Academic Tutoring: A Review for Cypress College

Executive Summary

This review of the recent empirical literature focuses on tutorials for adult and adolescent learners, though briefly provides a background on tutoring with younger students. Tutoring has traditionally been provided to struggling learners either individually outside the classroom, or in whole-class reciprocal teaching procedures in which each student acts as both tutor and tutee. The latter is much more common among young children. For college students, the evidence suggests that such whole-class techniques can produce improvements in important self-regulatory skills, but that they may not reliably enhance academic achievement (Rittschof & Griffon, 2001).

It is very common for peer tutoring services to be used to develop basic literacy (Elbaum, Vaughn, Hughes, & Moody, 2000) and mathematical knowledge. For instance, paired reading has ranked as one of the most effective techniques for teaching young children (Brooks, 2002; Topping, 2001). Tutoring of more advanced curriculum often requires individualized and intensive assistance by a more advanced peer, such as that found in college learning centers.

Tutoring, whether delivered by a trained professional or similar age peer, has a variety of positive academic, attitudinal, and socio-emotional outcomes for tutors and tutees (e.g., Britz, Dixon, & McLaughlin, 1989; Cohen, Kulik, & Kulik, 1982; Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller, 2003). Tutored students have been shown to spend more time in academic instruction and engagement (Greenwood, 1991). Tutoring can facilitate growth of more effective cognitive and learning strategies among tutees that can improve future performance, and generalize to other non-tutored disciplines. Peer tutoring has been shown widely beneficial to students from diverse backgrounds, ages, and at different levels of skill and knowledge. For example, it has been used effectively to address individual needs in remedial programs for at-risk and mildly disabled students (e.g., Fantuzzo, et al., 1992).

Tutors' performance is also enhanced. There is often a benefit in socio-emotional growth for tutors of any age group in the form of initial increases in self-efficacy and esteem. One tends to see the greatest academic performance improvements among tutors when there is a small or moderate age and skill difference between the tutor and tutee, so that both members of the pair find some cognitive challenge in their activities. Furthermore, the role of tutor need not be reserved for high achieving students. Recent research has demonstrated that learners who themselves have academic and behavioral challenges can perform effectively, particularly as tutors to younger students (Early, 1998; Nazzal, 2002; Polirstok & Greer, 1986).

Effective tutors across many disciplines and age groups tend to use some common pedagogical techniques. For instance, tutors have been found to use a wide range of motivational techniques and cognitive scaffolds (Cohen, et al., 1982; Greenfield, 1984), including breaking down a problem into subtasks, hinting, and asking open-ended questions. The social dimensions of the tutoring relationship are also important for enhancing growth. In general, tutorial behavior that gets students to generate their own explanations tends to be most efficacious for learning growth (VanLehn, Siler, Murray, Yamauchi, & Baggett, 2003). Fortunately, the wealth and variety of

information about the efficacy of tutoring has been distilled into numerous commercially available training protocols and certification programs.

Within the community college environment, remedial and introductory English and math courses are intended to prepare students for the academic demands of postsecondary education. However, students do not always succeed in those courses. Learning assistance centers that provide tutorial services represent an alternative, and are offered as an adjunct to standard in-class training. Though the research conducted is typically cross-sectional and often anecdotal, students and educators view those support services as an important means of increasing academic preparedness, and report positive outcomes including retention in college English and increases in grade point averages (Gribbons & Dixon, 2001; Hendriksen, Yang, Love, & Hall, 2005; Perin, 2004).

In recent years, information technology has begun to permeate adult education in various ways. Research indicates that within the virtual learning environment, the e-moderator takes on three roles: technical advisor, facilitator, and manager (Packham, Jones, Miller, & Thomas, 2004). However, they are limited by the temporally asynchronous nature of the communication, unavailability of non-verbal cues, and considerable time demands. Research has contended that establishing and maintaining course guidelines and planning, monitoring, and reviewing content delivery are key facets of e-learning success. Packham, Jones, Thomas, and Miller (2006) found that from a student perspective, the quality of feedback, student support, and module management were key attributes of an effective e-moderator. Using trained peer tutors to facilitate on-line discussion and learning is a common, cost-effective technique.

A comparison of the dynamics of face-to-face and online peer-tutoring in writing by university students, found that online interactions tend to be more egalitarian (Jones, Garralda, Li, & Lock, 2006). This may have important implications for disenfranchised groups. For example, females have traditionally been thought to be disadvantaged with regard to technology access and fluency of use (Kirkup & von Prummer, 1997; Yates, 2001). However, recent literature suggests that women's access to technology and enrollment in online courses is comparable to men's, and that women may be more successful (Price, 2006). Women may excel in an online environment, because of the more egalitarian exchange that is created in an electronic forum (e.g., Jones, et al., 2006).

Though much has been learned about tutoring, particularly among young children, there are still many unanswered questions about the efficacy of tutoring in the college environment. In concluding this review, there are suggestions for areas of future research, including mention of a few methodological challenges and solutions, and recommendations for optimizing the efficacy of tutorial services in the college environment.

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This review of the literature is limited to human tutoring—it does not cover such topics as intelligent/interactive educational software. It focuses on recent empirical research, though does mention earlier work as necessary to provide sufficient background for discussion and to draw conclusions. The primary focus is on tutorials for adult and adolescent learners delivered in stand alone services, which are typically student-initiated and episodic. Because of the limited number of recent articles on tutoring in the college environment, this review also includes articles on tutoring in the primary education levels, such as cross-age and reciprocal classwide tutoring, which tend to be teacher-initiated pedagogical techniques.

Background

<u>What is Tutoring?</u>
Academic tutoring is a common technique used to assist a student in learning, and improve academic performance and behavior. Very often, tutoring is delivered by same-age or slightly older peers. This is particularly true with adult learners in college environments where learning centers that provide a variety of tutoring and supplemental instruction services are heavily staffed with students. When peer tutors are trained in the use of proper methods and protocols, the evidence is clear that peer tutoring renders numerous benefits for both the tutee and tutor, and is cost-effective.

Peer learning can be defined as the acquisition of knowledge and skills through active helping and supporting among status equals or matched companions (Topping & Ehly, 1998). It is qualitatively different from the interactions between a professional teacher and a student. Peer tutoring is characterized by specific role-taking as tutor or tutee, with a high focus on curriculum content and on procedures for interaction, in which participants receive training, and may include assessment of performance. This is distinct from cooperative learning which involves interdependent work toward a specific shared goal or target.

Peer-assisted learning includes both peer and cross-age tutoring. In peer tutoring, students work with others who are at their own grade level. By contrast, cross-age tutoring involves students at different age or grade levels, typically, though not exclusively, for the benefit of the younger student. Individual tutoring outside of the classroom is common for both adult and child learners. Those types of stand alone or supplemental learning assistance techniques are the primary focus of this review. However, there are class-based implementation strategies that also prove beneficial. When peer tutoring is used as a whole class pedagogical method of curriculum delivery, it is in the form of reciprocal peer tutoring—in this scenario each student enacts both roles as tutor and tutee. Individual accountability is particularly crucial in reciprocal peer tutoring, because it is a dyadic learning structure with role inter-dependence. However, it is not meant to supplant teacher-led instruction. Over-use is cautioned so as to not hinder the most accelerated students who do not require any additional assistance.

<u>What are the Benefits of Tutoring?</u>
There is a great deal of evidence substantiating the value of individualized and personalized instructional help for struggling learners. Past reviews and meta-analyses of peer and cross-age

tutoring have found a variety of positive academic, attitudinal, and socio-emotional outcomes for tutors and tutees (e.g., Britz, Dixon, & McLaughlin, 1989; Cohen, Kulik, & Kulik, 1982; Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller, 2003). Cohen et al.'s (1982) meta-analysis of tutoring in the primary and secondary grades found that almost 87% of the studies that measured achievement showed higher academic achievement by students who received tutoring than those who did not.

In addition to academic gains, peer and cross-age tutoring have been found to be effective methods of improving behavioral school-related outcomes, such as time on-task improved classroom behavior, increased attendance or retention rates, more positive attitudes about school (e.g., Bar-Eli & Raviv, 1982; Brush, 1997; Fantuzzo, King, & Heller, 1992; Hilger, 2000; Nazzal, 2002), and other positive socio-emotional outcomes such as a sense of belonging, internal attributions for academic success, and self-concept (e.g., Strodtbeck, Ronchi, & Hansell, 1976). Although these are more elusive to measure and are not found as reliable as academic gains, they represent considerable added value.

For example, White (2000) found that Hispanic and African American 6th grade tutees showed academic efficacy increases after a four month program. Fantuzzo and colleages (1992) found higher self-ratings of scholastic competence and lower teacher ratings of disruptive behavior among African American 4th and 5th graders randomly assigned to a reciprocal peer-tutoring program. Cohen's study found eight reports of the influence of tutoring on tutees' attitudes, in all of them the more positive tutee subject matter attitudes were in tutored classes.

It is not clear, however, if longer tutoring programs produce greater benefits. The duration of tutoring programs and the amount of tutoring involved vary widely. In terms of duration, tutoring programs reviewed ranged from two weeks (Early, 1998) to several years (Greenwood, 1991), with a median of 12 weeks. Longer tutoring programs do not necessarily produce better academic outcomes. Cohen et al. (1982) concluded that programs lasting 19-36 weeks produced less academic improvement than shorter programs. Rohrbeck, Ginsburg-Block, Fantuzzo, and Miller (2003) found no connection between number of sessions and tutees' academic outcomes.

What Topics are Commonly Tutored?
For both children and adult learners, tutoring is often used as a method of helping struggling students master the fundamentals of basic literacy and mathematical knowledge.

Literacy skills. With young children, peer learning techniques have been used extensively to enhance literacy skills. Elbaum, Vaughn, Hughes, & Moody (2000) conducted a meta-analysis of 31 studies on reading tutoring for elementary students at risk for reading failure. They calculated a mean effect size of .67 across a wide range of tutoring interventions for studies that used control groups. This means that approximately 9-10% of the change or improvement in performance was accounted for by the tutoring intervention effect. Paired reading is a well-researched structured method for supported or assisted reading in cross-ability pairs. In recent work on the effectiveness of interventions in reading, paired reading has ranked as one of the most effective (Brooks, 2002; Topping, 2001). More recently, a group of 57 1st grade students scoring in the lowest quartile for reading skills who received intense decoding tutoring instruction significantly outperformed their non-tutored peer on measures of reading accuracy,

reading comprehension, reading efficiency, passage reading fluency, and spelling (Vadasy, Sanders, & Peyton, 2005).

For young students, there is some evidence that cross-age literacy tutoring has more positive effects on both the tutor and tutee than does same-age reciprocal tutoring; possibly, because very young students have not mastered the basic literacy skills being taught. Van Keer and Verhaeghe (2005) compared the relative merit of explicit reading comprehension strategies, followed by either (1) practice in teacher-led whole-class activities, (2) reciprocal same-age peer tutoring, or (3) cross-age peer tutoring. In total, 444 2nd and 454 5th graders from 44 classes in 25 schools participated. Generally, they found that fifth graders benefited most from tutoring interventions in terms of short- and long-term reading ability and self-efficacy thoughts. The authors concluded that, compared with same-age tutoring, cross-age tutoring seems to create better conditions to split the focus between the cognitive act of reading and the metacognitive act of monitoring and regulating reading behavior, resulting not only in higher level acquisition of the metacognitive skills by the tutor but also better reading comprehension for the tutee.

Metacognitive skills. Good readers are characterized by more than just decoding skills. They use a flexible repertoire of comprehension monitoring and regulating activities that includes both cognitive and metacognitive strategies. Cognitive strategies are mental or behavioral activities that increase the likelihood of comprehension, such as rereading, activating prior knowledge, and adjusting reading speed. Metacogntive strategies involve self-monitoring and regulating activities that focus on the product and the process of reading, support readers' awareness of comprehension, and assist in the selection of cognitive strategies as a function of text difficulty, situational constrains, and the readers' own cognitive abilities.

Paired thinking is a framework in which pairs of students with different reading abilies work together, and it involves training tutors and tutees to ask increasingly intelligent questions about what they have read (Topping, 2001). Topping and Bryce (2004) demonstrated that very modest student time engaged in metacognitive thinking skills can be measurably effective for tutees when peer interaction is maximized during that time. Theirs was a comparative study of cross-age peer-tutored paired thinking, with two classes of Scottish 7-year-old tutees and two classes of 11-year-old tutors. Overall, the experimental tutees showed growth in thinking skills and there was some evidence of improved attitudes toward reading. However, for the experimental tutors, there was no evidence that the paired thinking experience added significantly to their thinking skills or attitude. Some tutors found that the paired thinking was very labor intensive, and for some stopping to ask questions interrupted their enjoyment of the book.

Mathematical skills. Low levels of math achievement serve as a barrier for entry into scientific and technical occupations. Poor math achievement disproportionately affects many ethnic groups. For example, the mathematics achievement of African American 17-year olds is roughly that of White 13-year olds, and this gap has increased in the last decade (Education Trust, 2003). Researchers have consistently found that reciprocal classwide peer tutoring in math has a positive impact on mathematics performance, often in classes including or composed heavily of minority students (e.g., Fantuzzo et al., 1992; Mathes & Fuches, 1994).

There are exceptions to the pattern of positive impact of peer tutoring on math performance of tutees. For example, Cairo and Craig (2005) examined the extent to which cross-age tutoring in a rural setting would produce results similar to those in urban settings. A between/within repeated measure experimental design was used to gauge effects on learning and on retention of knowledge of fractions. Tutors were 7th and 8th graders, tutees were 3rd-5th grade students. Examination of knowledge gain and retention revealed no significant differences between tutors and non-tutors, tutors and tutees, or tutees and non-tutees. The authors provided little explanation, other than methodological, as to the lack of positive results.

Allsopp (1997) found that classwide peer tutoring with a group of 8th graders was no more effective than independent student practice in algebra. Most tutoring research focuses on basic mathematical skill acquisition. Allsopp's study concerned algebra. It may be that tutoring results in greater improvement in lower level skills. Or, that tutoring of more advanced curriculum requires more individualized and intensive assistance by a more advanced peer, such as that found in a learning center.

Who Benefits from Tutoring?
Peer tutoring has been shown widely beneficial to students from diverse backgrounds, ages, and at different levels of skill and knowledge. Tutoring increases students' time spent in academic instruction and engagement (Greenwood, 1991), and has been used effectively to address individual needs in remedial programs for at-risk and mildly disabled students (e.g., Fantuzzo, et al., 1992).

Dual-risk students. As mentioned earlier, tutoring has the added benefit of improving behaviors and attitudes. These are particularly important effects early in a child's progress, because longer-term developmental outcomes are worst when behavior and academic problems co-occur. Gest and Gest (2005) examined the effects of individual reading tutoring on the time-on-task and student-teacher interactions. Participants were 17 students in Kindergarten through 2nd grade who were rated by teachers as below average in academic skills and above average in aggressive-disruptive behavior. Ten of these students were randomly selected to receive individual tutoring from a paraprofessional. Among tutored students, increases in time-on-task were largest among children whose reading skill gains were largest. The intervention provided prerequisite skills for effective engagement in assigned learning tasks, which displaced time-off-task.

Academic and behavior problems are positively associated, but this association strengthens across the elementary school years. Students who have been unsuccessful throughout elementary and middle school frequently adopt a negative stance toward reading that becomes more and more difficult to modify (Mathewson, 1994). Their cumulative lack of success also leads to them read less and fall progressively farther behind. They also tend to accept success and failure as something beyond their control and rely on coping mechanisms to handle school demands. Any interventions to help struggling adolescent readers succeed must target attitudes toward reading along with cognitive gains.

Harmon, Keehn, and Kenney (2004) examined the efficacy of various techniques to combat struggling adolescents' negative attitudes while improving reading ability. The tutors were

graduate students seeking a reading certification or pre-service teachers. Tutors found that modeling explicit comprehension strategies, encouraging metacognitive awareness of tutees' thinking, and segmenting the text for stopping points were quite effective. Motivating the students was also critical, and for this the tutors found that building interpersonal relationships, allowing students to choose reading material, and using interesting analogies were effective techniques. Tutors also mentioned a large variety of modifications to the tutoring protocol that they made. About one half of those included the use of graphic organizers. Given the variability and complexity of literacy behaviors that struggling adolescents exhibit, it is important that tutors maintain a constant focus on the strengths and needs of the tutee, instead of a strict adherence to the program itself.

Coulter (2004) demonstrated that reading tutoring also proves effective with older, more troubled students; even those who have been incarcerated due to delinquent and criminal behavior. High quality literacy instruction is difficult to design and implement in correctional facilities and detention facilities, because of short stays and high mobility of youth, resistance to traditional education, and expense. A reading intervention was implemented with 12 adjudicated youth in a detention facility in Southern Colorado (10 male and 2 female, average age 15.5 years; median reading level was forth grade; 10 had disabilities). Tutors were trained in the Direct Instruction Reading Intervention (Carnine, Silbert, & Kameenui, 1997), which uses novels just slightly above the student's reading ability as instructional material, and involves a rather intensive set of decoding instruction along with successive rounds of repeating and correction. Oral reading with on-going error correction has been shown to contribute to accuracy, fluency, and comprehension (Pany & McCoy, 1988). There was variability in the number of tutorial sessions completed, because of release or transfer to new facilities; nonetheless, students showed an average increase of nine months of growth in comprehension and passage reading accuaracy.

The results of the foregoing studies extend findings by indicating that reading tutoring for dual-risk students in elementary through high school can produce gains in reading skills and behavior, and that these gains are interrelated. The simplest explanation is that promoting reading skill development provides students with the prerequisite skills to engage in classroom tasks that require some form of reading. A related explanation is that repeated experiences of mastery reinforce engagement in reading activities. A third explanation is that successful tutoring entails a supportive tutor-student relationship that reinforces tutors and tutees for engaging in reading tasks. These three explanations (capacity building, mastery experiences, and social reinforcement) are not mutually exclusive.

Students with learning disabilities. Many of these at-risk students also demonstrate identifiable learning disabilities. Classwide reciprocal peer tutoring has been used effectively across a broad range of disabilities to increase performance in many areas such as spelling and vocabulary (Burks, 2004; Greenwood, Arreaga-Mayer, Utley, Gavin, & Terry, 2001), and math and reading (Gardner, Cartledge, Seidl, & Lynn, 2001). For example, Calhoon (2005) demonstrated that peer mediated tutoring was more effective than whole-class instruction for improving learning-disabled middle school students' letter-word identification and comprehension. In addition, peer tutoring has resulted in increased engagement time and a reduction in disruptive behavior by young disabled students (DuPaul, Ervin, & Hook, 1998). However, research on remedial reading programs for older students with disabilities has indicated that although they accelerate reading

growth these programs do not significantly close the reading gap to the level of their non-disabled peers (e.g., Swanson, 1999).

To help special education reading teachers identify key instructional practices associated with improving reading outcomes, recent research syntheses have been conducted. The results show that using small, interactive group instruction; reading strategy instruction; using directed questioning and responses; extended practice opportunities with feedback; and breaking down tasks into component parts are associated with significant improvement in reading skills (Swanson & Hoskyn, 1998; Vaughn, Gersten, & Chard, 2000). If a portion of students seeking assistance have learning disabilities, orienting tutors to those instructional strategies shown to be effective with special-needs populations should prove beneficial.

English language learners. Ethnic diversity is also reflected in diversity of achievement, socioeconomic status, cultural background, and linguistic background. The population of students with a non-English speaking background in the public school system is estimated to grow to 6 million by 2020 (Pallas, Natreillo, & McDill, 1989), with the largest group being Spanish speakers. Research on language of instruction reviewed most recently has generally found that bilingual programs are more effective than English-only programs (Cheung & Slavin, 2005). For Kindergarteners, the literature supports the efficacy of structured, phonetic programs emphasizing language development, in both native-language and English instruction. For grades 2-5, programs that make extensive use of cooperative learning, vocabulary instruction, and literature tend to be most effective. The beginning reading programs with the strongest evidence of efficacy in the review made use of systematic phonics.

It will come as no surprise that English language learners with learning disabilities also benefit from tutoring. Saenz, Fuchs, and Fuchs (2005) examined Peer-Assisted Learning Strategies (PALS: Fuchs, Fuchs, Mathes, & Simmons, 1997) conducted during reading sessions of 35 minutes, three times a week, for 15 weeks. It involved 132 English language learners from 3rd-6th grade classes in which there were at least two students with learning disabilities. For English language learners with learning disabilities, strong results on reading comprehension improvement were obtained. These findings are notable because reading comprehension is a major development milestone in grades 3-6 (Jacobs, 2002). There was also strong teacher and student satisfaction. High achievers' development was promoted, even when paired with lower achievers.

Tutors. It is also important to note, that positive outcomes are not the exclusive purview of tutees. The academic gains for the tutors themselves have been increasingly emphasized. With reciprocal peer tutoring and other forms of peer assistance, achievement gains accrue for both students, particularly the student in the role of tutor because of the necessity of preparation for teaching and evaluation of the tutee (Allen & Feldman, 1973; Bargh & Schul, 1980). Tutors are challenged to consider the subject more fully, to engage in active monitoring and to identify and correct errors, to reorganize and clarify their own knowledge, and to elaborate information.

There are also positive effects on tutors' social and emotional functioning, especially with regard to self-efficacy, self-concepts, and attitudes toward the subject matter. One factor associated with being at risk for academic failure is a sense of not belonging. Fantuzzo, Davis, and

Ginsburg (1995) showed that tutoring increased feelings of social acceptance for African American students in reciprocal peer tutoring with parental involvement. Early (1998) found that peer tutoring boosted academic self-concept. Those results were not due to pre-existing differences—students in reciprocal peer tutoring had slightly lower competence than controls before the program.

Furthermore, academic gains are not limited to the material taught. Academic gains appeared to generalize to science and social studies achievement, for a group of at-risk adolescents who participated in classwide peer tutoring for literacy skills (Greenwood & Terry, 1993). One exception to the pattern of tutor growth is found in Sprinthall and Scott (1989), who did not find improvements in algebra for 11th grade tutors who taught 4th and 5th graders. This may be because the age difference was too great, forcing tutors to teach simple materials.

Role theory has been suggested as a way to frame some of the effects of peer-tutoring on the tutor (Allen, 1976; Bierman & Furman, 1981). When an individual assumes a role, that individual is likely to behave in role-consistent ways, to hold attitudes consistent with the role, and to develop self-perceptions in line with role expectations. The role of tutor or teacher involves competence, prestige, and authority. A student assumes that role of teacher/tutor, and behaves in a way that includes conveying information, answering questions, engaging in active listening, verbal reinforcement, having independence and responsibility. The role of tutor also implies academic competence, a liking for school and the subject matter being taught, and the capability to help others learn. Role theory suggests that in trying to help the tutee, the tutor may come to better understand the importance of various behaviors that are part of the student role, such as employing certain study strategies, paying attention and actively participating in learning activities. Decisions about the selection of peer or cross-age tutors should take into account that serving as a tutor can have those positive academic outcomes.

Who can be a Tutor?
The role of tutor need not be reserved for high achieving students. Recently it has become of interest to use helpers whose capabilities are nearer to those of the helped, so that both members of the pair find some cognitive challenge in their activities. Early (1998) showed that average performing 10th graders increased their math performance in just two weeks of being a tutor. Cohen et al. (1982) demonstrated that tutors with varying levels of achievement did not differ reliably in the amount they gained from tutoring.

In recent years the literature has gone beyond this to demonstrate that learners who themselves have educational challenges can act effectively as tutors. For example, recent work shows that low-performing, at-risk, and disabled students experience positive academic outcomes when acting as a tutor, as did their tutees (e.g., Polirstok & Greer, 1986). Nazzal (2002) demonstrated that at-risk 8th graders who tutored peers in math had increased feelings of belonging. Being a tutor similarly improved school-related attitudes and behavior. Maher, Maher, and Thurston (1998) found deploying disruptive students as peer tutors effective in improving the tutors' achievement and behavior, as well as advantageous for the tutee. However, Sutherland, Wehby, and Gunter (2000) reviewed eight experimental studies of the effectiveness of cooperative learning for students with emotional and behavioral disorders and concluded that results were mixed.

Paterson and Elliot (2006) developed a cross-age reading program to overcome the attitudinal barriers of the older students by placing them in a leadership role as tutors for younger children. Thirty struggling 9th and 10th grade readers, all in remedial education, tutored 32 struggling 2nd and 3rd grade readers. The relationships formed caused the high school students to reflect on their own life experiences and academic needs and goals. Tutors became more efficacious through their growing awareness of their ability to teach and as their responsibility grew. A key component of the shift in perspective was that students began seeing themselves as change agents instead of objects of intervention, and to attribute that success to their own learning. Tutors also used external measures, which were previously discounted, to assess their tutees' progress to validate the effectiveness of their work. As a result of teaching, the high school students were able to articulate their own reading issues and identify specific strategies to improve them. As students recognized their own academic growth, they described themselves as improved readers rather than as misjudged readers, and they became more comfortable with and less defensive about being judged by external standards. While beneficial to both tutor and tutee, such interventions require a great deal of training and oversight to ensure that the participants are enacting their roles appropriately.

Most of the studies that examine the use of tutors with academic and behavioral challenges involve adolescents and young children. Troubled older students are often paired with challenged children. Thus, they are often delivering developmental or remedial curricula. No research was found to suggest that tutors of adult learners can be effective if they have such problems. However, it is possible that when working with developmentally delayed adult tutees, similar patterns may be found.

Tutoring Adult Learners

How are Tutoring Services Delivered to Adult Learners?
Previous research demonstrates peer tutoring and other forms of supplemental instruction to be an effective strategy for increasing student achievement at various educational levels (Bargh & Schul, 1980; Sherman, 1991; Slavin, 1996), including among adult learners. For adult learners, individual and small group tutoring are most commonly used. Whole-class techniques have been used successfully to enhance young students' learning, which has stimulated interest in whether those techniques work with adult learners.

The evidence supporting the efficacy of whole-class reciprocal tutoring interventions comes largely from studies conducted in the primary education setting with young children. Conflicting results have been found in studies of the effectiveness of reciprocal tutoring on undergraduate and graduate student learning and performance in higher education. Rittschof and Griffon (2001) used two randomized experiments with an individual learning control condition to examine reciprocal peer tutoring in the college environment. Graduate and undergraduate education students' comprehension of course materials was examined, and it was found that whole-class reciprocal tutoring was not more effective than individual study. It is important to note that the individual study condition required use of a journal with reflective activities on course content, which in itself is an intervention. Had the comparison group truly been "no intervention" control, differences in performance may have been detected. It may be that adult learners evince

more resistance to such strategies. Or, by the time they reach college, they have mastered learning techniques.

> "While we have no basis to dispute the value of cooperative strategies such as reciprocal peer tutoring (RPT) for children, it is possible that many college-level students have acquired the metacognitive means to allocate their limited time to more test-focused learning than that which is allowed with the RPT technique"(Fantuzzo et al., 1995, pg. 328).

While Rittschof and Griffon (2001) did not find differences in achievement, there were overwhelmingly positive responses from students—particularly the undergraduates. The self-regulatory effects (self-evaluation, assistance seeking, goal setting, planning), though not reflected in performance differences in groups, are of importance to educators.   The reciprocal peer tutoring appeared to not only enhance the enjoyment of learning, but also to stimulate those types of self-regulation that have more generalizable effects on college students' long-term academic life/performance.

Providing remediation to prepare students for college-level work has become an important community college role. However, developmental education is not always effective. Remedial and introductory college-level English and math courses are intended to prepare students for the academic demands of postsecondary content-area learning; however, only one-quarter or less of first time college students enroll in those classes (Maxwell et al., 2003). Another alternative, outside the classroom, is the use of learning assistance centers. Supplemental tutoring, offered as an adjunct to standard in-class training, is offered to learners of all ages and skill levels. However, it is very common to find such stand alone assistance made available to adult learners in institutionalized learning centers within two and four-year colleges. Their services include academic tutoring, computer assisted learning, assessment, advisement, and counseling. A main function is to help students develop efficient learning techniques. These centers typically offer a variety of lower-level or remedial academic support in language, writing, and math delivered by peer tutors or paraprofessionals. While use of services may be required by faculty, it is most often accessed by students on an episodic, as-needed basis. In some cases where students avoid remedial courses or where these classes are ineffective, assistance in learning centers can help fill in gaps in basic skills.

A number of investigations have been conducted within the community college environment to assess the effects of tutoring services offered. For example, as part of the National Field Study of the Community College Research Center, Perin (2004) conducted interviews with hundreds of community college members (e.g., faculty, staff, students) within a national sample of 15 community colleges and found that learning assistance centers and specialized skills labs were viewed as an important means of increasing students' academic preparedness for postsecondary study. The institutions consider the learning centers to be effective, and report positive outcomes including retention in college English and increases in grade point averages.

Similar results are reported in two studies of community college learning centers' impact on student retention and success. Both used quasi-experimental designs to compare tutored to non-tutored students' academic performance. At the College of the Canyons, data were compared

from 1805 students who used the Tutoring/Learning/Computer (TLC) center during Fall 2000 to their non-tutored peers enrolled in the same classes (Gribbons & Dixon, 2001). Again, Math and English were the two most frequently tutored disciplines. Results indicated that in all comparisons, students who made more visits to the learning center or spent more hours there had significantly higher success and retention rates in courses. Likewise, the assessment of the Learning Center at Northampton Community College, Pennsylvania revealed that tutored students (n=1385) earned an average 2.78 (GPA) in their tutored course while non-tutored students (n=6879) averaged 2.64 (Hendriksen, Yang, Love, & Hall, 2005). Tutored students were also less likely to withdraw from their tutored classes, and had higher institutional retention rates compared to the non-tutored. Qualitatively, students were satisfied with services, and thought that the center helped them work independently and improve their grades.

Unfortunately, the aforementioned investigations provide only descriptive, anecdotal evidence. Because there is no recognized industry standard for learning centers, they used measures for evaluating developmental education programs, such as college-level course completion and persistence. There are many barriers to conducting controlled experiments in a college environment with a widely available student service that is offered on a drop-in basis. The authors could not rule out any differences attributable to motivation or other factors. However, with such large sample sizes it is unlikely that all the effects detected were due to systematic error. Nonetheless, the findings are suggestive of the efficacy of tutoring among adult learners. We must look at more focused research on specific processes or populations to extract relevant information to understand what makes tutoring effective in these contexts and with adult populations.

What are Effective Tutoring Techniques?
Effective tutors tend to use some common pedagogical techniques. For example, tutors across many domains have been found to support students in figuring out problems for themselves, that is, to scaffold learning. Applied to education, the term scaffolding describes the process of supporting learners while they acquire new skills (Greenfield, 1984). Tutoring procedures are most effective when thoughtfully and thoroughly scaffolded (Cohen et al., 1982; Topping, 2000). Tutors have been found to use a wide range of cognitive scaffolds, including breaking down a problem into subtasks, hinting, asking open-ended questions, and prompting. Cognitive scaffolding can narrow the scope of the task by breaking it into subtasks, focus the students' attention on parts of the problem or solution, remind students of relevant factual or procedural information, or elicit further answers. During scaffolded instruction, the skilled partner establishes with the learner a mutual understanding of the task and tailors assistance to a level just beyond that at which the learner can function independently. As the learner gradually masters the task, the scaffolded assistance diminishes and the learner becomes capable of doing what previously could be accomplished only with the assistance of the skilled partner.

In addition to the cognitive techniques that facilitate learning, the social dimensions of the tutoring relationship are also important. An essential social skill of the peer tutor is facilitating the development of relationships that have a positive influence on the learning experience and foster cognitive development. The social factors along with a responsive teaching stance are critical for enhancing growth. From a motivation theory perspective, the learner's self-efficacy

and attributions for success at the task also affect goal setting, strategy use, effort and other self-regulatory mechanisms.

Research has examined the differences in technique that tutors of different experience levels and effectiveness utilize. Juel (1996) noticed patterns in three tutoring techniques used by more effective reading tutors. The first is direct reinstruction in decoding, labeled explicit cognitive modeling. The second is instructional scaffolding, to help students solve reading problems by simplifying the problems or providing a clue. The third pattern was motivational scaffolding, such as encouragement. Pinnell, Lyons, DeFord, Bryk, and Seltzer (1994) also conducted process studies and noticed common tutoring techniques: prompts, telling the student the answer, specific reinforcing statements, and general reinforcing statements. The tutors whose students made the most progress gave more prompts and gave the answer less often, and their feedback was more specific. Tutors across many domains provide students with various types of positive and negative feedback, but expert tutors often respond to students' correct answers with simple positive feedback.

Tutors often ask questions, and these questions cover the entire spectrum of instruction, cognitive scaffolding, and motivational scaffolding. Among expert tutors, Lepper, Drake, and O'Donnell-Johnson (1997) found that tutors asked students questions and hinted at possible errors much more frequently than they told students information. Graesser and Person (1994) found that tutors asked more questions per hour that required deep reasoning than did teachers. Expert tutors articulate specific concepts, facts, and procedures or give a general version of a rule to students, especially when students show a lack of understanding. Whereas, novice tutors tend to refer to students' prior knowledge (e.g., VanLehn, Siler, Murray, Yamauchi, & Baggett, 2003). Expert tutors use analogies to help students understand concepts, and expert and novice tutors both explain or clarify once students show a lack of understanding. However, compared to expert or more trained tutors, novice or low-trained tutors tend to do long segments of explaining (e.g., Chi, Siler, Jeong, Yamauchi, & Hausmann, 2001). Expert tutors summarize what was covered at the end of segments of tutoring. Expert tutors select or generate problems for specific pedagogical purposes. Both expert and novice tutors set specific learning goals for tutoring sessions.

Cromley and Azevedo (2005) analyzed verbal protocols from three more and three less experienced volunteer tutors from preexisting dyads as they taught adults with decoding problems. Adult literacy students have a high dropout rate and have different educational histories from children who are tutored, and they may differ motivationally from children. It was found that the more experienced tutors used significantly more cognitive scaffolding and significantly less motivational scaffolding than did less experienced tutors. Tutors were similar in their rates of question asking, content errors, and responses to student errors. More experienced tutors pushed the tutee for information, and less experienced tutors gave more examples. Less experienced tutors gave slightly more inappropriate responses. Unfortunately, the authors were not able to obtain information about student performance and progress, so it is difficult to say whether the more experienced tutors were also more successful.

There is a tendency in the literature to attribute overall effectiveness of tutoring to the tutors' pedagogical skills. However, for tutors to be effective in any of the tutoring tactics, the tutors

must monitor the students' misunderstanding or incorrect understanding accurately. The evidence in the literature so far suggests that tutors seldom give customized feedback that is based upon an accurate diagnosis of student's alternative understanding of a problem. To test the assumption that it is the adaptive nature of the tutors' pedagogical skill that is responsible for outcomes, Chi, Siler, and Jeong (2004) examined how accurately tutors monitor the status of students' misunderstanding. The study involved an examination of the cognitive processes of learning conceptual knowledge about the human circulatory system. Tutors were 11 college students who were knowledgeable about the domain, but were untrained as tutors. The tutees were 22 8th graders. These novice tutors failed to accurately diagnose students' alternative knowledge. Tutors seemed to be extremely competent as assessing what normative knowledge students had, however, this accuracy seemed to result from tutors' general bias to over attribute students with such knowledge and under attribute them with alternative knowledge. Tutors were far better at assessing when knowledge deviated from the normative. Thus, the authors conclude that tutoring effectiveness could not be attributed to tutors' pedagogical skills alone, because positive outcomes were achieved even with inexperienced tutors. It may be that tutoring effectiveness arises from the students' constructive learning while being tutored, as well as from the interaction with the tutor.

Tutorial feedback. In one sense, tutoring is simply a form of structured feedback. What the tutee does with the advice given, to an extent determines the effectiveness of the tutoring experience. In face-to-face encounters, feedback is immediate and verbal. However, there are some instances in which written feedback is given.

Orsmond, Merry, and Reiling (2005) conducted semi-structured interviews with 16 third year college students concerning written tutorial feedback. The study indicated that there were four specific ways students used written feedback: to motivate, to assist in learning, to encourage reflection, and to clarify progress. Effective feedback resulted from the use of exemplars allowing a common understanding of terms to be developed and for guidance to be given. Effective feedback encouraged the processing of new information into an existing framework. While it was recognized that feedback and assessment were important in helping students to progress and learn from their mistakes, fewer than half of the students were satisfied with the feedback. The language used may have been vague and unfamiliar, the quantity of both positive and negative feedback may have been overwhelming, or what students really desired was a dialogue with a tutor about their work rather than written assessments. The authors concluded that the diversity of written feedback used poses a challenge to tutors in attempting to enhance individual learning. They also caution that standardized institutional approaches to quality control (e.g., standard tutor feedback forms) do not improve student learning. Tailored feedback is more effective and well-received. Heightened awareness by tutors of how students implement feedback could positively influence how tutors write feedback.

Whether written or verbal, feedback needs to be delivered at the level of the students' understanding and tailored to their individual needs. However, there is some conflicting evidence about the provision of explanations as a form of feedback and its effect on learning. When computer-based tutors told tutees that they had made an error, giving some explanation was better than giving no explanation, but the benefit was surprisingly small (Anderson, Conrad, & Corbett, 1989). In general, it appears that student-generated explanations are more effective

than instructional tutor-generated explanations (Chi, 1996). Moreover, having students self-explain by asking for instructional explanations when they reach a point where they become "stuck" or have trouble seems even better than self-explanation alone (Renkl, 2002).

A recent study involved tutoring for mathematical, scientific, and technical problems (VanLehn et al., 2003). The tutees were 42 University of Pittsburgh physics students who had already learned some of the basic principles of the domain. Students took a pretest, solved five problems with the tutor's help, and took a post-test. The tutoring sessions consisted of a sort of asymmetric collaboration, or coached problem solving (Shute & Psotka, 1996). Tutoring sessions were audiotaped and transcribed. To facilitate transcription, the student and tutor were placed in different rooms and communicated by phone; the tutor watched a copy of the student's computer screen but could not manipulate it. This prevented non-verbal communication, and was similar to computer-based tutoring.

The data suggested that there was an increased likelihood of learning if, during the tutoring session, the student reached an impasse (i.e., had difficulty finding the correct answer) and was pushed to find the answer independently (VanLehn et al., 2003). Tutors who asked questions that encouraged deep reasoning and cognitive challenge tended to produce the best outcomes for tutees. Providing an explanation may be more effective in the context of an impasse, but mentioning goals was not associated with learning gain. This indicates that letting the student try to do an action even if he or she is likely to get stuck or make an error is better than giving the answer.

The lack of positive results for explanations and goal-prompting suggests that tutorial explanations are perhaps much less important than thought. However, McKendree (1990) showed that a tutoring system that merely flags errors yielded significantly less learning than when it gave hints as well. The main positive effects of tutoring may be achieved by prompting students to think harder with the knowledge that they already possess. This is also consistent with studies showing that when tutors are prohibited from generating explanations and may only give content-free prompts to students, the students learn just as much as when tutors are allowed to tutor normally (Chi et al., 2001).

Tutorial behavior that gets students to think, such as generating opportunities for impasses or giving zero-content prompts, may be the key to why tutoring is effective. On the other hand, zero-content prompting probably fails where the students simply cannot generate a sufficient explanation by themselves. This suggests that an optimal tutoring strategy may be to (1) let the student reach an impasse, (2) prompt them to find the right step and explain it, (3) provide an explanation only if they have tried and failed to provide their own explanation. When tutors must give an explanation because the student cannot, the tutor's explanation should be as simple and short as possible. More elaborate explanations, while perhaps beneficial in non-tutorial settings, appear to have no benefits.

Resistance to feedback: Adult learners come into the tutoring relationship with a set of skills and experiences, and are faced with getting advice and assistance from a similar (or even younger) peer who has their own area of expertise. Unlike other dyads in educational advising where the expert-novice relationship is relatively clear cut, the tutor and tutee often carry competing areas

of knowledge. Tutoring also differs from teaching in that the tutor does not have any power over the tutee in terms of grading. Thus, due to competing expertise and the tutor's lack of any consequential power over the tutee, the tutor-tutee interaction exhibits great potential for negotiation and resistance.

Waring (2005) describes how resisting advice occurred in peer tutoring in a graduate writing center. Tutoring sessions between 2001 and 2003 involving one tutor and tutee were taped and transcribed. The tutee resisted advice on general academic writing issues, content-related matters, and mechanics of writing. The pattern of resistance was accounted for by the tutee's self-identity and the competing expertise of tutor and tutee. The tutor's expertise was juxtaposed with his lack of knowledge in the discipline in which the tutee was trained.

Although it is not empirically clear whether less resistance is the equivalent of more effective tutoring, two practical implications may be extracted from these findings. First, for the least amount of resistance to occur, it may be advantageous that the tutor is knowledgeable not only about academic writing in general but also about discipline-specific content. A related issue is that content and structure are intricately connected in academic writing. One way to avoid such resistance is to employ the stepwise entry to advice documented in both health care (Heritage & Sefi, 1992) and education counseling (Vehvilainen, 2001). In this technique, questions are asked to elicit the client's perspective so that the advice delivered can be better fit, especially in the areas of content-related matters or mechanics of writing. For example, by eliciting student opinion, the tutor can present the advice as either justified by, or commenting on, the student's perspective (i.e., validation of his or her views). Understanding when, where and how advice may be resisted can sensitize tutors, and help them cultivate techniques to deal with that resistance.

Is Tutoring Different in the Electronic Environment?
In recent years, information technology has begun to permeate peer learning in various ways. With the increased access to affordable technology, the opportunity to deliver educational content through electronic media has grown. Most of those who use such services are adolescent and adult learners. For example, the popularity of on-line college courses has grown exponentially over the last decade—witness the growth of University of Phoenix, a pioneer of on-line post-secondary education. It follows that electronic student support services have also become more highly developed and more widely utilized. With this growth, a new set of tutorial and on-line communication skills have emerged among students and educators.

Bull et al. (1999) argued that scaffolding to contain and frame new information is more important in online than face-to-face learning. This could include visual cueing, web directions on what to notice or what process to employ, interactive tutorials, etc. Social as well as cognitive interaction with both instructors and peers appears important in enhancing active participation and learning in online discussion (Jung, Choi, Lim, & Leem, 2002), particularly for online peer assessment.

While cognitive interaction skills are common to both face-to-face and online environments, interactive process management skills are arguably much more crucial in purely online discourse. These are needed to keep the discourse progressing productively in the absence of a

full-time professional facilitator able to give immediate scaffolding and feedback. Some areas of skill essential for effective online interaction seem less critical for structured face-to-face interaction, or are perhaps more likely to develop spontaneously in the face-to-face environment. In particular, the socio-affective and interaction process management skills seem the most difficult in the online environment (McLuckie & Topping, 2004).

Jones, Garralda, Li, and Lock (2006) report the results of a study comparing the dynamics of face-to-face and online peer-tutoring in writing by university students in Hong Kong. Many researchers and theorists have coalesced around a kind of writing center orthodoxy, one that emphasizes student control of the interaction with the goal of empowerment. Central to this perspective is the promotion of egalitarian relationships between tutors and clients. Some research has seen benefits in this approach, finding that clients make more improvements in their writing and take up the advice of tutors more readily when they are more actively involved in controlling the agenda of the session (Flecher, 1993), and that supportive strategies compare favorably to authoritarian ones in feedback sessions. However, difficulties with the egalitarian model are especially apparent in second language writing contexts. Tutors tend to take on more authoritative roles with second language writers (Williams, 2004). It has also been found that some non-native speaking clients, especially those who come from cultures which may not value egalitarianism in the way it is valued in the Western cultures, prefer for the tutor to take charge as they may see tutors as the authoritative institutional representative.

Jones, et al (2006) collected transcripts of six face-to-face sessions conducted by five tutors, as well as logs of 18 online sessions by the same tutors and many of the same clients. Clients and tutors were non-native English speakers and second language writers (all Chinese). All tutors had undergone an intensive training, a month long apprenticeship, and had at least three months job experience. Results showed considerable differences between the on-line and face-to-face tutoring sessions. Face-to-face interactions involved more hierarchical encounters in which tutors took control of the discourse; whereas, online interactions were more egalitarian, with more client control of the discourse. Differences were also found in the topics participants chose to focus on in the two modes, with issues of grammar, vocabulary, and style taking precedence in face-to-face sessions, and more global writing concerns like content being discussed in online sessions. This helps explain some of the interaction differences. For example, in discussions of grammar there are fairly clear-cut rules and correct responses, and a body of information that tutors command allowing the tutor to have more control and ask more closed questions. Discussion of more broad issues like content and process, tend to be more open-ended. In face-to-face sessions, questions and explanations about grammar almost always occurred in the context of a text; whereas, online clients frequently elicited evaluations regarding de-contextualized sentences. In most cases, tutors did not have access to the text from which these phrases were taken, making it more difficult to make an accurate diagnosis and recommendation. Among the clearest evidence of the differences in control was how much more willing clients seemed to be to issue directives in online sessions. In face-to-face sessions tutors issued more than six times more directives, in online sessions the numbers were equal. There was also more relational communication online aimed at establishing and maintaining rapport. It seems that there was more variation and room for negotiation in online sessions. Understanding the relationship between discourse and teaching outcomes requires close attention to topics and purposes of the interactions. The authors concluded that there are benefits in both types of

interactions, and that, ideally, both face-to-face and online tutoring should be used together (Jones, et al., 2006).

In addition to the one-on-one tutorial assistance that can be provided on-line, the advent of multi-user environments (e.g., chat rooms) creates new challenges for tutors trying to facilitate and moderate learning among a group of students. Efforts to enhance learning through group, peer interaction in an electronic forum are now common-place. However, facilitation and moderation of such a forum by academic staff (e.g., professors) can be of limited effectiveness and very time-consuming. Analysis of online interaction shows a predominance of social greetings or administrative/housekeeping issues, rather than intellectually challenging content (Miller & Wallace, 2002). Using trained peer tutors to facilitate on-line discussion and learning is a more cost-effective solution.

Professional facilitators often participate in online peer communication to facilitate, moderate, and guide the discourse. However, they are limited by the temporally asynchronous nature of the communication, unavailability of non-verbal cues, and considerable time demands. Synchronous communication takes place in real time with learners involved in the communication process simultaneously. Asynchronous communication involves delayed communication and takes place between learners and a facilitator within a forum over time. Research has contended that establishing and maintaining course guidelines and planning, monitoring, and reviewing content delivery are key facets of e-learning success. Management skills include time management, a capacity to monitor the learning process, and ability to evaluate the teaching and learning and the capability to adapt and change teaching and courses to accommodate specific needs of learners. However, students and tutors have different perspectives about what constitutes effective online moderation.

Packham, Jones, Thomas, and Miller's (2006) qualitative study involved semi-structured interviews with 35 experienced students and 35 tutors with at least two years experience with online moderation. From a student perspective, the quality of feedback, student support, and module management were key attributes of an effective e-moderator. Critical comments helped them develop and enhance their contributions and learning. Regular communication was also important to overcome feelings of isolation and apprehension. Feedback helped to build confidence in their understanding of key concepts and practical applications. With regard to module management, the students appreciated the creation and management of online debates. The students also valued the effort to help pace their learning experiences. In contrast, tutors said that motivating students, including the provision of constructive feedback, was critical to successful e-moderation. They also felt that to be effective they needed good time management skills, and the ability to communicate with students on a timely and regular basis. Tutors also believed that to be effective they must create and sustain an online personality, which included being empathetic and understanding of student learning needs and personal circumstances.

Managing students' learning experience is critical to achieving effective moderation. Research indicates that within the virtual learning environment, the e-moderator takes on three roles: technical advisor, facilitator, and manager (Packham, Jones, Miller, & Thomas, 2004). Facilitation skills are the methods used to enhance interpersonal communication. The facilitator role includes engaging the learner in the learning process, questioning and listening skills,

providing direction and support, management of online discussions, building online groups and developing relationships. Facilitation also involves the provision of insightful, timely and objective feedback that enables students to develop their learning skills. Lack of feedback can lead to disillusionment with the learning program and withdrawal (Packham et al., 2004).

Technological disadvantage. It is important to note that technology access and technological fluency are not universal. There are still students who do not have access to or competency in the use of important computer technologies. Tutoring in the development of those skills has been found highly effective (Vogelwiesche, Grob, & Winkler, 2006). A voluntary tutor-based training program was studied in which 126 socially disadvantaged adolescents acquired basic computer skills in a public learning center. This design had some advantages. Namely, that computer skills can be acquired in private at one's own pace, and more importantly, the courses take place outside of school where teachers are not involved in evaluating the pupils' success or failure. The study was a repeated measures design with two experimental groups. One group was instructed by adolescents, the other by adults. The comparison of tutees' post-test scores controlling for self-reported initial skills indicated that both groups achieved comparable, significant increases in knowledge and self-esteem. Adolescent tutors were at least as effective as adult tutors. Tutees' learning results did not differ with respect to their initial knowledge, gender, school type, or socio-economic status, nor did these factors interact with the training group. Furthermore, tutor's knowledge increased beyond their initial levels, and this effect did not depend upon the frequency of tutoring.

Females, in general, have traditionally been thought to be disadvantaged with regard to technology access and fluency of use. Research into computer-supported learning suggests that women are disadvantaged by poorer access to technology (Kirkup & von Prummer, 1997), lower levels of computer literacy and lower confidence levels in its use (Yates, 2001). The biggest difficulty in this line of research has been separating the effects of gender from the effects of other societal factors.

Price (2006) examined whether gender differences exist in terms of predisposition to enroll in an online course, performance in online courses, academic engagement, and perceptions of tutoring in online contexts. Data came from 1991 students enrolled in an undergraduate social-science course over a three year period (2001-2004) with online or conventional tutoring support. There were no significant differences between the proportions of women enrolled online versus in conventional classes, but women were somewhat more likely than men to complete the conventional courses. Furthermore, the odds of women passing the online version were more than twice the odds of men passing. Women also obtained significantly higher scores than men on both continuous assessments and the final examination in the on-line course. No significant differences were found in the non-online course test scores. Women taking the online version were more self-confident than men online, and more willing to learn from other students. The women taking the online version were more academically engaged than their male counterparts. There was no gender difference associated with perceptions of tutoring.

Women's access to technology and enrollment in the online version of the course were comparable to men's. Women were more successful, as well. The question then becomes not whether women are disadvantaged by technology, by why they excel in an online environment.

It may be because of the more egalitarian environment that is created in an electronic forum (e.g., Jones, et al., 2006).

How do Tutors Learn to Teach?

The wealth and variety of information about the efficacy of tutoring techniques may seem overwhelming. Fortunately, the accumulated knowledge of tutoring practices has been distilled into numerous commercially available training protocols and certification programs. For example, Peer Assisted Learning Strategies (PALS) is a well-researched classwide peer tutoring program with different grade level versions from Kindergarten through 12th grade (Fuchs et al., 1997). It has been found effective at increasing reading performance across those age groups, and for oral reading fluency among English proficient students with learning disabilities; reading comprehension effects have been even more robust. PALS provides more frequent and extended opportunities to practice language than do traditional methods. Students must recall events, summarize main ideas, and make predictions as they read. PALS allows for individualization of instruction. PALS uses collaboration and a motivational point system; provides a positive affective climate, and motivates students to become proficient in their language skills.

Many colleges also use certification training to prepare their student tutors to deliver services according to certain "best practices." For example, at Northampton Community College all peer and professional tutors are required to pass the College Reading and Learning Association Tutor Certification (http://www.crla.net/tutorcert.htm) (Hendriksen, Yang, Love, & Hall, 2005). Similarly, The Association for the Tutoring Profession (http://atp.jsu.edu/cert.htm) offers certification for tutors and tutor trainers with a twofold purpose: to recognize individuals for their expertise and dedication to the tutoring profession, and to establish uniform standards for training across the profession. A competitor, TutorNation.com, offers a variety of training programs and services, and recently established the International Tutoring Association (ITA). Through ITA they offer an on-line training program and certification available to any tutor with access to the internet (http://tutornation.com/certification/overview.html). These are only a couple of examples of the many training and certification programs available commercially.

Not all schools feel it necessary to adopt commercially available protocols for tutor training; some have "home grown" programs tailored to their specific institutional needs. For example, the University of Auckland developed a class to train math instructors/tutors (Oates, Paterson, Reilly, Statham, 2005). The course is part of their teacher education program, and provides the department with a pool of experienced tutors capable of transferring their skills to work in higher-level courses, making it possible to run a cost-effective and efficacious small-group tutorial program. In fact, their student tutors provide 38-48% of all math tutorials. It also provides an important pre-training opportunity for the students to explore teaching while studying mathematics.

From the pre-service teachers' perspective, there was strong support for the value of the tutoring experience, and growth in developing their ability to critically reflect on their teaching practices. The main positive features cited by their tutees were the small size of the tutorial groups, and social features such as working together and getting to know others, which are consistent with the literature (Oates, 1999; Morton & Oates, 1998; Boud, 2002; Royse, 2000). Furthermore, the most striking feature of this data was the proportion of the tutors who obtained grades of B or

better for Classroom Teaching: 82% of those who had done the tutoring course, compared to 67% of those who didn't (Oates, Paterson, Reilly, Statham, 2005). The tutoring experience may have better prepared them because of the demands that classroom teaching has as a learning experience. Alternatively, some students may have come to the realization that teaching was not for them and withdrawn from the program.

Conclusion

The foregoing review of the literature on tutoring demonstrates the broad applicability and efficacy of these forms of academic support. For both children and adult learners, tutoring is often used as a method of helping struggling students master the fundamentals of literacy and mathematical knowledge. In addition to academic gains, peer and cross-age tutoring have been found to prevent or reverse attitudinal and behavioral problems that often accompany academic challenges. Tutoring achieves positive outcomes through skill development, efficacy building experiences, and social reinforcement.

For adult and adolescent learners tutoring is most often delivered in stand alone services; whereas, classwide reciprocal tutoring is common with elementary students. For example, within the community college environment learning assistance centers often deliver a variety of tutorial services. Though the research conducted is typically cross-sectional and often anecdotal, students and educators view those support services as an important means of increasing academic preparedness, and report positive outcomes including retention in college English and increases in grade point averages. There is also some evidence that classwide reciprocal tutoring techniques may enhance college students' self-regulatory skills, though no impact on academic performance was noted.

Peer tutoring has been shown widely beneficial to students from diverse backgrounds, ages, and at different levels of skill and knowledge. Tutoring has been used effectively to address individual needs for at-risk, mildly disabled students, and for second language learners. The act of tutoring also has positive academic and socio-emotional impacts on the person providing assistance, and those gains are often sustained over time. The beneficial effects for tutors are particularly pronounced the closer the tutor and tutee are in age and skill, because of the cognitive challenges that are inherent in the teaching experience. Tutors who themselves have academic and behavioral challenges have been found not only to benefit from teaching, but also to perform as effective tutors to younger students.

Effective tutors tend to use some common pedagogical techniques. For example, tutors have been found to use a wide range of cognitive scaffolds, including breaking down a problem into subtasks, hinting, and asking open-ended questions, which narrow the scope of the task by breaking it into subtasks, and focus the students' attention on parts of the problem or solution. In addition to the cognitive techniques that facilitate learning, the social dimensions of the tutoring relationship are also important for enhancing growth.

When working with students, tutorial behavior that gets students to think and to generate their own explanations when impasses occur, such as giving zero-content prompts, appears more effective than the provision of tutor-generated explanations. When tutors must give an

explanation because the student cannot, the tutor's explanation should be as simple and short as possible. As a general policy, tutors should let students experience challenges in their problem-solving efforts, and provide hints that encourage deeper cognitive processes. Additionally, heightened awareness by tutors of how students implement feedback could positively influence how tutors deliver feedback.

As more educational offerings go on-line, there is also an impact on provision of tutorial services. For example, the asynchronous nature of communication can pose a challenge to tutors trying to provide timely feedback. It has also been argued that scaffolding to frame new information is more important in online than face-to-face learning. Social as well as cognitive interaction with both instructors and peers appears important in enhancing active participation and learning in online discussion. Interactive process management skills are arguably much more crucial in purely online discourse. Within the electronic environment, there also appears to be a more equalitarian exchange between tutors and tutees. This may serve to empower female students, and other disenfranchised groups. Research demonstrated that women's access to technology and enrollment in online courses were comparable to men's, but that women were more successful in that forum.

Future Research
There are still many important research questions about the efficacy of tutoring in the college environment. For example, research is needed to determine whether remedial education or individual tutoring is more efficacious and cost-effective for the intended skill development. Since students appear to approach tasks differently depending on subject matter, it could be that the generic instruction in developmental education courses is less effective than the contextualized learning that occurs when students are individually coached. However, the latter may be cost-prohibitive on a large scale. It would also be valuable to document the application or transference of study strategies. To the extent that tutees gain better learning and study techniques from their tutoring experience, it could positively affect their performance in content areas other than the one tutored. Additional research should seek to record improvements that are not reflected in a student's grade or retention, such as self-regulatory effects of peer tutoring. Finally, research is needed to determine whether individual characteristics of tutors and tutees influence impact. For instance, there is no systematic research on the outcomes of using mixed ethnicity dyads in peer tutoring.

There are a number of logistical and methodological challenges posed to conducting controlled research experiments in the college environment. For one, random assignment is often quite impractical especially where something as widely available as tutoring and other student support services are concerned. Careful monitoring of utilization of such services can be used to create groupings for quasi-experimental designs. However, creating equivalent or matched samples is often a daunting task because of the multitude of known and unknown variables that can affect the phenomena under investigation. This is particularly true when examining something as complex as human tutoring and learning. Future studies need to control for such things as baseline skills, and identify and control for other systematic differences between those that seek assistance and those that do not. For example, the same students who tend to persevere rather than drop out of college may be those that seek learning assistance. Future research could

examine why students self-select to come to learning centers for assistance, and why others with comparable academic challenges do not.

An additional challenge to conducting research within the college environment is the large samples sizes that render inferential statistics of little value in interpreting the importance of results. With samples of students that are often in the thousands, virtually any comparison is statistically significant, yet many are of little practical importance. One possibility is to calculate and compare effect sizes, as is done in meta-analytic techniques.

Recommendations
From this extensive body of literature a number of modest recommendations can be drawn for optimizing the efficacy of tutorial services in the college environment.

- The age and skill gap in cross-age tutoring programs should be relatively small if the program is intended to maximize benefits to the tutor as well as the tutee.

- Tutoring can also be used as an intervention to assist struggling (academically and behaviorally) learners, by employing them in the role of tutor. A possibility within the college environment is to have the more challenged students deliver tutorial services to youth at other facilities in the community. Development of such a tutorial intervention program could be an effective way to provide valuable community services, and enhance troubled students' efficacy and academic performance. It may even be effective to have such students assist other college students who have learning disabilities or other developmental delays. This would, however, require careful training and monitoring.

- Prompting learners to self-correct is widely seen as a superior to more direct approaches such as giving tutees the correct answer. In general, the use of tutoring techniques that facilitate the tutee's self-discovery of correct answers tend to be more effective for producing lasting academic gains, than simply giving answers.

- Tutors who provide support services for distance education should be trained in the effective moderation techniques for on-line education. They need to be aware of the variety of differences in communication styles used, and the possibility of a more egalitarian exchange that can ensue between themselves and their tutees.

- If not already in place, employing one of the many proven commercial certification programs as a way of training new peer tutors could prove cost-effective and efficacious, with long-term benefits for provision of high impact student support services.

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