Level I Certification. HFCC's Tutoring Services will be applying for Level II and Level III Certification at the completion of the 2012-2013 academic years. Reaching Level III Certification means that a Tutoring program is accredited for five years” (HFCC, 2012).

It is important to note that CRLA-ITTPC does not certify tutors, it certifies tutoring programs. If Brevard Community College were to someday attain a tutoring program that had achieved a CRLA-ITTPC certification, it would place us in the company of more than 800 colleges and universities worldwide that have received certification including such distinguished Florida schools as University of Florida, University of Central Florida, Florida Atlantic University, Florida State University, Rollins College, University of Miami, University of South Florida, and many Florida community colleges such as Valencia College and Tallahassee Community College (CRLA, 2012).

The PT program at HFCC is clearly an integral part of the college's tutoring services as peer tutors are “always available” for drop-in tutoring at the college's learning center (HFCC, 2012). HFCC's tutoring program is therefore featured prominently in HFCC's application for CRLA-ITTPC certification. The following description of HFCC's PT program has been taken in its entirety from HFCC's application for CRLA-ITTPC certification as available on HFCC's website (with only minor

edits for clarity and formatting) and is included here to demonstrate further the requirements for a truly successful PT program:

“To qualify for the position of Peer Tutor, the candidate must be a currently enrolled student at Henry Ford Community College; have a 3.0 GPA or better overall as well as in the content area; have successfully completed the course above the highest level course for which the student will tutor; submit a formal application, receive two letters of references from HFCC faculty in the content areas, and be in good academic and financial standing with the College; be interviewed by a content area specialist as well as the Coordinator of the Learning Lab and Tutoring Services; and complete tutor training.

Once trained and hired, Peer Tutors must adhere to certain key responsibilities, such as tutoring registered students, reviewing subject content regularly, assist with collection of tutoring data, enforcing Tutoring Services policies, and conscientiously communicating schedule changes in agreement with the Tutoring Services attendance policy.

Approximately three times per academic year, the Learning Lab and Tutoring Services Coordinator conducts hiring for Peer Tutors all year, with recruiting drives just prior to the Fall (Aug – Dec) and Winter (Jan - May) semesters. Tutors are recruited primarily through the College’s Job Placement Office, which helps verify eligibility and through the College’s Honors Program. All applicants must submit an application, transcript, and at least two letters of faculty recommendation to be considered. Prospective tutors are interviewed by the faculty lab liaison in the respective discipline, wherein they must demonstrate their ability to communicate course content within the department’s instructional guidelines.

The Coordinator of the Learning Lab and Tutoring Services collects all of the application material and, after scrutinizing applications, academic histories, verifying faculty recommendations, and received recommendations from the content-area faculty lab liaisons per their respective interviews. If all is positive, the applicant will be invited for a final interview to discuss availability to work the days/times needed in the respective subject-area based on usage data from the prior year. If the applicant is hired based on all criteria, then the applicant will be scheduled for an orientation. At the Tutor Orientation, tutors learn more about working for the Learning Lab in general and

tutoring rules in particular. The one-hour meeting explains the program's mission and the role of the tutor in that mission, mandatory in-person and online training, pay scale, and benefits.

The tutor is then enrolled into a non-credit 95% online tutor training class, 5% of which includes several in-person meetings, which consist of workshop style sessions for minimum total of eight hours. The bulk of the training happens during the first three weeks of the semester, prior to tutoring being made available to the campus community, but continues throughout the semester per the attached syllabus. The training sessions not only help insure tutors understand what is expected of them but also serve to screen tutors. Tutors who exhibit undesirable characteristics must meet with the Coordinator, and if the behavior persists, will be terminated. In the online tutor course, nine quizzes, two observations and one reflection paper are required. All quizzes and assignments are enclosed with this application.

At the start of training, all candidates are given the HFCC Tutor Manual, which covers topics that are required for certification by CRLA/ITTPC. Instructors conducting tutor training draw from exercises from Dr. Paul Nolting and Kimberly Nolting's Learning Assistance and Training Manual such as the chapter on "Learning Styles."

In addition to the training provided by the Learning Lab and Tutoring Services Coordinator, the departments of English and Math provide discipline specific training by faculty lab liaisons. A mandatory two hours of discipline specific training is required of each tutor in these areas.

At the close of training, the Coordinator of the Learning Lab and Tutoring Services personally evaluates each tutor's performance. At the end of the semester, tutors complete a Tutor Self-Evaluation Form, where they rate their own strengths and weaknesses, and tutees complete a Student Tutor Survey Form, where they rate their tutor(s) and their experience with the center. The Coordinator meets privately with each tutor to discuss the results of the evaluations and survey" (HFCC, 2012).

As demonstrated in three previously described studies (Beasley, 1997; Mynard and Almarzouqi, 2006; Werner, 2008), successful PT programs such as the one at HFCC share several similar features. Essentially, these similar features may be grouped into Allen's (2011) three categories for planning a successful PT program: setting clear goals for peer tutors, training peer

tutors, and monitoring the results of peer tutors. In fact, Gordon (2005), author of *Peer Tutoring: A Teacher's Resource Guide*, says the “main reason peer-tutoring programs fail is that tutors aren't retrained” (Allen, 2011). To ensure the success of a PT program, Gordon recommends implementing “peer-feedback sessions so that tutors can learn from the pooled experiences of the group, rather than just from the teacher” (Allen, 2011).

To truly understand what works in a PT program, it is instructive to consider in contrast that which does not work. Foran and Longpré (2007) discovered some pitfalls to be avoided in implementing a PT program by investigating a PT program that had been languishing for several years at Upper Canada College, a boys' school in Toronto, Canada.

“For many years the College offered The Lab, a Tuesday/Thursday lunchtime drop-in program, housed in classrooms and staffed by senior students who earned community service hours toward their graduation diploma for the time they spent tutoring. We found that, due to the program's drop-in nature, younger students were often intimidated when approaching the group of senior boys to ask for support. Its casual nature resulted in a lack of visibility and made accountability hard to measure. As the adult supervision was cursory, there was no way to be sure the recorded community service hours matched actual tutoring hours. A feeling of apathy surrounded the collection of hours, resulting in an overall lack of respect for the program. Perhaps most importantly, the drop-in aspect did not allow tutoring relationships to develop, leaving both tutors and tutees dissatisfied. As a result, there was a high rate of attrition and the program had difficulty sustaining itself” (Foran and Longpré, 2007).

As a result of their study, Foran and Longpré (2007) created a checklist, far more detailed and nuanced than Allen's (2011), for successfully implementing a PT program. The list that follows is taken from Foran and Longpré's (2007) report but with several edits for brevity and clarity (not content):

- The PT program must have its own space.
- The PT program space should be viewed as a quiet working area always.
- The PT program space should be inviting and full of support resources.
- The PT program space should be monitored by faculty or staff always.
- Peer Tutors must be properly trained.
- Peer Tutors must record their hours.
- Peer Tutors must be recognized and rewarded.
- Peer Tutors must believe that the opinions they express matter.
- Peer Tutors must be encouraged to take on leadership roles assisting in the program.
- Peer Tutors must believe that their input is the basis for initiating changes to the program.
- Peer Tutors must file daily logs and progress reports.
- Faculty and Staff must respond to tutors' progress reports.

The Social Dimensions of Peer Tutoring

According to Topping (1996), “social and cognitive interaction with a more experienced peer ... remains a theoretical cornerstone of peer assisted learning.” The study conducted by Foran and Longpré (2007) demonstrates how the often overlooked social dimensions of these interactions in a PT program can detrimentally influence program effectiveness and ultimately, inhibit student learning. A lack of faculty supervision and the drop-in nature of the tutoring offered at Upper Canada College fostered intimidation in potential tutees, prevented the building of tutor-tutee relationships, and ultimately led to a lack of respect for, and failure of, the program (Foran and Longpré, 2007).

The findings of Foran and Longpré (2007) are not surprising when one considers Colvin's (2007) study of social dynamics within a newly developed PT program in the Communications Department at the University of Utah. Colvin (2007) found that “interaction and relationships are key (sic) in both describing and implementing a peer tutoring program, especially one that is not skill based, such as math or science.”

The PT program studied by Colvin (2007) is similar to that previously described at Henry Ford Community College (HFCC, 2012). However, one difference is that student tutors at University of Utah must undergo even more preliminary training. Colvin (2007) developed a training course called “Peer Tutor Seminar” that is described as “a formal, upper-division course focused on providing undergraduate students with training in pedagogical theories, principles, and skills necessary for successful tutoring.” Student tutors in the program used Ender and Newton’s (2000) *Students Helping Students: A Guide for Peer Educators on College Campuses* as the required text “because of its focus on college students in general rather than a specific subject, as well as its inclusion of such topics as intercultural competence, interpersonal skills, and use of campus resources” (Colvin, 2007). After completing a full month of the Peer Tutor Seminar, potential tutors were permitted to apply for an internship in the following semester where they served as “facilitators in one of two introductory, large lecture style courses” (Colvin, 2007).

As both instructor/facilitator and researcher/investigator, Colvin (2007) had a unique, inside view of the PT program. She was “a familiar face; had complete access to everyone involved; interacted with students, tutors, and instructors on an almost daily basis; and was occasionally treated as a confidant by all three subject positions” (Colvin, 2007). Colvin (2007) found that “this type of interaction and reciprocity is key (sic) to building trust and rapport.” Through her direct and frequent observation of all aspects of the program, Colvin (2007) took extensive field notes, axially coded them (Strauss and Corbin, 1998), and, using a Grounded Theory Approach (Glaser and Strauss, 1967), analyzed the data to reveal emergent patterns so as to ultimately answer the following four questions:

1. How do students, instructors, and tutors respond to the experience of initiating peer tutoring into the curriculum?
2. How do students, instructors, and tutors come to understand the peer tutor role?

3. What is the response of the peer tutors to the experience of tutoring?
4. How are power and resistance constituted, perceived, and comprehended in classrooms that include peer tutors?

The answer to Colvin's (2007) first research question was essentially "confusion." Colvin (2007) found that "the role of peer tutor was not yet established as a cultural object," and because "this role was not yet established, students, instructors, and tutors all responded to the tutor with varying degrees of confusion." Clearly, proper communication of roles and responsibilities for all participants is of paramount importance in developing a PT program.

Colvin (2007) found that the answer to Question 2 was variable and dynamic. As she explains, "the position of tutor was in continual negotiation throughout the semester as tutors acquired the knowledge and skills that enabled them to enact their roles, and as students and instructors learned what to expect from the tutors" (Colvin, 2007). This finding is confirmed by Allen (2011) who points to continual retraining as a requisite for success in a PT program.

For Question 3, Colvin (2007) found that peer tutors had to continually "adapt their performance," so as to redefine "their role and manage the way that others viewed them." In fact, Colvin (2007) discovered that "as soon as tutors walked through the door, they changed, in the eyes of the students, from being 'one of them' to having at least a perception of power." As noted by Topping (2005), PT should occur between "status equals or matched companions."

In response to Question 4, Colvin (2007) states that "both power and resistance issues were found to be inherent in the inclusion of peer tutors in a college classroom." With respect to tutees, Colvin (2007) found they "questioned the role [of peer tutor] itself, inquiring why tutors were needed if they were paying tuition to be taught by instructors not peers, and what quality of education would occur if tutors became an integral part of higher education." Peer tutors also expressed frustration and confusion "about why students were not asking them for help or were even actively excluding them from group meetings" (Colvin, 2007).

Again, the tutor-tutee relationship is dynamic and Colvin (2007) found that although “tutors were nominally granted power [they] gained no privilege until a relationship was formed.” Topping (2005) highlights the importance of tutor-tutee relationships by noting that a “trusting relationship with a peer who holds no position of authority might facilitate self-disclosure of ignorance and misconception, enabling subsequent diagnosis and correction.” Topping (2005) further states that:

“[A]s the learning relationship develops, both helper and helped should become more consciously aware of what is happening in their learning interaction, and more able to monitor and regulate the effectiveness of their own learning strategies in different contexts. ... This development into fully conscious explicit and strategic metacognition not only promotes more effective onward learning, it should make helper and helped more confident that they can achieve even more, and that their success is the result of their own efforts” (Topping, 2005).

As far as the resistance encountered from faculty, although they generally “did not exhibit overt resistance to tutors ... resistance was demonstrated when instructors were initially solicited to participate in the program” (Colvin, 2007). Such resistance from faculty may be common. Faculty resistance to the implementation of a PT pilot program was also encountered by Beasley (1997). When approaching faculty to enlist their classes’ participation in the program, Beasley (1997) encountered many faculty who expressed “a number of unfounded fears including the idea that the scheme might create extra work for unit lecturers and tutors and that peer tutors might ‘give students wrong information.’”

Although Beasley (1997) was able to allay those fears in the course of several meetings with concerned faculty members, he may have mischaracterized these concerns as “unfounded.” As one faculty member noted in Colvin’s (2007) study:

“[It] really requires substantially more dedicated time on the part of the instructor to get it going, to get it set up ... the design of the course has to be substantially heightened and there has to be a recognition by the peer tutor of their role and training set up and all of that infrastructure has to be put into place for it to work. (Interview 49)” (Colvin, 2007).

Given the frequency and types of resistance encountered in implementing a PT program, Colvin (2007) ultimately found that “those involved in training peer tutors should stress the liminality or ‘in-betweenness’ of the position,” and furthermore, that “it is necessary to recognize that programs in early stages will engender more resistance than those that are already established.”

Colvin (2007) concludes by emphasizing that the effective implementation and utilization of a PT program relies on faculty, tutees, and their peer tutors all discovering “common ground about what it means to be, or use, a tutor in a particular classroom.” Ultimately, Colvin (2007) concluded:

“From this research, it is apparent that the use of peer tutors is not something that can be grafted onto a standard classroom configuration with automatic success—the system must be designed specifically with peer tutors in mind. It is a whole system of training and support concerning the socialization of students, teachers, and instructors in the interaction” (Colvin, 2007).

Gender issues in the tutor-tutee relationship were researched by Reinheimer (2000) who “found no evidence that same sex tutoring pairs were more effective than non-gender-matched pairs.” However, Wright (2003) examined the question of why one sex should resist tutoring more than the other. It is interesting to note that in the course of answering this question, Wright (2003) discovered that while gender is a predictive of a student’s likelihood to resist tutoring, “resistance to asking for help crossed cultural/ethnic lines.”

Wright’s (2003) study took place at Stephen F. Austin State University in east Texas and focused on students taking two developmental mathematics classes, *Fundamentals of Mathematics*

and that course's successor, *Fundamentals of College Algebra*. These courses were chosen because of the "high course failure rate and notable student under-preparedness" (Wright, 2003).

Specifically, Wright (2003) investigated "why male students resist seeking academic assistance from peer tutoring programs" more than female students. "Laziness, pride, and stubbornness" were the most commonly cited answers and the dominant theme of the study (Wright, 2003). Wright (2003), citing research by Covington (1992), found that these answers are consistent with the notion that "many students self-handicap by confessing a favorite personal flaw as an impediment to one's success in order to maintain his or her self-esteem in the event of eventual failure."

As Colvin (2007) found, power in the peer tutor-tutee relationship is a factor impacting success. Wright (2003) also discovered that the issue of power was a critical aspect of the relationship, specifically, that "equating weakness with needing or asking for help was a recurrent theme" in interviews with all study informants.

Despite peer tutors receiving "training that focused on the idea that they were peer tutors and were on an equal plane with their clients" (Wright, 2003), Wright (2003) essentially confirmed the findings of Tannen (1990) who stated "men are less likely to ask questions in a public situation where asking will reveal their lack of knowledge," while alternatively women "are more likely to stop and ask for directions when they're lost." Wright (2003) expands on this by saying:

"Again, Tannen's (1990) research supports the tutors' impressions. She claimed that in most cases a man engages the world as an individual in a hierarchical social order in which he is either one-up or one-down. ... On the other hand, women engage the world as individuals "in a network of connections" where "conversations are negotiations for closeness in which people try to seek and give confirmation and support" (Tannen, 1990)" (Wright, 2003).

Finally, Wright (2003) concludes with the following advice on how to promote effective social dynamics when implementing a successful PT program:

“Tutor trainers must set aside training sessions to talk about gender communication issues. All tutors need to recognize that male clients may be competing for status and power and that the tutor has a hierarchical advantage by nature of his or her position as the one with the directions. Male clients who strongly feel the need to be independent and who must negotiate status in a tutoring relationship should be allowed to feel equal or even superior in an area other than the academic subject being tutored. Initial conversations between tutor and client should allow the client to reveal areas in which he feels confident. Tutor preparation should include role playing in order to give tutors the opportunity to practice a variety of responses to a male client's attempts to get one-up on the tutor, and role playing would also be an effective tool for teaching tutors how to deal with self-handicapping excuses” (Wright, 2003).

Measuring Effectiveness by Tracking Learning Outcomes

As revealed previously in the review of several successful tutoring programs, successful PT programs require continuous monitoring and evaluation of academic gains. In fact, “academic gains for both the tutee and the tutor are the standard measure of tutoring success” (Foran and Longpré, 2007). Measuring academic gains will require a coordinated effort on behalf of all participants and stakeholders. The *Handbook of College Reading and Study Strategy Research* (Boylan et al., 2003) lists three types of data that should be collected for the purposes of evaluating developmental educational programs such as a PT program:

1. Primary data that describe how much and how many, such as number of students served, subjects tutored, contact hours generated.
2. Secondary data that describe short-term outcomes, such as course retention rates, pass rates in courses, short-term retention, gain in scores, grades in courses tutored, extent of student satisfaction, faculty/staff perceptions.
3. Tertiary data that describe long-term outcomes such as long-term retention, graduation rates, and faculty-staff perceptions of program and program students.

Consistent with Boylan et al.'s (2003) secondary data types, Hendriksen et al. (2005) evaluated three primary goals of faculty tutors, as established by their own learning center, and developed the following measurable outcomes which are certainly applicable to PT:

Goal 1: To help students meet the demands of academic college level coursework.

Measurable outcome: Students will pass their tutored course at the same rate as non-tutored students.

Data: Grades in courses tutored, pass rate in courses, and course completion rate.

Goal 2: To help students succeed and graduate.

Measurable outcome: Students will re-enroll at the same rate as non-tutored students.

Data: Short-term retention, i.e., re-enrollment from one semester to the next.

Goal 3: To help students develop self-awareness, self-direction, and self-confidence.

Measurable outcome: Students will report and demonstrate independent application of learning strategies.

Data: Student self-reports/extent of student satisfaction.

In the simplest sense, a tutored student exceeding a non-tutored student in any measured dimension (grade point average, retention, etc.) by only a fraction would constitute an academic gain. According to VanLehn (2011), the bar should be raised higher. "Tutoring researchers should retain Bloom's challenge and strive to develop [methods] that are 2 standard deviations more effective than no tutoring" (VanLehn, 2011; Bloom, 1984).

Data acquisition can be challenging. However, Cooper (2010) reports on the successful implementation of a software program designed to solve this problem in a college serving a large student body. The TutorTrac (© Redrock Software Corporation, www.tutortrac.com) tracking system allowed the tutoring center at Western Washington University “to keep more accurate student usage records and to merge those usage records with individual student records, which created greater freedom to compare students across different factors” (Cooper, 2010).

Given the overwhelming importance of tracking in assessing effectiveness, TutorTrac, or some equivalent software package, should be considered at least as a potential enhancement to Brevard Community College’s present tutoring services offered through our learning labs. However, regardless of how the data is collected, the collection of data on student learning outcomes is critical to the success of a PT program. The following partial list of TutorTrac features has been excerpted and modified for brevity and clarity (not content) from www.tutortrac.com to demonstrate the potential power of implementing such a system college-wide.

- Can store over 2 billion student records.
- Is completely web-based.
- Integrates easily with existing college web sites.
- Can import student, course, and faculty information.
- Connects to LDAP, Active Directory, or Single Sign-On systems for authentication.
- Interfaces with Banner, Datatel, PeopleSoft and other student information systems.
- Is secure and protects data online with SSL Encryption.
- Logs students’ activity and records visits with tutors.
- Can utilize scanners and card readers at login stations to record visits both local and remote
- Is accessible from web-enabled devices such as iPhones, Androids, etc.
- Manages unlimited centers, tutors, schedules, and allows or restricts access to data.
- Manages schedules for unlimited advisers across unlimited centers.
- Generates pre-formatted and customized reports and can restrict access by group and center.
- Emails appointment confirmations and schedule reminders automatically.

Summary and Recommendations

We as educators have a duty to impart the strong, essential skills necessary to create successful students. While it is clear that current tutoring services at BCC, such as those offered through our Learning Labs, are already an important asset to this end, it is equally clear that we have many opportunities to enhance the quality of the education we provide by both enhancing existing programs and supplementing with new programs.

One opportunity not discussed thus far is BCC's website. Under the heading "What to Expect from Tutoring," BCC Palm Bay's Learning Lab states on its website that (BCC, 2012):

"Our professional tutors are here to provide a complimentary service to BCC students who need additional help with understanding core concepts and how to improve their study skills. If you have questions regarding formulas, concepts, processes, formatting a paper, structuring a paper or improving your writing, our tutors can help." However, they further state that "tutors will not explain your class assignments, assist you with a quiz or test, or edit your paper. Please see instructors during their office hours or your class for clarification about assignments. Please note that all tutoring times are subject to change" (BCC, 2012).

At the time of this writing (end of the 2012 summer semester) the previous passage contains almost all of the website's content as related to tutoring. Furthermore, the tutoring schedules on the BCC website are all listed as "To Be Announced," with the exception of tutoring in Spanish and American Sign Language that are both set to "resume in November," due to a staff member's leave of absence (BCC, 2012). The first point to be made with respect to our website is that it is deficient in terms of content and resources for tutoring, especially when compared to other colleges such as many of those mentioned in this report. The second point to be made is that while it is normal and expected for a faculty or staff member to take a leave of absence or even just the occasional sick day, at present

doing so can leave our students with a gap in supplemental support. If we were to recruit and develop a team of highly trained peer tutors, not only would we avoid this pitfall of having all our eggs in one basket, but we would ensure the continuous and increased offerings our students are requesting.

As we consider implementing a PT program at BCC, we must take great care and caution to heed the many warnings and admonitions presented by the authors of the various studies that have been reviewed herein. As Topping (2005) stated, “many schools might think they are implementing peer tutoring or cooperative learning, when all they are really doing is putting children together and hoping for the best.” The successful program will be planned well in advance of implementation, allocate all resources necessary, proceed from a strong foundation of widespread faculty support, ensure careful attention is paid to complex social dynamics in the tutor-tutee relationship, ensure thorough and continuous training for peer tutors, evaluate feedback from all participants and stakeholders, and assess and monitor program effectiveness continually.

Although intended to target professional tutors specifically and not peer tutors, LaFontaine (2007) of Quinsigamond Community College in Worcester, Massachusetts has developed a method called *The Quad-A Method* that could be utilized as potential resource in the advanced preparation undertaken by peer tutors as recommended by several studies (Beasley, 1997; Topping, 2005; Werner, 2008). *The Quad-A Method* stands for “Assess, Assist, Allow autonomy, Approach again” (LaFontaine, 2007). According to LaFontaine (2007), this system “offers an uncomplicated cookie-cutter consistency that allows a deep human style and attitude while directing the student towards good study skills and the security and ability to self-assist.” LaFontaine’s (2007) method is likely a great starting point and it is certainly consistent with the best practices for peer tutors mentioned herein. However, further research is needed on implementing a PT program at BCC and this research may reveal that it is in our best interest to develop and formalize our own methods, materials, and resources.

As we consider taking our first steps toward a fully-developed PT program, it may prove wise to make CRLA-ITTPC certification a goal from the outset. Doing so would ensure we are using a time-tested protocol for quality assurance in tutoring and would provide an important milestone for measuring our progress on the path to program success.

One path to a fully-developed and successful college-wide PT program might be to start a small, focused, single-campus, subject-specific, PT program as outlined in the following five point plan:

1. Research. Form a program committee, including faculty whose students will be the most likely participants, to conduct a cost analysis of implementing a PT program. Such analysis should assess not only the direct costs in terms of faculty, staff, and other human resources, but should also include the costs of allocating key infrastructure and facilities, acquiring/developing appropriate training materials, advertising/marketing costs, and the costs of remuneration, monetary and otherwise, for prospective peer tutors including, but not limited to, stipends, tuition reduction, and academic credit.
2. Education. Educate faculty, staff, and stakeholders. Through a coordinated effort designed to minimize resistance and gain the support vital to program success, recruit additional faculty participation.
3. Infrastructure. Allocate all logistical, physical, informational, and monetary resources necessary to ensure the program is not only successful, but that it achieves Bloom's 2-sigma challenge (Bloom, 1984). The first step in building the underlying infrastructure that will ensure program success is the implementation of a comprehensive tracking and analysis system such as TutorTrac to monitor program effectiveness and learning outcomes.

4. Participation. The program committee should work with faculty to identify, recruit, and train student tutors who either have demonstrated or are capable of demonstrating not only the appropriate subject matter skill and expertise, but who also demonstrate the necessary sensitivity to the complex social dynamics in a peer tutoring relationship. Based only on the author's anecdotal experiences in the Science Department of BCC Palm Bay for the past three years, there would seem to be many students at BCC who plan to pursue careers in education. The benefit to these students in identifying, recruiting, and training them as peer tutors, as well as the benefit to potential tutees, would seem self-evident. One way to help identify potential peer tutors, as well as provide a nucleus for building a community of peer educators, might be starting a chapter of Future Educators (futureeducators.org) at BCC. Every local high school from Bayside High in Palm Bay, FL to Cocoa High in Cocoa, FL already has a chapter of Future Educators on their campus so there could be instantaneous and effortless matriculation.
5. Assessment. Throughout the duration of the pilot program, and certainly at its close, there will need to be a thorough and quantitative analysis of the results of the program's effectiveness as measured by academic gains and participant approval. Attaining Bloom's (Bloom, 1984) 2-sigma challenge would constitute the ultimate measure of success.

Our students have entrusted us with their education, their future. If we are to meet this challenge, we first must ensure they remain our students. As Tinto (2005) reminds us, "students who learn are students who stay." We the educators of Brevard Community College should take every necessary action and make every necessary effort to ensure that all students who stay continue to be students who learn. Actively involving our students in a cooperative learning program such as peer tutoring may be the simplest and most elegant path toward this end yet there are many options to

consider and choices to make in implementing such a program. But as Pashler et al. (2008) have noted, “given the capacity of humans to learn, it seems especially important to keep all avenues, options, and aspirations open for our students, our children, and ourselves” (Pashler et al., 2008).

Afterword

In his 1693 treatise, *Some Thoughts on Education*, John Locke observed that “there are possible scarce two children, who can be conducted by exactly the same method” (Locke, 1693). This idea has evolved into a modern categorization and customization of instructional methods to fit the various “learning styles” of students despite there being “no adequate evidence base to justify incorporating learning styles assessments into general educational practice” (Pashler et al., 2008). Despite the findings of Pashler et al. (2008), educators who attempt instructional methods beyond the conventional lecture are to be commended. However, regardless of the efforts made, if they are not sufficient then students must subsequently engage in a dialog with a tutor because, as Graesser et al. (2001) have found, “conversational dialog substantially improves learning.”

Such conversational dialog may be insufficient at Brevard Community College today, especially in those areas where students have requested the most supplemental instruction, the sciences. This paper has elucidated many of the effective strategies and methods used by tutors. As Wood and Tanner (2012) remind us, “we need only strive to remember the key characteristics of effective tutoring and doggedly attend to them in designing our learning environments for students.” It is with an awareness of Wood and Tanner’s (2012) “key characteristics,” and an appreciation for the necessity of Graesser et al.’s (2001) “conversational dialog,” that this paper’s author calls attention to his own title at Brevard Community College as it appears on his faculty photo-ID badge and on this paper’s title page. That title is “Lecturer.” Such an appellation is literally evocative of the “old paradigm,” that is, the paradigm in which students are viewed as a *tabula rasa* on to which information is passively transcribed. Further to this point, designating our educators as “Lecturers,” and describing some of our core courses (e.g., Biology) as consisting of “lecture and lab,” is at least a tacit endorsement of an antiquated educational philosophy that is extensively decried in the literature today.

This observation is offered only with the hope of providing potentially valuable insight as we seek to enhance, *in toto*, the quality of the education offered by Brevard Community College. While the implementation of a supplemental instruction program such as PT certainly has many demonstrated benefits, it may be wise first to investigate to what extent such a program is only treating the symptoms of poor student performance and not the underlying causes.

Literature Cited

- (BCC) Brevard Community College. 2012. Learning Lab Website. URL: <http://www.brevard.cc.fl.us/academics/academic-support/learninglabs/palmbaylearninglab/tutoring.cfm> Accessed: June 29, 2012.
- Beasley, C. 1997. "Students as teachers: The benefits of peer tutoring." In Pospisil, R. and Willcoxson, L. (Eds), *Learning Through Teaching*, p21-30. Proceedings of the 6th Annual Teaching Learning Forum, Murdoch University, February 1997. Perth: Murdoch University. URL: lsn.curtin.edu.au/tlf/tlf1997/beasley.html Accessed: June 29, 2012.
- Bloom, B. S. 1984. "The 2-sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring." *Educational Researcher*. 13(6):4-16.
- Boylan, H. R., Bonham, B. S., White, J. R., and George, A. P. 2000. "Evaluation of College Reading and Study Strategies Programs." In R. F. Flippo and D. C. Caverly (Eds.), *Handbook of College Reading and Study Strategy Research*. Mahwah, New Jersey, U.S.A.: Lawrence Erlbaum Associates.
- Brooks, S.J. 2006. "A Case Study of Ten Selected Southern California Community Colleges' Peer Tutoring Program Relative to Desired Cognitive Student Learning Outcomes." *Dissertation, College of Education and Organizational Leadership, University of La Verne*. La Verne, California.
- Chi, M. T. H., Siler, S., Jeong, H., Yamauchi, T., and Hausmann, R.G. 2001. "Learning from Human Tutoring." *Cognitive Science*. 25:471-533.
- Cooper, E. 2010. "Tutoring Center Effectiveness: The Effect of Drop-In Tutoring." *Journal of College Reading and Learning*. 40(2):21-34.
- Covington, M.V. 1992. *Making the Grade: A Self-Worth Perspective on Motivation and School Reform*. New York, New York, U.S.A.: Cambridge.
- (CRLA) College Reading & Learning Association. 2012. International Tutor Training and Certification Program. URL: www.crla.net/ittpc/current_certifications.htm Accessed: August 5, 2012.
- Dame, N.F. 2012. "The Role of Frequency and Cross-Ability Peer Tutoring on Student Performance in a Collegiate, Developmental Mathematics Classroom." *Dissertation, School of Education, Colorado State University*. Fort Collins, Colorado.
- Delacôte, G. 1998. "Putting Science in the Hands of the Public." *Science*. 280(5372):2054-2055.
- Ender, S. C., and Newton, F. B. 2000. *Students Helping Students: A Guide for Peer Educators on College Campuses*. San Francisco, California, U.S.A.: Jossey-Bass.

- Fagen, A.P., Crouch, C.H., and Mazur, E. 2002. "Peer Instruction: Results from a Range of Classrooms." *The Physics Teacher*. 40:206-209.
- Fike, D.S., and Fike, R. 2008. "Predictors of First-Year Student Retention in the Community College." *Community College Review*. 36(2):68-88.
- Foran, L. and Longpré, R. 2007. "Peer Tutoring: A Route to Leadership – An Action Research Report." *Education Canada*. 47(1):31-33.
- Gardiner, R. 1996. "Supplemental instruction (SI)." Academic Staff Development Unit, Queensland University of Technology.
- Glaser, B. G., and Strauss, A. L. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago, Illinois, U.S.A.: Aldine Publishing Company.
- Gordon, E. 2005. *Peer Tutoring: A Teacher's Resource Guide*. Lanham, Maryland, U.S.A.: Scarecrow Education.
- Graesser, A.C., VanLehn, K., Rosé, C.P., Jordan, P.W., and Harter, D. 2001. "Intelligent Tutoring Systems with Conversational Dialogue." *AI Magazine*. 22(4):39-51.
- Hendriksen, S. I., Yang, L., Love, B., and Hall, C. 2005. "Assessing Academic Support: The Effects of Tutoring on Student Learning Outcomes." *Journal of College Reading and Learning*. 35(2):56-65.
- (HFCC) Henry Ford Community College. 2011. "ITTPC Program Certification Application Packet Rev. 9/14/2011." URL: users.hfcc.edu/~pkim/2012-2013CRLA-ITTPCApplicationHFCC.pdf Accessed: August 5, 2012.
- King, A. 1993. "From Sage on the Stage to Guide on the Side." *College Teaching*. 41(1):30-36.
- LaFountaine, T.J. 2007. "Tutor Training Manual: An Interactive Module 2007-2008 Edition." URL: www.qcc.edu/files/communications_skills_center/tutor_training_manual.pdf Accessed: August 3, 2012.
- Levin, H.M., Glass, G.V., and Meister, G.R. 1987. "Cost Effectiveness of Computer Assisted Instruction." *Evaluation Review*. 11(1):50-72.
- Lildren, D.M. and Meier, S.E. 1991. "The effects of minimal and maximal peer tutoring systems on the academic performance of college students." *Psychological Record*. 41(1):69-78.
- Locke, J. 1693. Some Thoughts on Education.
- Mynard, J., Almarzouqi, I. 2006. "Investigating Peer Tutoring." *ELT Journal: English Language Teachers Journal*. 60(1):13-22.
- Pulliam, L. 1963. "The Lecture: Are We Reviving Discredited Teaching Methods?" *The Phi Delta Kappan*. 44:382-385.

- Reinheimer, D.C. 2000. "Gender Matching, Floor Effects, and Other Tutoring Outcomes." *Journal of Developmental Education*. 24(2):10-16.
- Reinheimer, D. and McKenzie, K. 2011. "The Impact of Tutoring on the Academic Success of Undeclared Students." *Journal of College Reading and Learning*. 41(2):22-36.
- Smith-Burrell, R.D. 2011. "Focusing on the Core Essentials: A potential Quality Enhancement Plan to promote the success of Brevard Community College students." White Paper submitted to Brevard Community College. Summer, 2011.
- Stahl, P.C., Stahl, N.A., and Hank, W.A. 1986. "Historical Roots, Rationales and Applications of Peer and Cross-Age Tutoring: A Basic Primer for Practitioners and Researchers." ERIC:ED284660.
- Strauss, A. L., and Corbin, J. 1998. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory, 2nd Edition*. Thousand Oaks, California: Sage.
- Tannen, D. 1990. *You Just Don't Understand: Women and Men in Conversation*. New York, New York, U.S.A.: William Morrow.
- Telescan, B.L., Slaton, D.B., and Stevens, K.B. 1999. "Peer Tutoring: Teaching Students with Learning Disabilities to Deliver Time Delay Instruction." *Journal of Behavioral Education*. 9(2):133-154.
- Tinto, V. 2005. "Taking Student Retention Seriously: Rethinking the First Year of College." *The 9th Annual Intersession Academic Affairs Forum, January 26, 2005, California State University, Fullerton*. URL: fdc.fullerton.edu/events/archives/2005/05-01/acadforum/Taking%20Success%20Seriously.pdf Accessed: August 2, 2012.
- Topping, K. 1996. "The Effectiveness of Peer Tutoring in Higher and Further Education: A Typology and Review of the Literature." *Higher Education*. 32(3):321-345.
- Topping, K. 2005. "Trends in Peer Learning." *Educational Psychology*. 25(6):631-645.
- VanLehn, K. 2011. "The Relative Effectiveness of Human Tutoring, Intelligent Tutoring Systems, and Other Tutoring Systems." *Educational Psychologist*. 46(4):197-221.
- Werner, J.V. 2008. "Crossing the Student/Teacher Divide at the Community College: The Student Tutor Education Program (STEP)." *Teaching English in the Two-Year College*. 35(4):363-372.
- Wood, W.B. and Gentile, J.M. 2003. "Teaching in a Research Context." *Science*. 302(5650):1510.
- Wright, R. R. 2003. Real Men Don't Ask For Directions: Male Student Attitudes Toward Peer Tutoring. *Journal of College Reading and Learning*. 34(1):61-75.