

# CONTEXTUALIZED TEACHING & LEARNING: A FACULTY PRIMER

A REVIEW OF LITERATURE AND FACULTY PRACTICES WITH IMPLICATIONS  
FOR CALIFORNIA COMMUNITY COLLEGE PRACTITIONERS

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### ADDITIONAL CONTRIBUTIONS

The Research Team extends warm appreciation to the many **faculty and program directors interviewed** for the purposes of this primer. Interviewees include the following:

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### **Research and Planning (RP) Group for California Community Colleges**

The Research and Planning Group for California Community Colleges (RP Group) strengthens the ability of California community colleges to undertake high quality research, planning, and assessments that improve evidence-based decision making, institutional effectiveness, and success for all students. It does so through three primary strategies. First, RP's Center for Student Success (CSS) conducts research and evaluation projects that utilize the skills and unique perspectives of California community college institutional researchers, faculty, and administrators. Second, the RP Group builds the skills of administrators, faculty, and staff through a broad range of professional development offerings and by disseminating effective practices. Finally, the RP Group develops strategic partnerships and provides leadership on statewide initiatives to help keep evidenced-based decision making, accountability, and student success at the forefront of California community college efforts.

Since 2000, CSS has led 15 system-level research and evaluation projects that have resulted in significant changes to the California community college system, including the laying of the groundwork for the statewide accountability system (ARCC), the modification of admission requirements for the registered nursing programs, and the publication *Basic Skills as the Foundation for Success in the California Community Colleges*, which was instrumental in the development of the Basic Skills Initiative and provided the framework for evaluating college-level basic skills programs throughout the state. The success of CSS projects is rooted in their design. Each project is led by a unique team of community college staff, faculty, and administrators who have proven research skills and a direct understanding of the subject at hand. Projects culminate in audience-specific products that stimulate discussion, improve outcomes, and strengthen student success. You can find out more about CSS research and the RP Group at [www.rpgroup.org](http://www.rpgroup.org)



## INTRODUCTION

THE FOLLOWING REPORT OFFERS CALIFORNIA COMMUNITY college faculty a closer look at contextualized teaching and learning (CTL) as a promising set of strategies and practices that can be expanded through the state's Basic Skills Initiative. The report is relevant to a range of instructional and counseling faculty, including academic and career and technical education (CTE), Mathematics, English and English as a Second Language (ESL) instructors, as well as to basic skills staff and administrators.

The report is organized into three main sections: (1) a case statement for contextualized teaching and learning that draws on relevant research and learning theory and situates the practice within workforce development, (2) a review of a range of contextualized teaching and learning practices, told from the faculty/program director perspective, and (3) a set of considerations for community college faculty and leaders as well as funders and policy makers interested in the potential of contextualized teaching and learning to strengthen student success.



## A CASE FOR CONTEXTUALIZED TEACHING AND LEARNING

### HOW PREPARED ARE TODAY'S STUDENTS FOR THE 21ST CENTURY WORKFORCE?

MOST INSTRUCTORS WOULD AGREE THAT THE average skill level of learners who enroll in post-secondary education is “not what it used to be.” However, this need not be seen as a condemnation, but rather as a starting point for rethinking how community colleges can meet the educational challenges of an increasingly diverse student population.

As open access institutions, community colleges are the most frequent point of entry into post-secondary education for low-income populations, regardless of their academic preparation. This combination of affordability and access has made the community college the single most significant democratizing force in higher education. However, for students to reach their goals for expanded opportunities and economic stability, they must often begin by addressing their lack of academic preparation.

Nationally, research shows that 40% of all college students and nearly 60% of community college students enroll in at least one developmental course (Adelman, 2004; Attewell, Lavin, Domina & Levey, 2006; Bailey, 2009). In California, the largest community college system in the United States, more than one in every three students enrolls in a basic skills course: nearly one-half million in English and math, with additional enrollments in basic reading and ESL courses (CSS, 2005). If California were to adopt a mandatory assessment and placement policy, this percentage would likely be comparable to the national numbers.

The issue of weak academic preparation has serious implications for America's workforce. According to *America's Perfect Storm* published by Educational Testing Service (ETS), there is a widening chasm between the literacy and numeracy skills needed to effectively compete in both the global and national economy and the numbers of students who have mastered these skills, with minority students showing weaker performance than traditional students. According to the report, the high school graduation rate for minority youth is approximately 50% as opposed to a 70% graduate rate for mainstream students. (Kirsch, Braun, and Yamamoto, 2007, p. 3). Additional research shows that nearly 25 million workers age 18 to 64 lack a high school diploma or GED while another 52 million adults have no post-secondary education (Crosley & Roberts, 2007; Harris & Ganzglass, 2008).

This disparity has additional significance when considering demographic shifts in the nation's population. For example, the U.S. Census Bureau expects that between 2000 and 2015, “international immigration will account for more than half of the nation's population growth” (Kirsch, Braun, & Yamamoto, 2007, p. 3). In 2004, nearly 57% of working-age Hispanics were foreign-born, and more than half of these immigrants lacked a high school diploma. *America's Perfect Storm* notes that Hispanics will make up a larger share of the country's total population in part due to this immigration, increasing to 20% by 2030.

While America's “human capital” declines in its ability to compete academically, the rapidly changing labor market is raising its demand for higher-level skills. The need for advanced skills has always been an aspect



of technical and professional training. However, employers increasingly require broad academic skills in reading, writing and computation for career advancement in occupations that formerly required only job-specific knowledge and training. (Jenkins, 2003; Anderson, Holzer & Lane, 2005). The implications of this change for the economic future of workers who enter the labor market with minimal and/or job-specific skills are highlighted by Jenkins, “Research shows that it is very difficult to work one’s way out of poverty—having a job by itself does not lead to career advancement for most former welfare recipients and other low-wage workers” (2003, p. 4). For many, particularly in professional fields, higher education has always represented a pathway to career opportunity and advancement. In the future, the path to employment and self-sufficiency wages for most workers is likely to require an ongoing interplay of education and career development.

One example of changing workforce expectations is the demand for what are often termed “knowledge workers” (Jenkins, 2003), individuals who have current technical knowledge but who can also communicate well, think critically and learn quickly (p. 3). This is especially true for what have been termed “middle-skill” jobs, which some researchers consider the infrastructure of America’s economic health and future (Holzer & Lerman, 2007). Holzer and Lerman define middle jobs as those that require some level of skill at entry, though not the technical level that necessitates advanced training or degrees such as clerical jobs and employment in sales, construction, production and transportation. According to data prepared by the Workforce Alliance, middle skill jobs account for nearly half of the labor market in the California economy.

For education to successfully respond to the needs of this changing workforce it must work with students to develop their foundation skills and improve their ability to transfer skills from one context to another, think critically and continuously acquire new knowledge and skills. For community colleges, the challenges are dual: construct learning models that will improve students’ immediate marketability and at the same time, develop their capacity and confidence in themselves as life-long learners who can adapt to the changing demands of the workplace.

Community college learners often struggle to connect the dots between competencies learned in a classroom setting and those necessary for today’s workplace. Policy makers, researchers, and educators are engaged in a dialogue about ways to create an educational experience for students who arrive at community colleges without the skills needed to succeed in college-level work, and at the same time, bridge the disconnection between their education and the “real world.” Several national efforts are underway to address the overlapping issues of academically under-prepared students, workforce development and the economy including the Ford Foundation’s Bridges to Opportunity, Lumina Foundation’s Achieving the Dream, Joyce Foundation’s Shifting Gears, National Governor’s Association’s Sectoral Academy and the Charles Stewart Mott Foundation’s Breaking Through project. These initiatives have made significant investments in strategies that target low-income learners with basic skills needs through pilot implementation grants, research, evaluation and policy analysis.

### **HOW ARE CALIFORNIA COMMUNITY COLLEGES ADDRESSING THE SKILLS GAP?**

In California, the State Chancellor’s Office, the Academic Senate for California Community Colleges and a number of statewide organizations advancing the goals of higher education have developed a durable and long-term alliance to improve achievement in ways that benefit students and strengthen the economy.

This effort, called the Basic Skills Initiative, stems from a 2006 system-wide strategic planning process led by the State Chancellor’s Office which included an emphasis on student success and readiness. To promote

this goal, the System Office committed to “ensur[ing] that basic skills development is a major focus and an adequately funded activity of the Community Colleges...[by identifying] model basic skills and English as a Second Language programs and their key features, and given availability of funds, to facilitate replication across the Colleges.” Today, the Basic Skills Initiative is engaged in a series of strategic activities. These efforts include promoting structural, administrative, instructional and professional development innovations based on an initial foundation of research provided in the pioneering publication *Basic Skills as a Foundation for Student Success in the California Community Colleges* produced by the RP Group’s Center for Student Success (CSS, 2007).

### **A Shifting Theoretical Framework**

A primary theoretical perspective that underpins many of the recent advancements in community college practice is a shift in classroom dynamics toward a view of the student as the key agent in the learning process. Traditional classroom instruction has been predicated on the active role of the instructor and the passive role of the student. However, there exists a growing awareness that conventional learning methodologies placing students in inert roles in abstract contexts are unlikely to advance the development of non-traditional learners.

This shift from the learner as the receiver to the learner as the constructor of meaning is defined as “constructivism,” a conceptual framework that asserts that learners are constantly updating their memory based on ongoing experience. Constructivists argue that because learners create meaning in relationship to experience, every learner’s version of the world is unique, even when concepts are shared. In the constructivist framework, the measure of and motivation for learning rests with the learner, not the instructor.

In turn, the instructor’s primary responsibility is to create conditions that support student engagement in the learning process. The results of the Lumina Foundation’s study “Connecting the Dots: Multi-Faceted Analysis of Relationships between Student Engagement Results from the National Survey of Student Engagement, and the Institutional Practices and Conditions that Foster Student Success” indicate that meaningfully including students in the creation of their own learning has particularly significant results on traditionally under-represented groups (2007).

### **WHAT IS CONTEXTUALIZED TEACHING AND LEARNING?**

In *Basic Skills as a Foundation for Student Success in the California Community Colleges*, Contextualized Teaching and Learning (CTL) is identified as a promising strategy that actively engages students and promotes improved learning and skills development. CTL has been defined in different ways, based on the intent of the group championing its use. Most recently, the United States Department of Education Office of Vocational and Adult Education (2001) characterized CTL as a “conception of teaching and learning that helps teachers relate subject matter content to real world situations” (Berns & Erickson, 2001, p. 2). Chris Mazzeo (2008) broadened the definition, describing CTL as a “diverse family of instructional strategies designed to more seamlessly link the learning of foundational skills and academic or occupational content by focusing teaching and learning squarely on concrete applications in a specific context that is of interest to the student” (p. 4).

While much of the research on CTL is fairly recent, student engagement in contextual learning has deep roots. John Dewey introduced experiential learning at the turn of the century as the most sensible and effective way to make learning meaningful for students. In 1916, Alfred North Whitehead told the Mathematical Association of English that “the second-handedness of the learned world is the secret of its mediocrity”—hitting on a central feature of contextual learning: the best learning is that which can be used. In the 1970s, functional context education entered the education and training community and served as a pre-cursory to what is now known as CTL. Based on lessons learned from the U.S. military’s efforts to raise the skill levels of its soldiers (Sticht & Kern, 1970), functional context education is defined as “an instructional strategy that integrates the reaching of literacy skills and job content to move learners more successfully and quickly toward their education and employment goals” (Wider Opportunities for Women, 2009).

At that time, several proponents of this strategy introduced a curriculum development tool to integrate academic and vocational competencies termed “literacy task analysis” (Mikulecky, 1985). Piloted by the U.S. military and widely adopted in customized training, literacy task analysis profiles the specific reading, writing, computational, and communication competencies required for different occupational positions. These competencies are then incorporated into a contextualized curriculum, with literacy skills taught in the context of specific job applications. In the 1980s, Wider Opportunities for Women began promoting functional context as a tool to strengthen intergenerational literacy in *Six Strategies for Family Economic Self-Sufficiency* (Wider Opportunities for Women, 2009). Literacy task analyses also became part of the standard toolkit for customized training and the workplace education programs of the 1990s. Latter day examples of the functional context approach can be seen in WorkKeys customized training applications.

In 1990, the Department of Labor formed the Secretary’s Commission on Achieving Necessary Skills (SCANs) to identify the skills young people would need to succeed in the future workforce. Key principles identified by the Commission included: “join knowledge and skills; learn abstract concepts by doing practical activities; connect schoolwork with the real world” (Hull, 1993). In 1998, the Commission’s primary publication *Learning a Living: A Blueprint for High Performance* specifically highlighted contextualization as a key instructional strategy. According to Johnson (2002),

[The word] ‘contextual’ naturally replaced ‘applied’ academics because the word ‘applied’ was simply too small to encompass the startling innovations achieved by this grassroots reform movement. The more comprehensive contextual—in context implies the interrelatedness of all things. Everything is connected including ideas and actions. Contextual also directs our thinking toward experience. When ideas are experienced, in context, they have meaning (p. 10).

The recommendations of the SCANs Commission aligned with the concurrent passage of the national School-to-Work Initiatives Act at the secondary level and the intensified focus in the Carl D. Perkins Career and Technical Education Act<sup>1</sup> on creating intentional connections between students’ academic preparation and workforce readiness. Perkins legislation began requiring that community colleges specifically integrate academic and vocational education for improved student performance and outcomes. The legislation only deepened its focus on issues of integration in its 1998 and 2006 renewals. In turn, secondary and community

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<sup>1</sup> The Carl D. Perkins 1990 legislation was titled the Vocational and Applied Technology Act; the reauthorization of 1998 renamed the legislation the Vocational and Technical Education Act; the most recent 2006 reauthorization revised the title yet again to the Career and Technical Education Act.

college educators have been experimenting with some form of contextualized teaching and learning for several years. Researchers have performed extensive investigation of these approaches and have developed standards and frameworks for this kind of integration as well as identified the benefits and limitations from view of these practitioners (Grubb & Kraskouskas, 1992; Grubb, 1995; Grubb & Badway, 1999).

One of the goals and effects of a contextualized approach is to capture a student's attention by illustrating the relevance of the learning experience. CTL helps students find and create meaning through experience, drawing from prior knowledge in order to build upon existing knowledge. A primary principle of CTL is that knowledge becomes the students' own when it is learned within the framework of an authentic context.

In CTL, the traditional curriculum is "...placed in a broader framework that integrates other subject content into the learning process for the students. Learning goals are elevated to higher order thinking skills in the process of learning to find information, adapt to change, and communicate effectively while relating to others" (Berns & Erickson, 2001, p. 5). In the traditional classroom, students often struggle to connect with abstractions. An authentic context helps the learner see the relevance of information and creates a pathway for them to understand the material.

The SSE Instructional Design Series (2007, p. 2) articulates several characteristics of contextualized learning frameworks including: 1) problem-solving within realistic situations, 2) learning in multiple contexts, 3) content derived from diverse work and life situations and 4) authentic assessment. More broadly, Johnson describes CTL as a "holistic system" (2002, p. 24) with several components working together to create a systemic learning approach—suggesting that instruction and learning derives from the whole and not from a discreet part. She argues that together, these components create a network by which students are better able to create meaning and retain information. These components include: 1) making meaningful connections, 2) doing significant work, 3) self-regulated learning, collaborating, 4) critical and creative thinking, 4) nurturing the individual, 5) reaching high standards and 6) using authentic assessment.

All of these features point to the importance of relevance and authenticity, which resonate with the objectives of the SCANs Commission. Instructors routinely ask students to "apply" a concept at the end of a lesson as a demonstration of the student's understanding of the concept, but the application of a concept to a real situation is different than a learning process that is structured around an authentic context. Svinicki defines the authentic situation in this way: "an authentic situation is similar to the situation in which the skills will really be used eventually, or it can be a real life situation in which the skills are needed but not necessarily representative of the learners' future use of them" (Svinicki, 2004, p. 69). Moreover, learning that takes place within authentic situations is also more likely to engage the student as a participant rather than an observer.

Another concept often incorporated into CTL is "cognitive apprenticeship," which also distinguishes contextual teaching and learning from mere application. Cognitive apprenticeship refers to the acquisition of academic knowledge and/or skills in ways that are similar to those employed by craftsmen in technical occupations (Bond, 2004). In cognitive apprenticeship, the instructor models the skills necessary to complete a task, but also helps students articulate the thinking that accompanies the completion of the task. Cognitive apprenticeship differs from the more traditional instructional models, where the instructor explains the concepts and models the application, after which students attempt to imitate what they have just seen. Raelin harkened back to Dewey in support of this strategy, stating "Dewey warned educators that merely doing an

activity was not enough to produce learning; rather, doing should become a trying, an experiment with the world to find out what it is like” (Raelin, 2008, p.72).

Using a cognitive apprenticeship model, students do more than just “practice” the skill in an application process. The entire task is explored within the parameters of a real-life situation, with the instructor coaching students through the mental thought process that accompanies the completion of the task and helping them create an internal dialogue or narrative of the process. Raelin (2008, p. 13) calls this “externalizing the process” for the learner.

### **WHAT LEARNING THEORY SUPPORTS CTL?**

A wide range of learning theories relate closely to contextualized teaching and learning as a strategy for improving students’ basic skills acquisition, particularly in relationship to under-represented and adult learners. Recent breakthroughs in brain research lend additional support. The following section provides a brief summary of several relevant learning theories and highlights their implications for a CTL practice.

#### **Motivation Theory**

Contemporary theoretical approaches to helping adults learn, or “andragogy” (Harris, 2003, p.38), acknowledge students’ role as an agent in the learning process. In this paradigm, learners are assumed to be: 1) self-directed, 2) enriched by a diversity of personal experience, 3) ready to learn, 4) life-centered, task-centered and problem-centered and 5) motivated by internal factors. According to Harris, “The basic format of the andragogical model is a process design that uses life experiences” (2003, p. 38). Mezirow (2000) describes this in terms of “meaning systems” which act as filters for information as students attempt to make connections to new information. He also underscores the necessity of the learners to “become critically aware of [their] own tacit assumptions and expectations and those of others and [assess] their relevance for making an interpretation” (p. 4). Inherently, this idea emphasizes the importance of the learners’ experiences and maturity, which is central for the success and motivation of adult learners.

To that end, Svinicki suggests that the instructor address the following issues:

- Increase the value of the learning to the learner...It is important to get the learner to believe that the choices being made [during the learning process] are under the [learner’s] control, if possible. Otherwise, motivation will be damaged.
- Increase the learner’s self-efficacy with regard to the task...focusing on smaller more immediate goals [to help students] make success more likely and believe in the eventual success of the whole task (2000, p. 245).

Additionally, when students feel that they can influence the learning through their own volition, as well as accept responsibility for the impact of learning, their motivation to learn is also increased. In this framework, setting clear goals, providing students options, and providing constant and meaningful feedback are also essential roles for the instructor.

**Implications for CTL.** Many instructors are accustomed to addressing questions from students like “Why do I need to know this?” or “When am I going to use this?” or “Will this be on the test?” Students who learn in a contextual environment are simultaneously introduced to the relevance of the learning content, which commensurately improves motivation. Predmore asserts, “Students are learning material within a concrete, memorable context...Once they see the real-world relevance of what they’re learning, they become more interested and motivated” (2005, p. 22-23). In turn, contextual learning has the potential to motivate and effectively engage students who view school as boring or non-essential, or who have struggled to make the connections between the demands of the classroom and their own personal goals and aspirations.

### **Problem-Centered Learning**

Known as problem-centered or problem-based learning (PBL), this theory addresses students’ engagement with real-world problem-solving to develop a “deep foundation of factual knowledge and understand that knowledge in the context of a conceptual framework..., and finally to facilitate the development of metacognitive skills” (Massa, 2008).

Merrill and Gilbert (2008, p. 207) assert five components to an effectively designed problem-centered learning experience including: 1) engagement of students in a progression of tasks leading to a logical conclusion, 2) activation of existing cognitive structures of recall and experience, enhanced through collaboration and demonstration, 3) learner observation of skills and connection to concepts being learned, including peer discussion and demonstration, 4) application of new knowledge followed by “intrinsic or corrective” feedback and 5) integration of new information with an everyday life skill and demonstration of that new knowledge.

**Implications for CTL.** Problem-centered learning closely relates to contextualized learning in its active involvement of students in a networked context to make learning more effective and relevant. This approach also frequently calls for students to work in teams, direct their own learning and develop creative solutions to real-world problems. Often a central component of contextualized learning, PBL de-emphasizes knowledge for its own sake and capitalizes on the utility of skills and information.

### **Social Learning Theory**

The research on the effectiveness of CTL strategies is well supported by theories involving collaborative learning. Collaborative learning rests on social cognitive theories suggesting that students’ learning can be facilitated and enhanced by connectivity to peers. “Collaborative learning is based on the idea that learning is a naturally social act” (Gerlach, 1994, p. 8). This model assumes that students create learning within this social context rather than within the solitary confines of their own studying or by just listening to the instructor. This approach is also distinct from “cooperative learning” which many theorists deem more appropriate for children; collaborative learning is more closely aligned with the needs of adult learners and adult education (Clardy, 2005; Van Hook, 2008; Merriam, Caffarella & Baumgartner, 2006).

According to this theory, students and instructors need to understand each other’s roles and further, students must learn collaborative skills in order for this approach to be successful. Bosworth (1994) asserts that teachers should train students to learn what skills will be necessary, ask students to demonstrate those skills,

model those skills in their instruction, provide feedback about students' collaborative skills and give students an opportunity to reflect on the collaborative experience. In the traditional classroom setting, where students compete for grades and academic standing, cooperation and collaboration are usually not rewarded. While collaboration models vary, the ultimate goal of social learning approaches is increased involvement.

Barkely, Cross, and Major (2005, p. 4) argue that collaborative learning strategies are particularly effective for diverse populations. The evidence strongly confirms that non-traditional students greatly benefit from the opportunity to participate in group settings: “women, members of under-represented racial and ethnic groups, adult and re-entry students, commuters, and international students have all been identified as students for whom peer and group learning seem especially valued and valuable” (2005, p. 4).

**Implications for CTL.** Despite the challenges of structuring effective collaborative learning experiences, Johnson (2002, p. 88) asserts that “collaboration is an essential component of the CTL system.” She further states, “the collaboration process removes the mental blinders imposed by limited experience and narrow perceptions. . . . Working together, members of small groups are able to overcome obstacles, act independently and responsibly, rely on the talents of team members, trust others, speak up, and make decisions,” which are all skills necessary to promote effective learning, as well as appropriate workplace behavior (p. 89).

### Learning Styles

While learning is at once social, instruction must also account for the differences in students' individual learning styles. The research on learning styles is voluminous, with varying, and sometimes contradictory classification systems for learning dispositions. What is commonly agreed upon is that because students present such a wide variety of traits, experiences and preferences to the learning task, effective instruction must include some considerations of the different ways in which students learn.

Researchers tend to agree that there are some specific differences among learners that significantly impact the learning process. First and foremost is the role that prior knowledge and experience play in that process. According to Svinicki (2004), “prior knowledge impacts what learners pay attention to, how they perceive and interpret what they are experiencing, and how they store new information based on what they already know” (p.185). This prior knowledge is not limited to what students bring to the particular discipline, but also their cultural orientation and personal view of themselves and the world.

In addition, differences in motivational factors also shape learning. According to Alexander and Murphy (1998), student interest is one of the most essential factors in producing the best learning. And yet, it is one of the most common questions for classroom faculty: how can students be motivated to learn? Goal orientation, self-efficacy and the students' interpretation of the relevance of the learning all contribute to develop student motivation (Svinicki, 2004, p. 205-07).

Finally, personality differences may cause learners to prefer a specific set of learning modalities. Indicators like the Myers-Briggs point to varying factors that influence a learner's tendency to gravitate to particular experiences. Kolb's learning style indicator is yet another tool commonly used to make similar determinations. All of these tools assist the instructor in designing experiences that will lead to deeper understanding and easier comprehension for the students.

**Implications for CTL.** Kolb indicates that in the most effective learning situations, learners “must be able to involve themselves fully” in the process. He asserts that no matter what style the learner prefers, students must have the opportunities to “learn from feeling,” “learn by watching and listening,” “learn by thinking,” and “learn by doing” (Jacoby, 1996, p. 69). Predmore (2005) argues that “CTL can be a highly effective means of accommodating students’ different learning styles” because an instructor has the ability to utilize a number of divergent instructional models within the contextual framework including collaborative pairs, hands-on demonstration and inquiry groups, to name a few (p. 23). In keeping with the philosophy of CTL and learning styles sensitivity, Brown also suggests “personalizing the learning environment, having the students relate personal experiences to content” helps learners engage the material and makes learning more powerful and significant (Silverman & Casazza, 2000, p. 190).

### Brain Research

Research on how the brain processes information adds a new dimension to our understanding of the learning process. In the language of brain research, effective instruction creates changes in the brain: that change is “learning.”

Recent studies challenge the assumption that the brain is fixed at maturity and suggest that the brain is more like “plastic”—“changing its own wiring, almost continuously” (Zull, 2004, p. 68). The most current research is especially compelling in relationship to adult learners, stating that “the neurological nature of learning strongly suggests that there is no age of finality for any learning” (Zull, 2006, p. 8). In fact, some research implies that the neurological complexity of the adult brain may actually improve conditions for learning, since the adult learner has a more extensive associative foundation from which to make new knowledge.

Zull asserts that two conditions create these changes: practice and emotion. According to Zull (2004), when neurons are active, they create biochemical pathways to other neurons. Repeated firing encourages neurons to reach out more frequently. When neurons connect and communicate as a result of this extension, synapses are created. This activity then leads to the development of networks within the brain that create the physical demonstration of knowledge or learning (p. 68). Similarly, emotion creates a chemical reaction in the brain initiated by adrenaline, dopamine or serotonin. These chemicals fortify the network connections within the brain, deepening the learning experience and entangling emotion and learning (p. 70). These emotions, Zull argues, then play a role in motivation as students strive to recreate the sensations associated with the chemical reaction. It gives a theoretical basis to one of the foundations of effective practice: success in learning motivates students to learn, which leads to further success, which leads to a confidence in the ability to learn.

In addition to emotion and practice, experience and the environment also appear to significantly impact learning. The human brain is highly responsive to association and sensory experience. New stimuli are connected to associations or memories that the brain already comprehends, creating an electrical network of new and known information. The ability of this network to result in long-term understanding and knowledge depends on how many regions of the neocortex are engaged. Zull suggests that this leads to “four pillars” of learning (inspired by Kolb’s learning process): gathering data, reflection, creating and testing (2006, p. 5-7).



Brain-based education emphasizes “the individual as an active learner in control of his [or her] learning situation, with the teacher facilitating student planning, self-evaluation, and self-monitoring skills” (Frith, 2005, p. 10). Cognitive research also emphasizes the importance of including sensory interaction. According to Johnson, “significant activities such as preparing projects, solving real world problems, conducting interviews, creating graphs and designing multimedia presentations place students in a rich learning environment that have the potential to appeal to an array of senses, address a variety of learning styles, and awaken many interests” (2002, p. 15).

**Implications for CTL.** Neuroscience adds another voice in support of contextual learning. From this perspective, contextual teaching and learning stimulates the students’ brain to develop patterns and create meaning by linking experience and sensory stimuli to new knowledge through a convergence in real-life application.

### **WHAT DOES THE RESEARCH SAY ABOUT THE IMPACT ON STUDENT OUTCOMES?**

With these theories as support, a growing number of researchers and practitioners increasingly agree that contextualization has a positive impact on the learning experience. Contextual teaching and learning advocates believe that through this strategy, learners can develop foundational knowledge (understanding specific ideas or concepts), application (the ability to engage this information in action), integration (understanding the relationships between the knowledge learned), and human dimension (the capacity to understand one’s self or others), promoting significant learning by engaging students at every stage.

The issue of transferable skills, or the students’ ability to demonstrate the competencies learned through one context in another, has become a more explicit goal in many contextualized programs. The measure of transferable skills can be evidenced by performance in placement tests or by the ability to function successfully in the next level of coursework or training. From a metacognitive perspective, transferable skills can be seen as the end product of ‘learning to learn,’ meaning that the student has developed into a better learner by becoming more aware and self-directed as well as increasingly capable of constructing more effective inquiry and transferring that knowledge to other fields.

Program evaluation and research assessing the effectiveness of CTL is continuing to expand and include a more detailed analysis of specific outcomes. Earlier assessments of contextual learning in traditional vocational programs, and more recently in U.S. Department of Education’s workplace education grants, focused on the effectiveness of this learning strategy in preparing workers for specific jobs. As the expectations and demands of the workforce have changed, the focus of these investigations have expanded from traditional workforce outcomes, such as reduced errors, Return on Investment (ROI), reduced turnover and employee advancement to include the research and evaluation of more traditional learning outcomes such as the ability of students to apply the skills learned in a vocational context to an academic context, persistence, success and certificate and degree completion.

Because of the relatively recent implementation of contextual learning models in community colleges, there are few examples of programs with longitudinal data on student success. Washington State’s I-BEST program, featured in the next section of the primer, offers the most extensive evaluation to date. This model integrates ESL and basic skills education with training in specific career pathways. Students in the ten original I-BEST

programs piloted in 2004 earned five times more college credits on average and were 15 times more likely to complete workforce training than were traditional ESL students during the same amount of time.

Another recent study performed by the National Research Center for Career and Technical Education (NRCCTE) looked at imbedded math instruction in five high school career and technical education programs including: agriculture, auto technology, business/marketing, health and information technology (Stone et al, 2006). Teachers in these content areas worked with math instructors to design integrated lessons and activities. After one year, students in the intervention showed significant math gains on both the ACCUPLACER and the TerraNov (Mazzeo 2008, p. 5). Students also performed equally well on assessments of their technical knowledge, suggesting that the integration of vocational and academic competencies results in higher outcomes in academic skills without a reduction in applied knowledge. A smaller-scale investigation of the impact of contextualizing developmental math with allied health examples on community college nursing students showed learners in experimental groups achieving higher results on course exit exams than those in control groups (Shore, Shore & Boggs, 2004).

An additional benefit cited by the research is the positive impact on students' learning behavior. Richard Lynch, a professor of occupational studies and the principal investigator of the University of Georgia's study of CTL, states that "94% of the students said that they learned a lot more in CTL strategy classes than in traditional courses in that same subject area" (Predmore, 2005, p. 23). Similarly, a recent study utilizing CTL indicated that as a result of their experience "more than 80% of the participants expressed that they were able to think more deeply about the topics and were able to participate more actively in the learning" (Choo, 2007, p. 198). Raelin asserts that through this deep engagement, a learner may be able to demonstrate knowledge without articulating the aspects or dimensions of that knowledge, distinguishing knowing how to do something from knowing something (Raelin, 2008, p.68). While the data in these studies is self-reported, they point to areas for potential further research.

Grubb and Kraskouskas (1992) suggest that other benefits to a contextualized curriculum or integrated learning model are more indirect. They assert that "integration efforts provide natural ways for faculty to collaborate, and particularly, to break down the isolation between occupational and academic instructors.... Integration can help bridge the distinct islands of activity within the community college, providing a way of moving toward a true community of learners" (p. 5). Grubb and Kraskouskas's assertion bears out as a key characteristic of CTL practice, as evidenced by the descriptions of faculty and staff that follow in the next section of this document.



## CONTEXTUALIZED TEACHING AND LEARNING IN PRACTICE

AS OUTLINED IN THE PREVIOUS SECTION, contextualized teaching and learning is connected to a number of learning theories as well as a growing discourse on strategies to promote adult learners' acquisition of basic skills. Contextual learning in practice is also becoming more visible as an effective learning strategy and as a focus of developmental education. To better understand what contextualized basic skills instruction looks like in practice, the RP Group interviewed faculty and staff implementing an array of models both in California and other states. The following section looks at common themes that emerge from these models and addresses some of the topics that faculty and administration might consider in plans to adopt or expand CTL practices in their colleges.

### WHAT ARE THE EXISTING MODELS FOR IMPLEMENTATION?

As noted by Mazzeo (2008), CTL practices can assume a number of forms and are found in a broad range of settings. The 11 practices featured vary in scale of implementation ranging from individual classrooms to program models; in the type of context utilized, from personal goals and experiences to workplace applications; and in the focus and the intensity of contextualization, from specific applications to comprehensive career preparation. **These examples represent only a small fraction of the entire breadth of models available;** rather, these practices were selected to offer a sampling of the continuum of possibilities for using contextualization as a strategy for improving students' acquisition of basic skills.

At a fundamental level, all of the featured practices fall into two broad categories: stand-alone classroom practices and linked courses or learning communities.

**Stand-alone classrooms.** These models focus on a single classroom and offer a flexible format. While faculty might work with peers in other disciplines to develop the course content, the primary locus of control rests with the individual instructor. Drawing on the work of Mazzeo, Perin and others, stand-alone classroom models can include infused academic and infused occupational delivery modes (Mazzeo, 2008; Perin, 2001).

*Infused academic* classrooms are individual courses focused on academic skill building. The context serves as a vehicle for enhancing the relevance of those skills to students and provides them opportunities to engage in active learning. Examples range from the exploration of students' cultural or ethnic background and personal experiences (Los Medanos College, mathematics) to the incorporation of service-learning (College of San Mateo, English).

*Infused occupational* classrooms are organized around the teaching of specific occupational content. Academic skills are taught in the context of the vocational competencies, or "embedded" within the curriculum. Examples include colleges that offer a single career technical education course that incorporates the development of basic skills such as reading, writing or mathematics (Ivy Tech, Shifting Gears Project, El Camino College's Basic Math Skills for Statistical Control Processes). The primary goal is to teach occupational content; academic skill development is the tool that advances this goal. In some models, an important secondary goal is for students to be able to demonstrate academic skills in different contexts. The

ability to transfer skills from a vocational setting to an academic setting is particularly important in colleges where “cut-off scores” are used to screen students who wish to enroll in higher level courses.

**Linked courses/ learning communities.** Mazzeo (2008) describes contextual learning communities as a cohort of students taking two or more courses that are linked in content. While learning communities take many formats and may or may not contextualize curriculum, the examples selected for this primer are ones that exhibit a high degree of collaboration and that utilize a specific context for delivery. These learning communities contextualize their basic skills instruction according to a variety of organizing principles, such as students’ occupational goals, social justice interests or cultural and community experiences. Some are delivered in short-term intensive formats (Los Angeles Trade Technical College’s Utilities and Construction Prep Program), while others take place over the course of one to two semesters (Cabrillo College’s Digital Bridge Program, City College of San Francisco’s Bridge to Biotech Program, Chabot College’s Daraja Program, Community College of Denver’s FastStart, Pierce College’s I-BEST) or multiple years (Southwestern College’s Spanish to English Associate Teacher Program).

**While each course retains its own objectives, learning community courses connect to mutually reinforce a set of shared goals.** Faculty who implement these communities collaborate to ensure that the content of each course complements and supports the others. In deeply integrated curriculum, the boundaries between courses disappear, and students learn both disciplines and skill sets simultaneously within a shared context.

### **WHAT ELEMENTS LINK THESE MODELS?**

While the 11 featured practices represent a broad diversity of delivery modes, several key themes emerged across the courses and programs. Moreover, the design features of every model are consistently connected to the learning theories outlined in the previous section. The instructors either implicitly or explicitly operationalize the theoretical understanding that any significant learning experience requires the motivation and engagement of the learner, that it is often socially constructed, that it must be individualized, and that it must be framed as a transferable process. These learning theories thread throughout the key common elements in the following section.

**Faculty Collaboration.** All of the faculty members who were interviewed discussed the importance of collaboration—with their peers, other divisions of their college, administration, employers, community partners and/or funders. In many cases, cross-discipline and cross-function partnerships fueled faculty innovations. The importance of collaboration was referenced in a number of activities including: program design and course curriculum development; engagement of services or the development of community experiences for students; professional development; evaluation and improvement of one’s practice; and the acquisition of resources to support instructional innovation. While collaboration varied in intensity by model type, it remained a central element of all practices. Reflective of contextualized instruction itself, collaboration across disciplines and functions of the college and with members of the community advanced faculty’s ability to serve students in the classroom.

**Curriculum/Instructional Material Development.** Most faculty cited the need to develop appropriate instructional materials to support their CTL practice, pointing to the artificial nature of the applications

in traditional texts as well as the lack of relevance of these applications to students' interests or experience. Several of the featured practices have invested significant time, effort and funds into developing and documenting lessons, assignments, instructional handbooks and texts for their coursework. In some cases, faculty performed this work on their own, but more often faculty worked with their peers in their own department, across disciplines or with the support of external partners. Underscoring the importance of authenticity to CTL, practitioners often acquired instructional materials or based their materials on resources from employer and community partners, or from students' experiences in the workplace or their communities.

**Relevant context.** All faculty and program directors noted the critical importance of employing a relevant context in curriculum design and delivery. Contexts varied by practice from the personal to the professional. In some cases, the instructor chose a context they believed would interest students, like service-learning or real-world problem solving; or, instructors engaged students in developing the context, identifying the issues and concerns most relevant to their lives, cultures and communities. In other instances, students chose a course or program for the context in which basic skills were being taught (e.g. workforce development, social justice). In describing the dynamics of the classroom, all of the faculty interviewed noted how use of a relevant context helped students recognize the purpose and utility of the reading, writing and math skills to their personal or career development. Many indicated that the motivational aspect of these connections enhanced the efficiency of the learning process and facilitated students' mastery of the material.

**Interactive teaching.** Faculty regularly referenced use of interactive teaching in their course and program implementation. Whether it was students interacting with the instructor, with one another or with the hands-on applications of the coursework itself, faculty noted that interactive teaching played a prominent role in how they delivered curriculum. Use of an authentic context facilitated strong student engagement, often calling for team work, peer to peer review, real-world data collection and problem-solving, experiences with employers or community organizations, authentic assessments and reflective essays. While interactive teaching is an overall aspect of quality instruction, working with contextualized curriculum provided instructors with a multiplicity of opportunities to construct complex and engaging interactive activities. Echoing the social learning and learning styles theories discussed earlier, this interactive teaching allowed faculty to both accommodate different educational needs and leverage the power of faculty-to-student and student-to-student collaboration.

**Professional Development.** Instructors and program directors noted the role of professional development in CTL course and program design, curriculum development and implementation and learning assessment. In some cases, professional development focused on helping faculty clarify the learning outcomes afforded by an integrated curriculum. Some activities concentrated on better understanding and developing course content, while other training targeted how to teach in a contextualized manner. For example, some academic faculty teaching in career-focused learning communities cross-trained in occupational courses, often taking coursework alongside the students they would ultimately teach contextualized basic skills. In another case, two occupational faculty partnered with their academic peers to identify the natural opportunities to teach basic math in their CTE curriculum as well as develop an understanding of how an academic instructor might teach those skills. Several instructors and program directors pointed to ongoing professional development as vital to maintaining the quality of their CTL practice.

**Institutional Support.** Several faculty and program directors highlighted the critical importance of institutional support to the success of their CTL practice. This support came in a multiplicity of forms including administrative backing of new course creation and experimentation, release time for professional and curriculum development, sharing of faculty across departments, flexible scheduling and use of facilities and staff dedicated to program coordination for interaction with community and employer partners. For all program models (excluding the standalone classroom practices), linkages with student services or dedicated staff providing intensive support such as individual case management, academic and career advising or job placement was of particular importance. Many practices also pointed to the critical nature of institutional support in their ability to move beyond initial grant funding or pilot stages to the ongoing sustainability and true institutionalization of these CTL innovations.

**Continuous Improvement.** While a focus on continuous improvement tends to accompany any instructional innovation, the integrated nature of CTL seemed to heighten the importance of reflection and ongoing revision while the practice is evolving. Nearly all faculty interviewed noted significant learning in the initial semester of the course or program implementation, such as realizations about how to effectively blend academic and occupational and foundational content, whether the time allotted was feasible for developing desired competencies, and how to best coordinate curriculum with other instructors and coursework. Many instructors talked about their curriculum “gelling”, their instruction improving and their overall understanding of contextualization deepening after multiple semesters of implementation. Several practitioners have altered the design of their model since inception to address both students’ needs and logistical challenges. Faculty referred to student feedback and input as a significant driver of the continuous improvement process. In some cases, the analysis of student achievement data during and/or persistence and performance indicators drove significant adaptations.

**Improved Outcomes.** Despite the limited duration of most of the programs highlighted in this primer, nearly all report on some qualitative or quantitative data that demonstrate promising preliminary outcomes. The most consistent evidence of impact across all programs is in qualitative measures, such as student engagement, motivation, increased self-esteem and confidence and employer satisfaction. Some of this data is self-reported, or compiled from a comparison of Community College Study of Student Engagement (CCSSE) data. In addition to these broad qualitative measures, many program models collected some quantitative measures. These measures spanned a broad range both in time and topics, from course completion, grade point average (GPA), employment, and certificate completion, to measures of academic gains and subsequent performance in college-level classes. While the data points are inconsistent across outcome measures, what is consistent in them all is the belief of faculty that contextualization is a key to success, and that a more extensive evaluation will both support what they have observed in their classes and help them refine their practice.

## **WHAT DO FACULTY SAY ABOUT CTL?**

The next section summarizes 11 different practices as told from the perspective of the faculty and program directors involved in their implementation. These practices are presented according to the type of delivery mode (stand-alone classroom, learning community) and along a continuum of scale which takes into account the commitment and resources required for implementation. The summaries outline the following

for each practice: background; program organization; faculty roles and collaboration; key components of instruction; impact on/outcomes for students; and the challenges to and supports for implementation.

In reviewing the examples below, readers are likely to identify elements that are already part of their own classroom practice, even though they might not have viewed these practices as “contextualized learning.” Indeed, the examples identified here as CTL appear in many different formats in several different classroom settings. The goal of this section is to help faculty think more intentionally about ways to implement or further advance CTL in their own classrooms or departments as part of their efforts in improving basic skills instruction. When reading the summaries, faculty may consider the following:

- ▶ What are you thinking about doing (or are already doing) that can be informed by these practices?
- ▶ Which practice(s) may be appropriate for your own courses, department or college?
- ▶ Who can you collaborate with (in your own department, across disciplines and functions of the college) to develop your CTL practice?
- ▶ What kind of professional development might be needed, at what stage in the process, and who could provide it?
- ▶ What type of institutional support do you need to advance your engagement with CTL?
- ▶ What leadership in your college can champion CTL as an approach to basic skills instruction?
- ▶ What relationships can you leverage outside your institution to support CTL in your classroom?

While some readers may select to review those practices associated with their particular discipline, faculty may find elements in all the practices that can relate to and be adapted in their own instruction.

**Guide to Featured Practices**

<b>Practice</b>	<b>Summary</b>	<b>Page</b>
Intensive Introduction to Reading & Writing, College of San Mateo (CA)	<i>Intensive basic skills composition and reading course incorporating service learning</i>	21
Basic Math Skills for Statistical Process Control, El Camino College (CA)	<i>Contract education course integrating basic skills math instruction with manufacturing process implemented by front-line workers</i>	24
Elementary & Intermediate Algebra, Los Medanos College (CA)	<i>Elementary and Intermediate Algebra courses taught using real-world context</i>	27
Shifting Gears Initiative, Ivy Tech Community College (IN)	<i>Automotive course that embeds developmental math in collaboration with math faculty</i>	31
Construction & Utilities Prep Program, Career Advancement Academy, Los Angeles Trade-Technical College (CA)	<i>Short, intensive cohort model to prepare students with the basic skills math, English and workplace readiness required for entry into the construction trades, utilities or college-level education</i>	35
FastStart@CCD, Community College of Denver (CO)	<i>Accelerated developmental education learning communities that integrate career exploration and educational planning into math, reading, writing and college experience courses</i>	39
Digital Bridge Academy, Cabrillo College (CA)	<i>Intensive bridge program that uses social justice curriculum to engage high-risk students in the learning process through an analysis of meaningful social issues</i>	43
Daraja Program, Chabot College (CA)	<i>Learning community pairing English instruction and college success courses with a focus on African-American curriculum</i>	47
Bridge to Biotech Lab Skills Program, City College of San Francisco (CA)	<i>Learning community integrating basic skills math and English with preparation for employment as a biotech lab assistant or continued education</i>	51
Spanish to English Teacher Assistant Certificate, Southwestern College (CA)	<i>Learning community linking child development and ESL coursework to transition students from full Spanish to English instruction and achieve Assistant Teacher certification</i>	55
I-BEST, Pierce College (WA)	<i>A career pathway initiative that combines adult education and community colleges resources, integrating basic skills and vocational skills for entry-level jobs in specific careers</i>	58



## INTENSIVE INTRODUCTION TO COMPOSITION READING AND WRITING

**Daniel Keller,**  
College of San Mateo (CSM)

**Background.** English instructor Daniel Keller read an article on service learning during his graduate studies that motivated him to pursue this instructional strategy at College of San Mateo. The article described a service learning model that engaged college athletes in mentoring elementary school students in reading. The results of this model showed powerful reading and academic gains for both the elementary school students and the athletes. Excited by this research, Keller decided to try a similar approach in his own instruction. At the time, the college offered support to instructors interested in service learning through a campus organization called “CSM Connects” and Keller jumpstarted his practice utilizing these resources.

**Program organization.** Keller teaches a five-unit, stand-alone basic skills English course called *Intensive Composition and Reading*. He describes this course as targeting those students who place in the low to middle percentiles on the college’s English Placement Test. At the same time, because this course falls one level below transfer, students must have the potential to get to college level within one semester. Keller has independently chosen to incorporate a service learning approach into the one to two sections of the course he teaches each semester with a focus on critical community issues such as hunger and the environment. Coursework includes “intensive practice in reading, writing, listening, speaking, and thinking to develop and refine composition proficiency” in the context of a community issue as well as a voluntary service day in a related organization or agency.

**Faculty roles and collaboration.** Keller currently works on his own to implement this course. At the onset, Keller benefited from support from CSM Connects which provided a small stipend and a series of four trainings with colleagues on how to incorporate a service learning approach into course curriculum. At this time, CSM Connects is no longer an active function of the college. Keller arranges his own service learning opportunities and works on his own to select readings, develop and deliver assignments and arrange the service experience.

**Key components of instruction.** A community issue and service experience serves as the context for a portion of Keller’s course. Keller notes that for his students “reading and writing is unfamiliar...it’s not a regular part of their lives. They see it strictly as a school activity. They don’t read at home, didn’t grow up reading...they don’t see reading and writing as having anything to do with real world activities.” By connecting assignments to a real world issue, Keller aims to actively engage students in experiencing how what they are reading and writing plays out in their communities. He selects topics that he believes will be

**Model Type:** infused academic course

**Description:** intensive basic skills composition and reading course one level below transfer; incorporates service learning

**Target population:** students who place low-middle percentiles on college placement test

**Requirements:** placement test or prior coursework in basic skills sequence

**Type of Assessment:** English Placement Test (EPT)

**Length:** 1 semester/course

**Credit/Noncredit:** credit

**Program status:** in progress since 2001

interesting and relevant to students and that are “complex, requiring lots of critical thinking, where they have to advocate a lot of different solutions...anything that involves them debating what works.”

For example, Keller may focus a part of his course on the issue of hunger. He starts with students reading *Growing Up Empty*—a book that claims America is experiencing a hunger epidemic. He then engages students in a class debate on food stamps and other potential solutions to hunger. Using an additional reading that focuses on the use of food stamps as an intervention, they are required to work in teams to develop positions for and against making food stamps more accessible. Following, students write an essay based on these readings that describes issues of hunger in America and then argues for a solution to the problem. Keller requires the same composition components he would of an equivalent essay delivered in a non-service learning course: four dependent clauses, four appositive phrases, four short quotations from the book using MLA citations, a clear introduction and thesis, etc. To add further perspective, students subsequently read and discuss *Fatland: How Americans Became the Fattest People in the World*.

Building on these hunger-focused reading and writing assignments, Keller then engages his students in a voluntary service project on a Saturday. For example, students have volunteered at Samaritan House, a local food distribution center. Students can participate in the service project and write a reflection paper in lieu of a final exam. Over multiple semesters of implementation with hundreds of students, he can only recall one individual opting out of participation. The final essay involves students informing the reader about the nature of the problem of hunger and reflecting on their own service experience. Keller requests an introduction that frames the problem based on the semester’s readings and additional research on the issue locally; he also requires students to reflect their observations from the service experience through “strong descriptive writing [that] follows the principle of ‘show and don’t tell.’” These assignments can comprise up to 27% of a student’s grade (including the final reflective essay).

Keller indicates the relatively low impact this approach has on his curriculum. He reflects that during his first semester of implementation, he “probably spent more time than I needed researching organizations and creating materials that weren’t necessary.” While it requires him to select different readings and tweak writing assignments, Keller says it does not impact the reading and composition skills or competencies he teaches.

**Impact on/outcomes for students.** At the same time, Keller highlights the positive impact engaging with a real-world issue, and the service experience in particular, has on students’ performance. “It doesn’t really impact what I can or can’t cover...it’s just that students are more excited and interested.” He observes that experiencing the context allows students to comprehend their reading and express themselves in writing in a deeper way. “It is revealing that even though [*Growing Up Empty*] stresses the diversity of those with hunger, they are shocked when they go to Samaritan House and see working people, people who don’t look like they’re starving, needing food. It’s as if what they had read didn’t make an impact until they see it in person.”

In describing how the service experience effects the final reflective writing assignment, Keller notes the richness of detail and description he receives from students. He asks students to reflect back to their initial position paper on how to solve the issue of hunger and consider how their impressions and opinions on the issue have changed. In doing so, he reports that students voluntarily ask to write well beyond the three

page minimum—something he remarks is rare in his developmental students. Ultimately, Keller finds these essays elicit students' best writing.

Additionally, Keller notes the bonding that takes place among students through the service experience and the satisfaction they feel at doing physical work in their communities. Students self-report in final course evaluations that the lessons and assignments that utilize the service context are the most interesting and engaging parts of the semester. They also note the pragmatic value of the experience—including the service on their resumes and in cover letters. In a few cases, students have chosen new majors or courses of study based on their service.

**Challenges and supports.** While Keller states that this particular practice requires minimal additional effort on his part, particularly after multiple semesters of implementation, he does acknowledge the value of having a function like CSM Connects available to support selection of and engagement with community organizations. He felt this function signified the institution's investment in service learning and an encouragement of faculty taking on this approach in their classroom. "Knowing the organization was there and that I had institutional encouragement, particularly when I was starting out and not totally confident about what I was doing, was helpful. It's not that I really needed the stipend; it was just nice to know the institution was supporting service learning."

He also acknowledges a few logistical challenges, such as selecting a topic that leads to service in an agency or organization that can accommodate large groups of students at one time. In some cases, transportation can be a challenge for students but they tend to work together to carpool or arrange rides. Keller expresses these as minor, surmountable obstacles. Ultimately, he and his students have great enthusiasm for the experience: "It's exciting, it's fun, it's something different...it makes students like the class more."

## BASIC MATH SKILLS FOR STATISTICAL PROCESS CONTROL

Phillip Sutton and Roberto Pandolfi,

El Camino College, Workplace Learning Resource Center, Region 7

**Background.** El Camino College hosts Region 7's Workplace Learning Resource (WpLR) Center—an economic and workforce development initiative of the CA Community College system. The WpLR Centers provide businesses with customized education and training services including workplace basic skills. Based on a history of successful partnership, Teledyne Corporation contracted with El Camino's Center in 1998 to develop basic math course for employees implementing a Statistical Process Control (SPC) process that aims to ensure quality and consistency in the microelectronic parts produced by the company. Implementing the SPC process requires workers to observe variation in production and identify when a part's length, diameter, weight, etc. is outside the acceptable limits of variation. Teledyne noticed that its workers struggled to understand the math used in calculating that variation and those limits. In turn, the Center developed a basic math course contextualized to the SPC process and delivers the course on-demand as contracted by Teledyne.

**Program organization.** Front-line Teledyne workers receive release time to attend this course, generally for two hour sessions held two times per week on-site at the company. Courses typically engage 12-15 students recommended by their supervisor or manager. Because Teledyne requested no assessment test prior to participation, students math skills range significantly from approximately fifth grade to early collegiate levels. Students learn basic math competencies all in the context of the SPC process including common fractions, addition, subtraction, multiplication, division, decimals, exponentials, roots, averages, percentages, temperature and basic algebraic functions. Because the course is arranged through El Camino's Contract Education, all training is not-for-credit and can vary in length and content based on the demands of Teledyne.

**Faculty roles and collaboration.** Course instructor Roberto Pandolfi works with the WpLR Center's Director, Phil Sutton, to develop and deliver course curriculum. Sutton manages the contract and facilitates interaction with Teledyne management to assist Pandolfi in developing the training suitable to the needs of the company's workers. Pandolfi and Sutton worked with Teledyne to identify the basic math competencies required in the SPC process. Pandolfi then drafted curriculum and engaged in a back and forth with Teledyne management to ensure all course content prepares front line workers appropriately for SPC implementation. Course curriculum is revised as needed for each round of delivery.

**Model Type:** infused occupational course

**Description:** basic skills math integrated with “statistical process control” (SPC) process implemented by front-line workers at microelectronics manufacturing company

**Target population:** incumbent workers

**Requirements:** recommendation by company for course participation

**Type of Assessment:** none

**Length:** 40 – 60 hours

**Credit/Noncredit:** not-for-credit

**Program status:** in progress since 1998

**Key components of instruction.** This course is specifically designed to assist participants in learning the basic math skills and knowledge necessary to perform their job successfully. All math competencies covered are tied directly back to the function these employees perform in the workplace. With implementation of the SPC process serving as the context for basic math instruction, all the problems students solve in class or for homework are authentic to their experience at Teledyne. Pandolfi draws examples from the course's textbook, *Mathematics for Machine Technology*, supplemental materials he has developed based on Teledyne examples as well as actual documentation used by the company.

Pandolfi starts each class with an introduction or review of the math competency in the abstract and then moves to application of that competency through hands-on, real-world problems students would encounter at Teledyne. For example, Pandolfi will present in one class period mean, median and standard deviation. Students will practice calculating these formulas in the abstract and then go to calculating these parameters for a variable control chart used in their SPC process. With this context for problem-solving, students often must not simply apply formulas learned but determine which set math skills to utilize for a given problem. Pandolfi will present a data set to students through a chart or graph and ask them to identify and work with select variables. Students may be presented numbers in decimal form but must solve for an answer using fractions.

Students also engage in significant group work in the course. Given the lack of pre-course assessment, Pandolfi evaluates students understanding of math concepts in the early stages of the course through in-class and homework assignments and then develops teams for classroom activity comprised of students with a range of proficiency. Students work in these teams throughout the course to practice competencies and solve the math required in a particular aspect of the SPC process. This teamwork also reflects students' actual work environment and requirements.

The course culminates in a final project where students pick a problem from their job site and identify and solve the related math. They must present both the math they used to resolve their problem and the resulting solution to their instructor, peers, supervisors and managers at a course-end gathering. Pandolfi and Sutton note that students often solve problems with significant benefit to the company. In one case, a student developed a solution for improving the air quality in a lab that was then presented to the company Teledyne contracts with for air cleaning services. In another, a participant's final presentation revealed a problem with his particular production line.

**Impact on/outcomes for students.** Sutton and Pandolfi point to repeated business with Teledyne over the past 10 years as a signal of their success impact on student learning. Over that time more than 100 employees have participated in Basic Math for SPC. Pandolfi says that for this particular approach to basic skills instruction, proof of learning comes in their ability to perform on the job and fulfill tasks like completing variable control chart, calculating a limit or reading a graph for their SPC process. Pandolfi notes students self-identify the transferability of their learning to other aspects of their lives like helping their children with homework or managing their finances.

Both Sutton and Pandolfi acknowledge the motivational aspects of learning math in the context of the SPC process. Because of its direct application to their job site, Pandolfi says students are "excited" and "empowered" by their skill development and their learning is "something they can immediately apply...it's not abstract."

Sutton remarks on the challenge of keeping adults engaged in basic skills training and points to the relevance and motivation found in contextualized instruction as “critical” to ensuring completion and persistence.

Sutton also highlights the impact on students’ confidence and esteem as it relates to education. He says that one of the “greatest barriers to students’ success is...they didn’t do well in school and don’t believe they can do this. One of the most valuable things [this class] does for students is it gives them the confidence they can learn these things, they can do these skills and that the [math] relates directly to their lives. They have a new experience toward learning.” Pandolfi echoes that many of his students have never completed high school or tried college and “don’t believe they can learn.” He feels the course “gives students the opportunity to succeed.” Anecdotal evidence shows that some students continue with their studies at a community college in the region. Most students stay at Teledyne full-time in their positions. Pandolfi comments that students use their course experience not only in their daily activity but also to negotiate advancement and remuneration.

**Challenges and supports.** Pandolfi comments on the professional commitment required in setting up a contextualized basic skills course. “It’s more work. You’re not just getting a book off the shelf...you have to do lots of extra research.” He acknowledges engaging in several revisions of curriculum based on Teledyne feedback and needing to create his own instructional materials for course delivery. At the same time, he notes that he “learns too” through course development and delivery and he appreciates being more personally involved. He recognizes the interplay between instructor and employer as supportive of and necessary to his contextualized curriculum development. The Workplace Learning Resource Center does the legwork to sustain this relationship and credits the contract education arrangement for allowing them to be agile and flexible in delivering the kind of training the company wants and the students need to perform their jobs.

## ELEMENTARY AND INTERMEDIATE ALGEBRA

Myra Snell,

Los Medanos College (LMC)

**Background.** LMC’s Math Department began a process of curricular and instructional improvement about 15 years ago in concert with national calculus reform efforts. Through both a Title III grant and the advent of the student learning outcomes movement, the Department took action to assess its developmental math curriculum and practice through informal, and eventually structured, convenings. Ultimately, the faculty narrowed the math program’s focus to a small set of learning outcomes to which all coursework is connected. These outcomes, according to instructor Myra Snell, influenced the Department’s course-level practice significantly. Rather than using a symbolic approach, the Department decided to teach students a core set of procedural skills to mastery and concentrate a majority of instruction on mathematics as modeling. This modeling happens in real-world context, connecting to students’ “gut level sense-making” with the goal of helping them see math “out in the world.”

**Program organization.** The department encourages faculty to utilize a contextual approach in Elementary Algebra (Math 25) and Intermediate Algebra (Math 30) courses. Students are assessed and placed through the College’s standard matriculation process. Each course is one semester. Both courses are credit bearing, and although neither course is transferable, Intermediate Algebra satisfies the math requirement for the associate’s degree. No special recruitment or outreach is performed for these classes and students range in age and ethnicity. Snell describes the population as “typical dev ed students...many have been through Algebra II in high school, and most really hate math.”

**Faculty roles and collaboration.** The Los Medanos Math Department has benefited from several grant efforts including Title III funds, a Strengthening Pre-Collegiate Education in Community Colleges (SPECC) grant, and support through the Chabot Faculty Inquiry Network to convene their faculty for both curricular and instructional reform. Through institutionalization of Title III work, the department now has a dedicated Developmental Math Program Lead, who is responsible for on-going assessment and professional development activities, and funds for faculty participation. Additionally, faculty are compensated for producing materials that demonstrate the impact of professional development on their classroom practice, such as classroom activities for students, student work that responds to a new pedagogical strategy, or websites documenting classroom-based inquiry projects. Snell emphasizes that in order for professional development to help a program sustain innovation, “we must do it, document it, share it and build on it.” The Department takes several different approaches to professional development including lesson study and faculty inquiry.

**Model Type:** infused academic course

**Description:** elementary and intermediate algebra courses taught using real-world context

**Target population:** basic skills math students at end of developmental sequence

**Requirements:** Elementary Algebra – completion of Math 12; Intermediate Algebra – completion of Elementary Algebra

**Type of Assessment:** Accuplacer

**Length:** 1 semester/course

**Credit/Noncredit:** credit

**Program status:** in progress since 2004

**Key components of instruction.** Snell talks about the Department’s use of contextualization to help students deeply master a few core math concepts and answer the ubiquitous “when will I ever use this” question. Snell describes traditional algebra instruction as an attempt to cover a large number of objectives that students may or may not need in subsequent courses. Teaching usually happens in the abstract with rare occasions of application. When applications are utilized, they are generally templates with students “essentially doing a matching exercise where [they] memorize a problem type and match to a procedural approach they’ve been taught.”

Snell and her colleagues take a different approach. As mentioned, five program-level outcomes drive instruction. These objectives include using math reasoning to solve problems, demonstrating math ideas through a range of representations, reading and communicating math with understanding and recognizing and applying math concepts to a variety of relevant settings. These outcomes lend themselves naturally to utilizing a contextualized approach. The thrust of instruction is on “pulling a few math threads through the entire course.” The context is not a constant one, rather it changes regularly to offer students different opportunities to work with key math concepts—identifying why they need to know and when to use a particular idea. Elementary Algebra focuses largely on linear functions and in part, on nonlinear functions; Intermediate Algebra adds the study of exponential functions. The activities written by LMC faculty start with a fairly simple context to explore these functions and then moves to more dynamic and “messy” situations and problems reflective of students’ lives.

To exemplify, Snell talks about the approach to proportionality in Elementary Algebra activities:

“Proportionality is often covered in a single section and then not tied to anything else. In our activities proportionality is connected to linear functions that are introduced in the context of money with students taking a trip to Mexico. They look at exchange rates online and determine how many pesos they would get for a given number of dollars. That moves quickly into investigation of the relationship of sales tax to price—a proportional relationship that is based on geographic location. Then we look at data connected to Environmental Protection Agency (EPA) ratings for cars such as fuel usage versus distance. We do a graphical analysis based on an EPA data model and come up with a linear equation that describes the relationship of fuel use for different cars. We look at scenarios for different peoples’ lives to determine what [kind of car] would make sense based on their context. From there, students do a lab exercise based on a PG&E [utility] bill. They look at use of therms, what a customer would be charged, and then they figure out the rates for residential versus commercial customers. All of these situations involve analyzing a proportional relationship between two quantities that can be modeled by a linear equation. In the next activity we extend proportionality to looking at situations where the change in one quantity is proportional to the change in the second quantity. In this way, proportionality becomes a thread that connects to the slope of general linear equations.”

When asked about starting instruction with the abstract versus the application of a math idea, Snell observes that she tends to start in a context that is interesting to students to help “connect to their intuition about [that] mathematical idea.” She stays with the context for the first couple of hours of instruction and moves to an abstract look at the idea, comparing and contrasting different symbolic expressions of the concept. She



then gives students a symbolic expression and has students make up their own context in a story that can be modeled mathematically by the given expression.

**Impact on/outcomes for students.** Snell describes student engagement in coursework as high and says that “when you teach this way, students never ask ‘why do I need to know this’ because there’s your PG&E bill, your trip to Mexico or the situation where they’re buying a new car.” She talks about students’ strong preparation for subsequent coursework and their ability to “be skeptical and take a step back...instead of trying to take careful notes and mimic the procedure, they wonder why would that [procedure] work, what if I change this, would it still work?” A summative analysis of Math 25 performed by the Department in 2007 shows that the students of instructors who used a set of contextualized activities designed to address the communications, problem-solving and multiple representations outcomes show a significant increase in performance over those that were not engaged in these activities.

When asked about determining the transferability of skills learned in a contextualized way, Snell states “We have not gathered specific evidence that it transfers but we have a lot of evidence that traditional approaches don’t produce learning that transfers. I always hear math and science faculty complain that students don’t have the requisite math skills to survive their courses. Yet we know that these same students have successfully completed the required math courses; they just can’t recognize and apply math concepts in these new situations.” Snell notes that she and her colleagues are teaching for transfer. “Our students don’t develop the expectation that the problems on the homework or on the test will look like those we did in class. The contexts are constantly changing; the way the information is presented is constantly changing. You might see information written in a paragraph, or you might be given data or a graph.” She acknowledges that not all “contextualization” promotes transfer if an instructor is still approaching the discipline in the same way—teaching a whole disjointed grab bag of things and just showing examples of different applications.

**Challenges and supports.** Snell recognizes the tension between content and context in teaching developmental math. She remarks that she has observed contextual approaches where the coverage of the basic skills is “thin” or a “small sliver” of what is covered in class and the main focus is on the context itself. She talks about the challenge and importance of using a context that will allow for students to “grapple with the math in a deep way.”

Clearly focusing on a set of key concepts is central to the contextualized approach taken by Snell and her colleagues. She notes that many of her peers do not want to teach in this way and are unwilling to let go of the “long list of things they think need to be included.” She discusses the colleagues’ concern about not preparing students appropriately for the next level of math when taking this focused approach. She challenges this concern, suggesting that what may be required of students in subsequent courses is actually fairly limited. As an example, she cites that nearly 80% of LMC students who continue their math studies take Statistics which actually requires a limited amount of Algebra.

Snell also notes the general lack of good curricular materials available for contextualization. She mentions spending incredible amounts of time developing her own or working in collaborative projects to develop materials. At this point, she and her colleagues do not generally use a text rather they teach from materials they have developed themselves.

Snell also speaks about teaching as a cultural activity and acknowledges that the way teachers learn to teach, their view of math and their role as a teacher is determined by the way they were taught themselves. Most math teachers were not taught math with a contextual approach. Snell observes that these “deeply ingrained patterns” are hard to transform and the incremental way in which change occurs is “very un-American in terms of our expectations for large scale education reform.”

A few essential conditions support Snell and her colleagues’ practice. As mentioned, LMC has institutionalized a .5 release time position for a developmental math lead solely responsible for assessment and professional development activities. The college also allocates about \$12,000 annually for adjunct participation in professional development. She talks about the importance of these elements to focusing professional learning in the developmental sequence and sustaining innovation. She additionally references the merits of several grants the College has received for both curricular and instructional reform and continued professional inquiry. She speaks not about the funds but the benefits of accountability to funders. “It makes you think about what you’re doing, what you’ve learned...the fact that you have to report out is very useful.”

She also mentions the merits of general education faculty connecting with career and technical education instructors. “GE faculty have lots to learn from occupational instructors...they really do teach in a problem-based, hands-on way. They have lots of connections to employers and they bring that perspective into the classroom. That connection to the outside world is really important. When the Board of Registered Nurses comes to campus, it really galvanizes the faculty to do something different. I think it’s really exciting to learn from folks in oc ed.”

## INTRODUCTION TO AUTOMOTIVE TECHNOLOGY/SHIFTING GEARS INITIATIVE

Rod Brown and Mark Lammers,  
Ivy Tech Community College of Indiana

**Background.** In 2007, The Joyce Foundation selected Ivy Tech Community College of Indiana to participate in *Shifting Gears*, a multi-state policy initiative to promote regional economic growth by improving the education and skills training of the workforce in five Midwestern states. The initiative focuses on identifying and implementing systemic changes that lead to the institutionalization of innovation and the creation of pathways to college and career success for low-income adults. Ultimately, *Shifting Gears* in Indiana aims for the piloting of these innovations to inform policy discussions.

Several Ivy Tech campuses selected the delivery of contextualized curriculum (called “embedded skills”) in occupational programs that lead to a professional credential in one year as the focus of their *Shifting Gears* work. These pilots intend to raise students’ academic performance in basic skills with the goal of more students qualifying for the next level of certificate and degree programs. Ivy Tech has launched embedded skills pilots in three program areas: industrial technology, early childhood education, and the Evansville campus’s automotive technology program profiled below.

Over the years, Mark Lammers, Chair of the Evansville Automotive Technology Program, lamented as he watched talented students leave the college after earning an initial certificate because of their struggles and frustrations with basic skills, particularly math. Under Ivy Tech Community College’s mandatory assessment and placement policy, students must assess at college level before being allowed to enroll in college level courses. Lammers saw embedded skills as a strategy that would result in more students continuing in automotive technology after completing the initial 18-unit Certificate of Training.

According to Lammers, only 25% of first-semester Automotive Technology students at Ivy Tech Evansville will complete the Associate of Applied Science (AAS) degree. Lammers looked at embedded math as a way to test the hypothesis that through a contextualized curriculum, student would not only earn a workforce credential but also develop the skills necessary for success in program-level math, and in turn, achieve more technical certificates and AAS degrees in Automotive Technology.

**Program organization.** Ivy Tech’s Automotive Technology program, accredited by the National Automotive Technicians Education Foundation (NATEF), structures its approach around the delivery of embedded math

**Model Type:** infused occupational course

**Description:** developmental math skills embedded in introductory Automotive Technology courses

**Target Population:** students in initial course of automotive technology certificate program

**Type of Assessment:** compass placement test

**Length:** one semester

**Credit/Noncredit:** credit

**Requirements:** participation in introductory automotive technology courses

**Program status:** in progress since Fall 2007

in the program's initial courses. The competencies are selected from the first level of developmental math and delivered as mini-lessons within three introductory automotive courses: Power Train Service, Engine Principles and Design and Engine Repair. Lammers describes how Ivy Tech arrived at this strategy based on the target population:

“We picked out the entry-level, first semester classes where students sign up with no pre-requisites. When I looked at the assessment profiles of incoming students, about a third would be exceptional, a middle were going to be okay, and there was a lower third that, in all honesty, should not have been in the course. So we looked at adding this base of mathematical skills, dealing with whole numbers, fractions, ratio, proportions and percentages.”

Students also receive additional support from a case manager, who recruits, screens and connects them to different services and helps them gain a clearer understanding of career options.

**Faculty roles and collaboration.** Faculty collaboration happens on many levels and with several different partners. One of the program's initial challenges included raising vocational instructors' confidence in their ability to deliver academic math concepts, as well as the developmental math instructors' confidence in their capacity to teach academic skills in an occupational context. As Lammers says:

“It sounds simple on the surface...for an administrator to go to his vocational instructors and say, ‘We'd like you to teach applied academics in automotive, welding, whatever...He (the instructor) understands how that works, but he doesn't know the nuts and bolts of what it takes to really make it go (in the classroom). What I ran into was that nobody really knew what to do, and until we had intensive instructor workshops, they didn't understand what it was that we wanted. On the other side, when academic instructors are told, ‘Well, why don't you give some examples of how people can apply math,’ they usually cringe and say, ‘well, let me look it up in the book.’”

Collaboration was the answer including joint curriculum and professional development. After an initial discussion of the pilot, the chair of the math department and Lammers sat in on each other's classes. The departments then began to collaborate on many levels, from curriculum formation to workshops for high school CTE instructors. Lammers also discovered that engaging both the academic and automotive instructors in team teach for one or two semesters provides a form of professional training. In his experience, once these two groups teach together, they are able to transfer new skills and applications to future classes.

**Key components of instruction.** Ivy Tech Evansville's embedded math pilot has two main parts. The first is an instructional component which includes curriculum development and instruction through team teaching and professional development. To embed math concepts in the automotive curriculum, math instructors come into the three identified classes at key points. Instructors review the math concept, which is delivered in a mini-lesson format. According to Lammers, the process begins with finding “math moments”:

“We look at our curriculum and identify math moments, or math that is implicit in the program already. I don't go out of my way to add content that is not in there. If there are linear measurements and we've got fractional measurements, right there, that's a good time to show them (students) the concepts of how to do that math....I can have a math instructor come in, or I can take five

or ten minutes and give math instruction and then show the students how to work with it (the concept)...It's that entry-level (course) with no pre-prerequisites that really lends itself (to the process)."

By embedding math skills, students learn both academic and applied math; however, the difference in the language of academic math and that of vocational math creates a challenge. As Lammers describes it, the two differ in that the introductory automotive courses contextualize the math to a particular piece of technology or equipment with the specific language of the automotive industry. To illustrate, he shares a specific example:

"In a math class you would be given the equation of  $\pi r^2 h$  (for calculating volume), which is  $\pi$  times radius squared times the height of the cylinder. When we look at engines, we don't deal with the radius, we deal with the bore, and we don't have the height of a cylinder, we would have the stroke that a piston travels moving up and down inside the cylinder – the equation that we would use is  $\text{Volume} = .7854 \times \text{bore}^2 \times \text{stroke}$ . This would give you the volume of that cylinder, but if you showed that to a math instructor, they would say, 'What kind of funny stuff is that?', because it's derived from that original formula."

Based on the pilot project thus far, Lammers believes that all program courses should have some level of applied math. Because many first-semester freshman courses at Ivy Tech do not have academic prerequisites, he observes that many students enroll in courses for which they are not academically prepared. In his mind, these courses should be required to embed a minimum of math content. At the same time, he notes that math instruction should be limited to 10 to 30 minute instructional segments, which are usually the limit of the attention span for many students in his experience. Lammers also remarks that worksheets directly connected with tools and equipment tend to maintain student interest best as adult students quickly lose interest.

In addition to the embedded math instruction, students in these courses also receive focused attention through enhanced advising with a focus on connecting students to automotive careers. Lammers highlights the pilot's revision of the traditional advising model to focus on providing students a clear vision of the career path for an automotive technician. In his experience, Lammers observes a direct relationship between this kind of advising and students' persistence to graduation. He states,

"Student attitudes about academic classes are modified as we provide extra math instruction, explain how on-line assessment testing operates, and demonstrate contextual examples of applied math...many students who entered the program in Fall 2008 came with the image of being a math failure. Now many of those students are interested and motivated to study and learn math skills."

**Impact on/outcomes for students.** One hundred students enrolled in Fall 2008 in the three courses identified for the project. Final quantitative data on pre- and post-Compass assessments, as well as pre- and post-in-class assessments will be presented at Ivy Tech's "Summit on Remediation" in April 2009. Lammers notes initial data from ongoing classroom assessments and student feedback are very positive. He points to students' ability to solve math problems with automotive terms as an example of their facility with using math skills in a vocational context. He also sees evidence of academic transfer: "We gave some mini-math

quizzes right at the first, and then we saw that people didn't know anything about how to work percents, or how to work scientific notation. Now they do."

Lammers also observes that feedback from instructors reinforces the importance of students' ability to see the relevance of math to their career goals. He explains that the expectation is that enhanced motivation and increased confidence in math will translate into more students succeeding in their initial certificate, and in turn, additional students continuing in the automotive technology sequence.

**Challenges and supports.** Lammers explains that the original objective of the embedded skills pilots focused on raising students' math skills to college-level, or "program level." At the Evansville campus as well as the other embedded math pilot sites, evidence suggests that this was an overly ambitious goal. As Lammers describes it, "There's a limit to what we can do. I thought I could cover the majority of what was covered in one of our math classes in our automotive classes, and I probably could, but that (would) put a lot of extra burden on our instructors." While instructors show enthusiasm for the strategy, he remarks that they are still uncertain about how much math could be incorporated into the automotive classes without the addition of more instructional time. As mentioned above, the task is further complicated by the differences in the language of formal math and the language of applied math. In Lammers' words, "There is a significant disconnect with the language that we would use [in an automotive setting] and the language that would be used in a pure math class."

Lammers acknowledges that the embedded math automotive program has become a focal point of excitement on both the Evansville location and the other Ivy Tech campuses. What is less clear is whether or how it will be continued after the initial funding is gone. While the curriculum function has been largely completed, funding for team teaching and case management would have to come from the college's general fund or a different source of external funding.

## UTILITIES AND CONSTRUCTION PREP PROGRAM/CAREER ADVANCEMENT ACADEMY

Kelly Dodge, Wally Hanley, Dr. Allison Tom-Miura, Tom Vessella,  
Los Angeles Trade-Technical College (LATTC)

**Background.** The Utilities and Construction Prep Program (UCP) is a short-term intensive program at LATTC that employs a cohort-based learning community model. The program focuses on improving students' basic math, English, workplace readiness and financial literacy skills for entrance into careers in the construction trades and utilities sectors. UCP is part of a broader network of "Career Advancement Academies" (CAAs) supported by funding from the State Chancellor's Office and leadership and technical assistance from the Career Ladders Project. CAAs are designed to address students' foundational skills in the context of career pathways of economic importance to regional economies.

When developing its CAA, LATTC made a strategic decision to focus on the utilities and construction industries. The college maintains credit construction programs into which UCP participants can easily matriculate—preparing them for self-sustaining careers and a college degree or certificate. The region also has a high demand for well-trained construction and utility workers. The construction trades prove generally to be more "felony-friendly" than other industries and the hands-on work often attracts disconnected men, a key target population for the program.

**Program organization.** Between April and December 2008, three cohorts completed the UCP. The program originally included an eight-week, full-time commitment with five primary components which students experienced concomitantly:

- › Industry overview and career opportunities (18 hrs)
- › Pre-employment skills training and workplace readiness (117 hrs)
- › Contextualized basic skills including reading, computation, mechanical and test-taking preparation based on KeyTrain and WorkKeys (72 hrs)
- › Applied construction skills (54 hrs)
- › Workplace fitness and conditioning (54 hrs)

LATTC learned numerous lessons about how the program model and content does and does not work for its target population during its rapid implementation of multiple cohorts over nine months. In turn, LATTC recently revamped the program format to accommodate students' need to work and to address the range

**Model Type:** learning community

**Description:** short, intensive training program to prepare students for entry into the construction trades and/or utilities or continued education

**Target population:** "disconnected" (undereducated, underemployed, underprepared) young adults with a 7-12th grade English/math proficiency

**Requirements:** participation in an orientation and assessment

**Type of Assessment:** CASAS pre, middle, post-testing; USA TestPrep

**Length:** full-time training program, 315 hours over 8 weeks (new format beginning Spring 2009)

**Credit/Noncredit:** noncredit

**Program status:** in progress since April 2008

of skills, abilities and knowledge students bring to the program. The revised model now includes 306 hours conducted over 12 weeks. The first week offers participants a transition to college and the last week provides a supported move toward the next stage of education and/or employment. The middle 10 weeks deliver an intensive core academic and workplace readiness program with a similar configuration of components outlined above.

**Faculty roles and collaboration.** Approximately eight faculty members work together to implement all program components with student cohorts. Weekly meetings allow for curriculum alignment and development. Three instructors, Kelly Dodge, Tom Vessella and Wally Hanley, focus on building students' basic skills English, math and applied construction skills respectively. They worked together and with program director Allison Tom-Miura to develop the curriculum for contextualized basic skills delivery and will continue to refine this curriculum using the California Department of Education *Career Technical Education Standards for Building Trades & Construction and Energy & Utilities Industry Sectors* as a guide for curricular focus. Dodge and Vessella have a unique combination of experience with both the construction trades and their subject matter (English and math respectively). Hanley is also a practicing contractor. All are relatively new to community college instruction.

**Key components of instruction.** Program instruction focuses on preparing students to enter employment or apprenticeship in the construction trades and utilities as well as matriculate into college credit courses. In turn, these sectors serve as the context for building students basic English and math skills. Given the short-term, intensive nature of the program and the variation in students' basic math and English preparation, the program focuses on raising students' skill level to a point where they can demonstrate sufficient proficiency for entry-level employment based on the KeyTrain/WorkKeys assessment system. Keytrain curriculum supports this process including modules focused on Reading for Information, Applied Math and Locating Information.

English instructor Dodge describes her component of the program as “English for Contractors...instead of reading *Wuthering Heights*, I have students read articles from *Fine Home Building*. I assign reading pertinent to construction.” She describes developing students' grammar, reading comprehension and composition skills by “going in through the back door.” Dodge notes the challenge of engaging students with the necessity of building English skills when preparing for a field such as construction. “To them, construction is about digging holes and building walls. I had to gain their trust before I could even begin addressing [skill development].” To do so, she often starts class with a warm-up, such as a review of construction vocabulary terms, to focus their attention on the utility of improving their English skills to their goal of employment. “When I start with a term that may be unfamiliar to them, it helps them realize that ‘maybe I don't know everything I need to’ and then I can work from there.”

Dodge begins her course with a focus on grammar to ensure a common foundation for subsequent reading comprehension and composition instruction. In-class activities to develop students' grammar skills such as subject/verb agreement focus on construction and utilities situations. She then moves to texts that focus on a particular aspect of construction, say building a table, and works with students to analyze those readings to develop their comprehension skills.



Math instructor Vessella speaks of how the context of construction lends itself naturally to developing students' math capacity as the job commands that students utilize a range of basic skills such as fractions, decimals, multiplication, subtraction and beginning geometry and algebra. Vessella tends to start by instructing students on a math idea in the abstract but immediately moves to engaging students in hands-on construction activities that show the math in action. When describing a typical class period, Vessella says he spends the first half on didactic instruction and the second half on practicing what they learn in a construction lab setting. Vessella notes that having longer class periods (105 minutes) allows more latitude for hands-on instruction of math concepts.

Like the English component, homework and quizzes focus on testing students' math knowledge using construction and utilities problems. Vessella explains, "For example, I teach them the Pythagorean Theorem and the 3-4-5 triangle rule. If a triangle is 3 feet on one end, 4 feet on the other and the hypotenuse is 5 feet, then the corner should be square. We then go into the lab and construct the triangle and if the corner isn't square, they can use the Theorem to figure out why. Or, I give them 10 feet of lumber and ask them how many pieces they can cut if I need two foot sections." To demonstrate their knowledge of ratios and scale, Vessella asks students to create a scale for and draw a 20 x 20 foot room based on paper with 2 x 2 inch squares, each of which represented five feet. Students then have to locate various items in the room based on the scale.

Like Dodge, construction instructor Hanley and Vessella both talk about changing students' fundamental perception of math from one of irrelevance to that of critical utility. Hanley says, "Lots of students did not have success in school, particularly with math. It's the typical story where students say, 'why do I have to learn this...I'm never going to use it.' We put that to rest. When you're on a job site, math is as valuable a tool as a screw driver or a power saw. Just cutting at random doesn't do any good. Knowing where to cut is critical. They've been resisting math all their life and now we have to fundamentally change the game."

Unlike Vessella, Hanley tends to start instruction by engaging students in hands-on construction activity and then moves to identifying the math theory or English competency being developed as appropriate. He finds this helps students connect better to the theory, provides them a starting point for why or how something works the way it does and again, reinforces the relevance of further developing their capacity with a given math or English competency.

**Impact on/outcomes for students.** Hanley, Vessella and Dodge all cite the impact of this short, intensive program on students' motivation, self esteem and performance. Hanley says, "Our constituents have such a negative approach to learning as a whole...but here we set up a positive educational experience that is specific to their goals. The contextualization makes it seem doable and that education is something they can be part of." Dodge furthers this sentiment by noting that students can "see the benefits of what they're learning almost immediately. They can see the instruction is helping and they are excited and willing to learn." After three cohorts, 73 of 86 students have completed and approximately 70% are employed or continuing their studies. Given the range of skills present in the first three cohorts, performance outcomes vary. CASAS post-test show 100% gain some improvement on reading and/or math assessment.

**Challenges and supports.** LATTC's UCP program benefits from several key partnerships. LATTC annually receives \$100,000 in State Chancellor's Office Career Advancement Academy funds. As mentioned, the Career

Ladders Project provides technical assistance including professional development, guidance on program and curriculum development, evaluation services and connectivity with other Career Advancement Academies. Additionally, the Career Ladders Project advocates for the long-term support for and sustainability of these models.

LATTC also engages several employer and workforce system partners including: the Electrical Training Institute of Southern California and IBEW Local 11, IBEW Local 18-LADWP Joint Training Institute, the Los Angeles Department of Water and Power, Los Angeles Infrastructure and Sustainable Jobs Collaborative, Regional Economic Development Institute (established with support from the Bank of America Foundation), Southern California Gas Company, UAW Labor Employment and Training Corp and Women in Non Traditional Employment Roles. These partners engage in curriculum design and provide classroom speakers and mock employment interviewers. LATTC notes that they are particularly helpful in helping students apply for employment in their respective organizations and institutions.

Dodge, Hanley and Vessella highlight the benefits of having both experience with construction and subject matter expertise. They believe it heightens the legitimacy of their contextualization process and suggest that it would be difficult for an instructor to teach in the manner they employ without some exposure to and/or experience with the occupation. Vessella says, “having experienced the context itself makes it easier for students to trust what you’re saying...which is an issue for our students.” At the same time, Tom-Miura says having training in the discipline enhances instructors’ ability to teach the academic skills content. She notes that finding this combination of skills presents a recruitment challenge.

Tom-Miura acknowledges the need for rigorous ongoing professional development to provide faculty the training and support necessary for teaching UCP’s population of disconnected adults. LATTC recently became part of the Chabot Faculty Inquiry Network and Tom-Miura aims to utilize this professional development to strengthen instructional delivery. She also recognizes the program’s struggle to hone in on the specific competencies to address in the UCP program as well as the challenge to appropriately assign students to the program based on their math and English skill levels. Current program restructuring efforts are aimed at 1) developing a comprehensive set of program options and support services, of which the UCP is a part, to appropriately serve any student who comes to LATTC seeking workforce preparation and 2) clearly identifying the types of basic skills each level of training addresses and refining curriculum accordingly. Continued support from the Career Ladders Project will allow LATTC to assess the impact of these revisions on students’ success.

## FASTSTART@CCD

Lisa Silverstein, Kristin Cutaia, Rosalinda Martinez, Ruth Brancard, Elaine Baker

Community College of Denver

**Background.** The FastStart program at Community College of Denver (FastStart@CCD) began with lessons learned from two successful career pathway programs. The first, the Essential Skills Program (ESP), was a response to the work-first focus of the 1997 welfare reform legislation. ESP offered a one-semester certificate (with concentrations in different areas such as business services, early childhood, phlebotomy, medical clerical, etc.) that gave participants access to jobs. ESP was able to move welfare participants into entry-level jobs within a short time span; however, over the next few years it became evident to program staff that if students left the ESP without the foundation skills needed for success in the next level of training, their career options were seriously limited. ESP was successful in reducing caseloads, but not in moving under-prepared students toward long-term economic self-sufficiency. As Elaine Baker, former ESP Program Director and current CCD Director of Workforce Initiatives remarked, “When students leave us before they’ve had the opportunity to develop strong basic skills, we haven’t really given them entrance to a career pathway. We’ve just given them access to a slightly higher-level, dead-end job.”

The second effort that informed FastStart@CCD was the CNA to LPN program, a workforce development partnership with the City and County of Denver, long-term care providers and the college, which gave certified nurse assistants an opportunity to move up the career ladder to a licensed practical nurse position. The CNA to LPN program began with a six-month accelerated remedial curriculum delivered at the work site. The program demonstrated that with contextualized curriculum and appropriate student support, students could accelerate through multiple levels of the remedial sequence. The program successfully moved CNAs who tested into the lowest levels of developmental math and the mid-range of developmental English through the remedial sequence and into the LPN program.

The successful integration of vocational context and the acceleration of basic skills instruction led to a new set of questions: “What about the broader population of developmental learners who struggle through multiple levels of developmental courses? How could faculty utilize the powerful strategies of acceleration and contextualization to promote learning in the larger population of students who hadn’t already made vocational choices, or whose goal was transfer?” To answer these questions, Baker and Ruth Brancard, Senior Chair of the Center for Educational Advancement (developmental studies) joined efforts to design

**Model Type:** learning community

**Description:** basic skills instruction contextualized with career exploration in an accelerated learning community format

**Target population:** first-time students who test at least two levels below college skills in English/reading or Math

**Requirements:** assess into two levels of developmental coursework

**Type of Assessment:** Accuplacer Length: 1 semester

**Credit/Noncredit:** credit

**Program status:** in progress since Fall 2005

FastStart@CCD, a developmental education learning community that uses acceleration and contextualized learning as its core strategies.

**Program organization.** Instead of contextualizing specific vocational curriculum, FastStart draws its content from the career exploration and educational planning processes. The program is structured around the principle that academically under-prepared students can accelerate to college-level skills through a blend of high academic challenge, a supportive academic structure, and enhanced advising with a career exploration emphasis. FastStart students have the option to accelerate in two levels of developmental math or two levels of an integrated developmental English and reading course in one semester. Classes are offered twice a week in three-hour blocks. Daytime students are required to enroll in a linked college experience course that emphasizes career exploration and academic planning. Participants receive tutoring through the college's learning labs, with student support delivered by an educational case manager specifically dedicated to the program.

**Faculty roles and collaboration.** The program is coordinated by an English faculty member through a .4 release position. Faculty observe each other's classes and provide feedback to each other, convene monthly to discuss program effectiveness and student issues, and work in sub-groups on the development of contextualized curriculum and in the planning of new learning community combinations. Stipends for adjunct faculty and release time for full-time faculty support additional curriculum development. In many ways, the FastStart instructors, coordinator, and the educational case manager operate as a faculty learning community. Other critical collaborations include chairs of the math and English departments, deans, and different divisions in student services; such as the testing center, recruitment, and career services.

**Key components of instruction.** The goals of FastStart are to reduce the time spent in developmental classes, to help students develop the habits, attitudes and skills of successful learners, and to help students make informed career decisions. FastStart staff believe that the achievement of these goals requires the integration of instruction, student services, and career planning. Key components are acceleration, a learning community/cohort model, case management, contextualized curriculum, student support services integrated with academic instruction, and professional development.

For students, acceleration provides motivation; for instructors, acceleration provides a block of time that promotes the development of community. Acceleration creates opportunities for efficiency, eliminating the duplication of content that characterizes traditional remedial sequences, and reduces the time students spend in developmental coursework.

The learning community model provides a vehicle to integrate academic, career and social support. According to Baker, "The learning community gives student the opportunity to get to know each other and creates an environment where students support each other to achieve their individual academic and personal goals."

A key instructional tool of the FastStart learning community is active learning. FastStart Coordinator and instructor Lisa Silverstein describes:

"Students are actively engaged in their learning and are a part of a classroom community where questions are encouraged and critical thinking is infused in every lesson. Students are an integral

part of the learning and discovery process. The class, including the instructor, operates as a team, learning through doing, experiencing, and discussing. Relevant content provides many layered opportunities for “ahas”, for both the class and the individual student.”

Career exploration is delivered in three complementary formats. The accelerated developmental English/reading course employs career exploration as its organizing content. Silverstein continues, “First we accelerate so we can retain students, but it has to be more than just getting through classes. We have to make it more meaningful. That’s where career exploration comes into play.” Class activities and assignments begin with personal reflection and the clarification of aptitudes and interests and move to a structured investigation of careers, which includes labor market research, an informational interview with someone in the selected profession, a written evaluation of the career and a presentation to the class. Products include the “I-Search” paper (a personal investigation), a gallery walk and exhibit of what students have learned, and oral presentations.

In the one-credit college success course required for all daytime FastStart students, the instructor works with a more focused career investigation, which feeds into the final class product, the student’s education plan. Career specialist Kristin Cutaia describes how the college success curriculum parallels the career development work in the English/reading class:

“In the beginning we offered workshops on different careers, but we realized early on that most of our students work and were too busy to attend workshops, and that if we thought the material was important, we had to find a way to incorporate it into class. We began to integrate career assessments, then students went on to other investigations such as informational interviewing, job shadowing, putting together a job outlook with wages and individual goals. All this is directed toward what we call a ‘career decision,’ which culminates in a career investigation project, and finally, in an individual education plan.”

The third prong of the contextualized career exploration is the Career Majors Fair. Through the Career Majors Fair, students meet with college program advisors and former students who have graduated and are working in different professions. Cutaia continues:

“We needed to give students some additional exposure to community and advisors in a more informal way than in a classroom, so we put together a Career Major Fair with real industry people, employers and former students We wanted to give students confidence in their goals and a sense of what is expected.. Informed career planning is a developmental skill. It begins by looking at who you are, first as a student, then as a professional, then as a member of the community... Who are you? Why are you here (in college)? When we get students to answer those questions, we can direct them to the path and connect them with the resources that will help them become that professional.”

While the learning community creates bonds among participants, career planning creates a bond between students and the college experience. As former FastStart co-director Ruth Brancard states in her doctoral dissertation:

“For most FastStart students, attending college is not the expected trajectory of their lives. They come to college with the idea that they want to improve their lives. . . , but in many ways the decision is a tentative one, fraught with doubt. We need to give students the opportunity to answer the burning question of whether college will help them reach their goals. . . . Career exploration helps students answer that question.”

FastStart strategies emphasize the integration of student-focused instruction, academic support services and student support services. The FastStart educational case manager is the first point of contact for students, helping them evaluate whether their schedules and goals fit the accelerated format. The case manager remains a key person for students throughout the semester and is the ongoing point of contact for faculty, who notify the case manager if students stop coming to class or need additional help with either personal or academic issues. The case manager works with two work-study students (called ambassadors) in outreach, helping students learn the processes for financial and enrollment procedure, as well as providing referrals to community agencies and support services. Additional academic support is available through CCD’s learning labs, which provides computerized learning support and individual tutoring.

**Impact on/outcomes for students.** Results from a 2007 study of FastStart students showed statistically significant differences between students in the intervention and a matched comparison in rates of completion in developmental math, overall course completion of developmental courses and first semester GPA. In addition, longitudinal tracking of accelerated math cohorts showed statistically significant differences between the intervention and comparison groups in completion of college-level math. Because of a growing awareness of the negative impact of multiple levels of remedial courses on certificate and degree completion, there is considerable interest in the program’s outcomes. A more comprehensive longitudinal study of the program by the Community College Research Center is scheduled for completion in Fall 2009.

**Challenges and supports.** FastStart was initially funded by the Lumina Foundation and was continued with funding provided by the Charles Stewart Mott Foundation to the Breaking Through initiative, a joint project of the National Council of Workforce Education and Jobs for the Future. CCD has institutionalized FastStart positions, including the project co-coordinator and case manager positions. Funding to expand the program is being provided through “Scaling Up,” a continuation of the Mott Foundation’s efforts in Breaking Through, with additional support from the Bill and Melinda Gates Foundation. With the institutionalization of core positions, the ongoing program challenges include those of logistics, such as scheduling and space, professional development for existing and new faculty, ongoing curriculum development, and continued reflection and evaluation of the program.

FastStart staff successfully adapted the model for GED completers in 2007 as a component of its Breaking Through project. The eight-week summer intensive, called College Connection, was the basis of a 2007 grant from the US Department of Education, Office of Vocational and Adult Education (OVAE), which is replicating the intensive at seven Colorado community colleges.

## DIGITAL BRIDGE ACADEMY

Diego Navarro,  
Cabrillo College

**Background.** The Digital Bridge Academy (DBA) began in response to a deep concern with gang activity among high-risk 18-25 year olds in Watsonville, California and consideration of the role the local community college could play in addressing this issue. Diego James Navarro, a former Hewlett Packard (HP) employee, was exploring how he could bring his business skills to assist the Santa Cruz community and Cabrillo College during these initial conversations about local youth involvement in gangs in 2000-2001. As a social science researcher at HP Laboratories, Navarro had been involved in empowering workers to make decisions and creating more efficient work environments. He believed that the same tools industry employed to empower their workers could be used to engage Watsonville's high-risk young adults in their own education and future. Navarro worked with Cabrillo faculty to create DBA—a strength-based program that would address both students' academic needs and the behavioral changes necessary for them to succeed in the knowledge economy.

**Program organization.** DBA is a one-semester program that serves as a bridge to college-level coursework. The program recruits from the pool of students enrolled in basic skills classes before census date, through extensive presentations at high schools and through referrals from probation officers, homeless shelters, rehabilitation centers and other community agencies. DBA requires students to enroll full-time. In this “bridge semester,” participants attend a foundation course from 9:00 a.m. to 5:30 p.m. for the first two weeks, followed by six courses delivered 9:00 a.m. to 3:00 p.m., Monday through Thursday for 13 weeks.

**Faculty roles and collaboration.** DBA addresses a dual challenge: designing a strength-based behavioral curriculum that will help students understand and overcome the unconscious patterns of behavior that stand between them and success in the knowledge works economy; and integrating this behavioral curriculum with basic skills instruction. The result is a contextualized curriculum that bolsters students' sense of belonging in the college community and improves their academic readiness for transfer-level coursework.

To develop and adapt the program, Navarro engaged experts from the natural and behavioral sciences and formed partnerships with student services providers, employers, other community colleges, foundations,

**Model Type:** learning community

**Description:** social justice curriculum delivered in a learning community format

**Target Population:** full-time students who test below transfer-level in math and English

**Type of Assessment:** CTEP Reading Assessment

**Length:** one semester

**Credit/Noncredit:** credit

**Requirements:** 7th-9th grade reading, math at any level, ability to attend full-time

**Program Status:** in progress since Fall 2002

advisory committees, community agencies and intermediaries. According to Navarro, the most important ongoing role of faculty is the delivery of the curriculum. He calls faculty “the countervailing force” in changing the counter-productive behaviors of the DBA youth. Faculty receive training in curriculum delivery through a structured professional development experience led by Navarro and other DBA master mentors. To date, DBA has trained more than 150 faculty from over 20 California community colleges.

**Key components of instruction.** Navarro sums up his pedagogy as a self-management approach that utilizes multiple modalities, contextualized curriculum of high value and relevance to students and problem-based experiential learning. The DBA program involves two primary components including 1) student self-growth and support and 2) academic acceleration. The student self-growth and support component is comprised of the Foundation course and the Team Self-Management course. The academic acceleration component consists of a project-based social justice course and just-in-time feeder courses that academically prepare students for successful completion of the project-based course.

According to Navarro, this curriculum has dual purposes with an academic goal of preparing students for transfer-level English and beginning algebra and a “cultural education” aim of readying students with the affective skills needed to succeed as knowledge workers. He describes the curriculum as having four organizing areas:

“The first is purpose and direction. It’s critical for students to figure out what their purpose and direction is because the students of today are going to have multiple jobs in their lifetime; getting to know yourself and knowing what drives you is the first thing. The second is self-discipline. Self-discipline has to do a lot with self-regulation; self-management falls into that area. The third organizing area is collaborative leadership skills. This has to do with team self-management, recording and facilitating meetings and project management. The fourth is academic skills, which is the traditional focus of community colleges.”

DBA finds that unprepared students are capable of making rapid academic progress once they have hope that they can succeed and a clear sense of who they are as students. Navarro explains that the Foundation course—an intensive, immersion-style experience early in the semester—rekindles students’ “fire for learning” by teaching them how to recognize their strengths and change their approach to learning. The program delivery incorporates a range of techniques drawn from corporate executive training and social service models as well as more traditional educational methods. Navarro highlights that over 90% of students who have entered have completed the course and he observes that these students emerge confident and motivated to learn. “The deep bonds of community created within the cohort and with the program create a 24/7 support environment for the students, ameliorating the centripetal force of distractions in their complex lives.”

In creating the Team Self-Management course, program designers adapted a social system model of addressing counter-productive social behavior. Navarro talks about three “buckets of skills” students develop through this course. The first bucket includes academic competencies focused on helping students reach transfer-level English and beginning algebra. The second group includes “knowledge worker skills,” a learning process intended to move students from hierarchical workers to self-managed professionals. The third “bucket” includes the behavioral system that teaches participants how to focus, show up on time,



recognize the unwritten rules of the middle class and develop the overall behaviors needed to succeed in the knowledge economy.

To achieve development of these skills, the Team Self-Management course engages students in scenario planning, a strategic planning process commonly used in business to envision possible future scenarios. Navarro explains:

“Scenario planning is not about predicting the future; it’s about capturing possible futures.... understanding possible futures and looking at the forces, events and behaviors that would drive these possible futures. Then, we help them (students) look at the tactics that will get them to the future they want ... we help them think about cause and effect regarding behavior, and to see possible futures, depending on their goals and behaviors.”

In DBA’s project-based social justice component, students work in teams to choose a research topic that has personal meaning and relevance to their community. Students administer 150 surveys with 35 to 45 questions, which are then tabulated and presented to a broad audience that includes the mayor, community members, family and friends, college administrators, and staff from public agencies. Examples of past topics include the effects of poverty on education in Watsonville, gang activity, domestic violence, child abuse and the impact of war on the community. The primary research and the final presentation of their findings helps students develop academic competencies and engage with each other and the community.

In addition to the instructional experience, student services are another critical program component. While support is provided by the student services division at Cabrillo, Navarro points to the student cohort as the key mechanism for providing support:

“We use the cohort to provide support, to tap into the under-utilized potential of the cohort itself. We have students review what’s blocking them from being successful and share with each other in class, which gives them practice for the final presentation. Having the students in one cohort full-time allows the creation of pedagogies of support to take advantage of the intensity of the experience.”

The program continues to adapt, integrating just-in-time curriculum to the core approach. In addition to a college-level English course that was added to the original DBA model, now called the “Accelerated Digital Bridge,” a just-in-time course in numeracy is scheduled to be added in Fall 2009. Cabrillo will also pilot a second semester science and math program in Fall 2009 which will include a contextualized science course supported by several just-in-time science and math feeder courses.

**Impact on/outcomes for students.** A National Science Foundation evaluation of DBA showed that community college students who participated in the experience demonstrated higher rates of course completion, accumulation of credits and completion than students who did not participate. A recent quantitative analysis by the Community College Research Center at Columbia University’s Teaching College of the DBA program had significant positive effects for participation in both the accelerated and non-accelerated versions of the DBA, although the effects for the accelerated model were generally greater than for the non-accelerated one. To the extent that colleges are seeking strategies for increasing the rate at which academically unprepared

students complete “gatekeeper” courses such as college-level English and earn college credits, the accelerated version of the DBA program seems to hold particular promise. The CCRC study evaluated nine semesters of DBA cohorts and was limited to outcomes over four semesters including the initial DBA intervention.

**Challenges and supports.** Navarro observes several challenges, institutional and cultural, in DBA implementation. From an institutional perspective, he views the linear, industrial model of education (divisions, silos of resources, scheduling blocks, etc.) as lacking the flexibility necessary to meet the needs of under-prepared students. From a cultural perspective, Navarro articulates the challenge of bridging between the cultural and behavioral patterns of non-traditional students and the real-world expectations of habits and behaviors that will lead students to success. “Students come in with behaviors and responses that were very successful for being on the street, that were adapted to survival in the violent world of poverty, but those behaviors are counter-productive in the knowledge economy.”

An additional challenge includes the project’s sustainability. Several different funding streams, including the National Science Foundation, the Irvine Foundation, Lucille Packard Foundation and the William and Flora Hewlett Foundation have contributed to the development and adaptation of DBA. While the process of replication and the costs associated with DBA have yet to be tested on a larger scale, Navarro is confident that the essential design and preliminary outcomes place replication within reach.

## DARAJA PROJECT

Tom deWit,  
Chabot College

**Background.** In 1988, a team of administrators and faculty at Chabot College initiated the Daraja program to increase the retention and transfer rate of under-represented African-American students. Daraja, which means steps, set of steps or stepping stone in Swahili, focuses on African-American literature and culture (Daraja Program, 2009). Since that time, like-minded community college programs across California have formed the Umoja Community—a network of programs committed to enhancing the cultural and educational experiences of African American and other students (deWit and Colandres, 2007). Daraja serves as a key inspiration for and has taken leadership in developing core curricular principles and resources with Umoja colleges.

**Program organization.** Daraja offers students a year-long learning community experience that links English and college success coursework with student services and supports. First semester coursework includes English 102, an intensive reading and composition class one level below transfer. Coursework is organized as follows.

**Model Type:** learning community

**Description:** intensive basic skills composition and reading course followed by English 1A—each paired with a college success course; focus on African-American curriculum

**Target population:** first-time freshmen, 18-20 year-old at-risk students

**Requirements:** college placement test, application, in-take interview and writing sample

**Type of Assessment:** Descriptive Test of Language Skills (DTLS)

**Length:** two semesters

**Credit/Noncredit:** credit

**Program status:** in progress since 1988

Semester 1	Semester 2
English 102 – Accelerated Reading/Reasoning/Writing	Psychology/Counseling 20 – The College Experience
English 1A – Critical Reading & Composition	Psychology/Counseling 7 – Contemporary Issues in Psychology/Counseling

While the curriculum focuses on African American culture, literature and experience, the program welcomes all students—primarily targeting 18-20 year-old, first-time freshman who may be at-risk of dropping out of college. In addition to Chabot’s assessment and placement process, participants submit an application, take part in an in-take interview and complete a short writing sample. Faculty utilize information gathered through this application process to advise students and tailor curriculum. Approximately 40 students annually enroll in the program.

**Faculty roles and collaboration.** Tom deWit is both an English faculty with Chabot's Daraja program and co-chair of the state-wide Umoja Community. He has taught with Daraja since its second year and before that, with the Puente Project—a related model, also originated at Chabot, focused on increasing the academic achievement of Latino students. deWit describes the intense collaboration that still occurs among program instructors, counselors and staff. In addition to bi-weekly meetings, faculty attend summer and winter retreats, collaboratively assess student work and develop shared mid-term and final progress reports. While he observes they are “not fine-tuned synchronized by any means,” he notes faculty co-develop curriculum, read one another's books and share assignments to reinforce them in one another's courses. Daraja staff also benefit from instructional materials, program design tools and professional development offered through Umoja. One significant focus of training includes learning “everybody's business” such that anyone delivering the Daraja model can address students' needs on the spot—even if outside one's expertise.

**Key components of instruction.** deWit explains that while his Daraja's English 102 course outline is the same for all of Chabot's *Accelerated Reading/Reasoning/Writing classes*, emphasis and approach to coursework is flavored by a focus on African-American literature and culture. Most importantly, deWit describes Daraja's context as one based unequivocally on the communities and experiences of participating students. “The students are our context. Our teaching, content and student services are provided directly inside of where they're coming from and what they're bringing to the classrooms. We're intentional about knowing students' situations and their stress points in any given year and adapting curriculum, thematic, discussions, assignments and even learning goals to the community in the room.” Initial classroom activities are designed for faculty to quickly understand students' experiences, families and communities and to adjust curriculum accordingly from there.

Daraja's *Accelerated—Reading/Reasoning/Writing* course outcomes include those focused on developing critical thinking and doing sustained reasoning and representative writing; others specifically address developing students' positive identities as learners and increasing their capacity for integrating in writing the ideas of class texts with their own experiences. “We're very much trying to make linkages across a whole span of history, voices and themes so our students' community, language and experience are accepted and dignified in a college setting.”

To illustrate, deWit discusses a language assignment designed to address the tension between “standard” and “Black” English. He explains that students often bring many associations about language to the classroom and stresses about the difference in how they and their families and communities communicate versus that which is called for in school. In addition to reading articles and texts on the issue, such as James Baldwin's “If Black English Isn't A Language, Tell What Is,” students develop what they call a “Black-tionary”—a dictionary of their own language. Students work in teams choosing and defining 20 to 40 terms, complete with examples of words in context. Students then present the terms in both writing and in presentations to show real world uses of the words and to ultimately demonstrate the power and beauty of language.

Another series of assignments focuses on *Manchild in the Promised Land*—an autobiography written by Claude Brown about his coming of age in mid-century Harlem. Students read the book and complete related assignments over the course of the semester. Discussions and writings include connecting the ideas about the text to their own lives as well as interpreting and analyzing the work of their peers. For example, one of students' first experiences with textual analysis includes reviewing written responses to a key passage from

Manchild produced by former Daraja participants. Students must underline the analytical or interpretive sentences in those responses, write about how the responses are connected, select an analytical statement from one of the responses and rewrite it as their own “clean punchy thesis” as well as write a thesis of their own that arises from the assignment.

Referencing the *Manchild in the Promised Land* assignments, deWit remarks on a current concern among English faculty about rising students’ inability to engage with literature analytically and critically—only having been asked to study it through their personal experience. He clarifies that assignments are “not a bunch of personal writing...it’s a way for students to try abstract language and reasoning on to their own lives and then back through the text...it’s a high level of textual analysis and thesis-driven, evidence-driven argumentation.” Ultimately, deWit emphasizes a heavy focus on developing Daraja students’ transferable skills and knowledge to the point where instruction in English 102 includes conscious, metacognitive training around abstracting ideas, applying them to their own situation and transferring them to another setting.

“Ideas and abstractions, which are the standard fare of college, are what take center stage. So at the same time they’re applying an idea to their own lives, it’s the ability to abstract and transfer that is absolutely the learning goal. We need them to be comfortable learning abstractions in other disciplines like Psychology or Philosophy where they don’t see an immediate relevance to their lives; [we prepare them] to deal with abstract ideas and do some applying back to themselves.”

**Impact on/outcomes for students.** deWit alludes to several anecdotal stories of success and impact on students’ motivation and notes the extreme rarity of a student voluntarily leaving the Daraja program. He prefers to reference longitudinal data showing the impact of Daraja participation on students’ performance, persistence and success in following transfer-level coursework. According to data compiled by the Chabot Office of Institutional Research, between 1994-2004, Daraja students (age 21 or under) successfully completed the Basic Skills to Freshman Composition sequence at a rate 19% higher than African American students (age 21 or under) not in Daraja. Furthermore, between 1995-2005, Daraja students (age 21 or under) successfully completed the second semester critical thinking course which follows freshman composition at a rate 11% higher than African American students (age 21 or under) not in Daraja. deWit notes that this critical thinking course is not part of the Daraja learning community and the higher success rate underscores the quality of academic preparation students receive in the Daraja Project.

**Challenges and supports.** deWit acknowledges the need to treat development of one’s contextual practice as an iterative process and a “work in progress.” He cautions against developing an instructional design that is too rigid; “I’ve seen folks work super hard to put things in place and if a few things fall apart, they feel like the whole thing is falling apart.” He comments on the evolution of the Daraja program over time, in particular through student feedback and evaluation. As is done in Daraja, deWit encourages instructors trying on CTL to incorporate an intentionally reflective process with students in small, focused ways whether it be through classroom assessment techniques or engaging an outside evaluator or hosting a focus group with students. He also notes the benefits of making such a practice public. While deWit says faculty can try a contextualized unit or two without significant administrator approval, he still strongly encourages instructors to share their work with colleagues and students to get their feedback on what does and does not work. For a full-scale

program like Daraja, administrative support has been critical and believes this support is vital for other like programs.

Driving home Daraja's intense focus on its participants' personal and academic goals and needs, deWit cites students' ambitions, experience and sense of self as a key element to designing any context for learners.

“The students should define and inform the context, not just the field or the subject matter. There are ways of inviting students in and dignifying their fears, ambitions and stresses so these are part of the context in which students are learning, without becoming a therapist or missing time needed to cover the content. Students have to feel grounded, comfortable and confident in this setting, or they very well might leave...and say I can't do college and it's not for you either. Even if students don't stay in [Daraja] but share with their peers that college is great and it's definitely for you, then we've been successful.”

## BRIDGE TO BIOTECH LAB ASSISTANT CERTIFICATE PROGRAM

Laurence Clement, James Lewis, Rob Reed, Rob Yung, Carin Zimmerman,  
City College of San Francisco (CCSF)

**Background.** CCSF initially developed the Bridge to Biotechnology (B2B) program to create better access to biotechnology training opportunities for people who needed to strengthen their basic language and mathematics skills. Faculty observed that in the early stages of biotechnology degree and certificate implementation, several students dropped or failed introductory biotechnology and chemistry coursework due to a lack of foundational skills. As Program Coordinator James Lewis states, “Students want to get a job. No one is convinced that basic skills are what they need.” B2B sought to develop a model that would help students build these skills and understand the value of these competencies to their goal of entering biotechnology employment. Over time, the College also recognized the need to assure employers of students’ readiness when they were hiring program participants for internships and employment. Participation in B2B allows for the College to ensure a foundation of skill development before students enter the workplace.

**Program organization.** B2B engages students in a two-semester model that includes 14 units of coursework and a 180-hour internship. See coursework outlined on next page. The program’s first semester aims to help students learn essential laboratory skills while strengthening the basic math and language skills necessary for success in the workplace or more advanced biotechnology coursework. Students then practice this learning during the second semester through an internship placement in a biotechnology company. All coursework is credit-bearing and counts toward CCSF’s Biotechnology certificate or A.S. degree. Student can take *Language Skills for Technicians* or *Practical Mathematics* for noncredit. Students in the program generally assess at the 7th – 8th grade level in math and language on the TABE test and the College’s placement test. Students vary in age, ethnicity, and level of education but the vast majority share a specific interest in gaining employment in the biotechnology industry.

**Model Type:** learning community

**Description:** basic skills math and English integrated with preparation for employment as a Biotech Lab Assistant and/or advanced biotech coursework

**Target population:** students placing at a 7-8th grade math and/or English level interested in pursuing employment in biotechnology

**Requirements:** participation in an orientation, assessment (strongly encouraged)

**Type of Assessment:** TABE test, college placement exam

**Length:** two semesters plus an optional 180-hour internship

**Credit/Noncredit:** credit

**Program status:** in progress since 2006

Semester 1	Semester 2
BTEC 10: Research Skills for Career Opportunities in the Biosciences (2 units)	BTEC 14B: Biotechnology Internship Experience (2)
ET 107: Language Skills for Technicians (3)	<i>Students also generally take additional 4 unit science courses (e.g. Introduction to the Science of Living Organisms or Advanced Medical Chemistry &amp; Biotechnology)</i>
ET 108A: Practical Mathematics (3)	
BTEC 14A: Biotechnology Laboratory Techniques (2)	

**Faculty roles and collaboration.** B2B employs a team approach with six faculty actively engaged in program development and implementation, including a part-time program coordinator. This team has worked intensively over time to develop and refine curriculum through weekly meetings, curriculum exchange and syllabi alignment. *Language Skills for Technicians* instructor Rob Yung took the program's introductory biotechnology courses to understand the writing and speaking requirements found in biotech courses and the workplace. Similarly, *Practical Mathematics* instructor Rob Reed performed a needs assessment with the biotech and internship preparation instructors to identify the basic math skills required in these classes. B2B instructors all commented on the interdependence of their work and their inability to deliver their own course curriculum without the input of their program colleagues.

**Key components of instruction.** B2B is designed specifically to prepare individuals for both entry level employment in a biotech lab and the next level of science coursework required for Biotechnology degree or certificate completion. All basic skills development is linked back to the field of biotechnology. Program faculty emphasize two key program underpinnings designed to advance students' basic skills acquisition: an interdisciplinary approach that intentionally reinforces students' basic skills development across coursework and embedding all skill development in a meaningful context connected to students' educational and employment goals.

Program instructors time content delivery to emphasize the relationship of basic math and language skills to biotech coursework or internship acquisition. The *Practical Math* and *Language Skills* instructors Rob Reed and Rob Yung talk about employing a "just in time" mode of instruction. For example, *Biotech Lab Techniques* instructor Laurence Clement will notify Reed that students will begin preparing lab solutions in the coming weeks. Reed will then introduce students to ratios and proportions, concepts required for solution preparation, as that unit approaches. He starts with teaching math skills in the abstract and then moves quickly to biotechnology applications. He uses examples from the lab and problems that students feed back to him from internships. Students will practice the formulas necessary for mixing solutions, working with calculating a range of volumes and concentrations until they show mastery of the competencies and begin actual solution preparation in the lab.

Similarly, Rob Yung works on students' written and oral communications skills necessary for success in the biotech and internship preparation curriculum. For example, *Research Skills for Career Opportunities in the Biosciences* instructor Zimmerman found that students struggle to write conclusions in their laboratory notebook that communicate what they have proven in their lab experiments. Yung then worked with



Zimmerman to develop a related unit for students. He now practices writing conclusions with students, discusses the criteria for a strong conclusion through use of examples and has students make an analysis of their own writing based on these criteria.

Lewis notes the impact of linking the basic skills instruction with biotechnology preparation. “No one class is working alone. The echoing between courses is persuasive to students because the reason [for skill development] is almost self evident. They’re using the math to prepare a solution in the lab or they’re preparing a resume for a job opportunity or they’re developing a lab skill that they’ll have to talk about in an interview. The reinforcement [across classes] is convincing to students.”

When talking about how the practice of contextualizing basic skills instruction differs from his traditional delivery of the content, Reed mentions a deeper level of investigation about the math students would really need to know for success in the workplace or continued biotech training. He notes the challenge of finding a relevant text and the time he has developing other instructional materials. He also talks about efforts to reinforce workplace readiness skills in the *Practical Math* course, emphasizing students’ ability to communicate and work in teams. He engages students in extensive group work and peer mentoring. He notes the benefits to both student and instructor: “Students need to have interaction with each other for the math to really sink in...and I don’t have to stand up and say what to do a million times.” He also talks about how much more his students seem to enjoy math. “If it’s purely academic, students lose interest. Students get turned on and like math after being in a contextual environment. They can see how it relates.”

**Impact on/outcomes for students.** When asked how his approach to contextualizing a basic skill such as writing a conclusion or teaching presentations differs from his traditional classroom practice, Yung states that it does not vary that much. However, he notes the power of context that is meaningful, real and interesting to students. “I use the same strategies in my ESL classes...but in the bridge program, you happen to have a real context, one that is interesting to students, motivating and inspirational because they want a job. Here the context, versus the content, is motivational. In many cases, it’s rare for students to see any immediate, pragmatic value of the math or language [in their learning]. Here, we’re making the relevance really apparent.”

Yung notes the challenges of creating a context that is meaningful to all students in a traditional classroom. He believes that because basic skills instruction happens in a context they care about, B2B students try harder. He talks about working with students on summarizing—a skill both his B2B and his traditional ESL students struggle to master. He observed that more B2B students take him up on the offer to revise summary assignments and really push themselves to improve their competence with the skill.

Reed echoes the impact of an authentic context. He says, “Students get more invested in taking on the discomfort of learning...The context helps create persistence because they’re getting something out of the process. Adult learners have survived one way or another with limited education or basic skills and connecting the learning with something pragmatic helps them tap into their ability to learn the content. There’s a definite increase in their self esteem.”

B2B faculty see not only an increase in motivation and self esteem but increased success for B2B students in subsequent science courses. B2B completers experience a 90% successful completion rate versus a much

lower rate of 45% for those who have not participated. Eighty-five percent of B2B students continue into the College's Biotechnology certificate/degree program. They self-report an increased interest in pursuing additional education based on pre- and post-program surveys and proper preparedness for other courses.

**Challenges and supports.** When talking about challenges to their particular contextualized basic skills practice, B2B faculty talk about the significance of instructor willingness to learn outside their own discipline. Reed and Yung say they had to learn a great deal of science to make their coursework relevant. They note the importance of attending classes in the topic area other than your own to support authentic contextualization.

They also remark on struggling through a few semesters before the curriculum gelled and they felt like they could effectively teach it to their students. As they developed their curriculum, B2B faculty engaged in peer review with colleagues from both CCSF and other institutions. The College has provided the infrastructure for this kind of collaboration, with the ESL and Transitional Studies departments allocating instructors Yung and Reed to work on the program's development with the Engineering Department—the organizational home to all of the College's biotechnology certificates and degrees. They held regular weekly meetings to discuss curriculum alignment at the onset and now maintain regular check-ins to address both general coordination and areas for refinement.

B2B also benefits from a part-time faculty coordinator who supports curriculum development, student outreach and recruitment and relationship development with external partners and funders. An initial grant from the National Science Foundation followed by additional funding from the Bay Area Workforce Funders Collaborative and San Francisco Mayor's Office of Economic and Workforce Development have all supported ongoing curriculum and professional development, program coordination and replication. The College continues to work toward full institutionalization of the program.

Ultimately, B2B faculty say employing a model like theirs requires motivated instructors who are willing to take a "leap of faith." As Reed notes, "the leap of faith is worthwhile. Experientially, I can see how something [I teach] being reinforced by another instructor is helpful." Yung seconds this sentiment, stating "Together we have created something a lot better than working on our own."

## SPANISH TO ENGLISH ASSOCIATE TEACHER CERTIFICATE PROGRAM

Sandra Corona, Angelina Stuart,  
Southwestern College

**Background/Motivation.** Southwestern College sits near the boarder of Mexico just south of San Diego and serves approximately 21,000 students annually. In the late 1990s, the college’s Child Development Department recognized a need for a new approach to serving the many Spanish-speaking students seeking child development training required for work in preschools and daycares throughout their area. Child Development tapped their ESL counterparts to develop a strategy that would assist students in gaining the English language and literacy skills necessary for success in child development courses and beyond.

**Program structure/organization.** After several attempts, the departments settled on a learning community model now called the Spanish to English Associate Teacher Certificate. The program targets beginning or intermediate English language speakers and prepares participants to acquire an Associate Teacher Permit through the San Diego County Office of Education. Assessment is strongly encouraged but can not be required legally. Students enroll in a four-semester series of linked Child Development and ESL course work totaling 17 units, 12 of which from Child Development are fully transferable and transcribed. All courses are mandatory for certificate completion. Program participants range in age, work or seek employment in child care or preschool settings and are almost entirely women who have had little or no experience with higher education.

The program sequence is as follows:

Semester	Child Development	ESL
1	Principals of Child Development (CD) (3 units)	ESL For CD: Principals of CD (2)
2	Observation & Guidance for CD (3)	ESL for CD: Observation & Guidance (1)
3	Curriculum Planning for CD (3)	ESL for CD: Curriculum Planning (1)
4	Child, Family & Community (3)	ESL for CD: Child, Family & Community (1)

**Faculty roles and collaboration.** Sandra Corona (Child Development) and Angelina “Angie” Stuart (ESL) helped initiate the program and continue teaching the certificate. The first time offering the series, Stuart

**Model Type:** learning community

**Description:** multi-semester program linking child development and ESL coursework that transitions students from full Spanish to English instruction

**Target population:** Spanish-speaking students seeking entry and/or advancement in an early childhood care setting

**Requirements:** ESL assessment (recommended), completion of program application, development of a Student Education Plan

**Type of Assessment:** college placement test

**Length:** four semesters

**Credit/Noncredit:** credit

**Program status:** in progress since 2003

took Corona's Child Development courses with the cohort because she did not have a child development background. Stuart recalls, "After Sandra's class, I would stand up and improvise the following ESL session; and then I would go home and write down the lesson and make the necessary support materials." She has now developed handbooks for all ESL courses involved.

While Child Development serves as the departmental "home" for the program, faculty from both departments note that the program is a "tandem job" and that they work together on all aspects of program implementation. At program conception, the interdepartmental team of Child Development and ESL faculty met intensively to develop a linked curriculum. The program has evolved to the point where the five to seven faculty involved can meet less frequently. Instructors continue to talk one to two times per week either in person or via email to share information on student progress and ensure curriculum alignment.

**Key components of instruction.** All ESL instruction uses the Child Development context to teach students introductory to intermediate English language skills. Through trial and error, Corona and Stuart settled on an approach to contextualizing the ESL curriculum that they find maximizes English language acquisition for their students. As they describe the process, Corona introduces a concept in the Child Development course and works with the students on that concept for a few class sessions. Stuart follows this introduction with the functions and structures of English that support their ability to discuss the topic in correct English as well as facilitate the acquisition and the application of that Child Development concept.

For example, Corona will introduce students to Sand and Water Play in the *Curriculum Planning* course. They do a series of activities with Corona to learn how sand and water play promotes development and learning, understand the equipment and material needed for activity implementation and the role of the teacher in guiding the students through this experience. Stuart then works with program participants to learn how, as a child care provider, they would describe this kind of play to students, how students might respond, how they would write a report about a student's sand and water play and how they would talk to a parent about the activity.

Stuart makes a point that, as an ESL instructor, she is not teaching Child Development, per se; her role, as she sees it, is to help her students focus on the strategies, vocabulary and acquisition of English. By the time they reach the related lesson in the ESL course, students have read about, discussed, practiced and applied the Child Development concept in the Child Development class. She explains that they then come to the ESL class to "put it into correct English." According to Stuart, students are the source of the child development knowledge; the ESL course serves to increase their English proficiency and literacy.

Likewise, Corona says Child Development coursework reinforces the English language and literacy development. While first semester coursework is delivered almost entirely in Spanish, Corona practices vocabulary in English with students from the start. With each semester, activities are gradually introduced and assignments increasingly completed in English. By the fourth semester, Child Development is conducted entirely in English. Both instructors remark that constant communication between Child Development and ESL faculty allows for customization of classroom lessons and activities to address specific grammar, pronunciation, comprehension or composition issues presented by each cohort.

Corona and Stuart describe their instruction as “student-centered” and “interactive” with students “engaging in lot of team work” throughout their courses. They say students are “empowered” to learn by themselves in groups, to do presentations, conduct research, share their learning with their peers and develop a portfolio of work for each course. To support their home-grown integrated curriculum, they utilize On Course strategies and resources designed to promote students’ active engagement in coursework as well as to help foster characteristics that ensure that the students are successful in both academic and personal goals.

**Impact on/outcomes for students.** When asked how they know the context of Child Development works to facilitate students learning, they refer to an increase in students’ reading, writing and oral comprehension, to students’ preparedness for additional college-level coursework and to their ease in securing employment and/or in continuing their education. Stuart notes that the context of child development is “deeply personal and motivating to them as women” and that the “theories and practices become part of them.” Corona states that participants need to learn English for their jobs and that the program is “not the same as when they take regular ESL classes. When they see what they are learning and can apply what they are learning [in work] the very next day...it’s very functional and workable for them. That becomes the key for them.”

Southwestern does not have an institutional research function, which makes tracking student outcomes quite challenging. According to data Corona collects, since 2005 when the first cohort graduated, 215 students have completed the certificate and four cohorts totaling 100 students are currently in progress. Instructors state they maintain close ties to their students and the community to gather anecdotal evidence of student outcomes; however, the program has no formal data collection system.

**Challenges and supports.** Corona and Stuart are clearly energized by their practice and experiencing what they describe as a transformation in their students’ knowledge, skills and abilities, self-esteem and motivation. They have never received additional funding or release time from the college for this work. When asked about conditions that support their practice, they note the importance of deep collaboration between Child Development and ESL faculty, leadership from their deans and assistance from the Instruction Office around scheduling their coursework together. They acknowledge the importance of the Curriculum Committee allowing Child Development to deliver coursework in Spanish and early concerns about “watering down the curriculum.” They also talk at length about the close partnerships the program maintains with several functions of the college that provide additional student support services.

Corona and Stuart are working to document the program to ensure long-term sustainability. They are training other Child Development and ESL faculty who are now also implementing the program. Stuart is currently creating answer keys for the assignments in the handbooks she’s written for all four ESL courses. They believe the model is replicable to other colleges and both are enthusiastic about other faculty trying what they have done. Corona says they are “not experts,” that they “learn something every day about the program” and that “they don’t see it as an end [but as a] beautiful and spiritually fulfilling journey.”

## I-BEST (INTEGRATED BASIC SKILLS AND SKILLS TRAINING) CERTIFIED NURSE ASSISTANT PROGRAM

**Jon Kerr,**  
Lower Columbia College (formerly Pierce College)

**Background.** I-BEST evolved from a pilot career pathway program integrating ESL instruction with workforce training to a statewide effort of 70 programs in 32 community colleges, serving approximately 1,000 students each year. I-BEST challenges the traditional notion that students must complete all levels of developmental education before they can begin college-level workforce training. Israel Mendoza, Director of Adult Education with the Washington State Board of Community and Technical Colleges (WSBCTC), conceived and championed the program in response to the state's critical workforce needs and the growing number of immigrants and non-native speakers in the state, whose numbers doubled in the decade between 1990 and 2000.

Washington launched I-BEST with 10 pilots in five colleges and expanded the program after an initial analysis of outcomes found that I-BEST participants were “substantially more likely than similar basic skills students to advance to college-level work and to reach the “tipping point” of at least one year of credits and a credential (Bloomer, 2005; WSBCTC, 2005). The importance of the “tipping point” emerged from a study of Washington's low-skill adult community college students (Prince and Jenkins, 2005), which found that completing a year's worth of college credits and earning a certificate created a “tipping point” which resulted in an average wage gain of \$7,000 per year for ESL learners, \$8,500 per year for Adult Basic Education (ABE) students and a gain of \$2,700 and \$1,700 per year respectively for students who entered college with only a GED or high school diploma.

Based on the initial success of I-BEST pilots and an analysis of its potential economic impact, WSBCTC approved a funding formula that represented an increase of .75 FTE over traditional funding. Current I-BEST offerings include programs that prepare students for employment in Allied Health, early childhood education, business technology, corrections, automotive, para-educator and other entry-level positions that lead to careers. Most I-BEST programs are one semester, with all credits applying to two- and four-year programs (with the exception of Allied Health).

In addition to the general description of I-BEST, this example includes a profile of the Certified Nursing Assistant (CNA) program at Pierce College (WA), which provides an operational view of how the program functions at the college level.

**Model Type:** infused occupational

**Description:** pairs Adult Basic Education/ESL with professional-technical training in a CNA certificate program

**Target Populations:** mid-range ESL or ABE learners

**Requirements:** level four ABE or ESL, as defined by reading assessments

**Type of Assessment:** CASAS

**Length:** two quarters

**Credit/noncredit:** credit for college-level courses

**Program status:** in progress since 2005

**Program organization.** According to Jon Kerr, former I-BEST Director at Pierce College, “I-BEST is not a special program; I-BEST is a delivery method”, based on a team teaching model that pairs a content instructor and a basic skills instructor, along with additional instructional and student support. ESL faculty and technical-professional instructors work together in the classroom. The content instructor is responsible for delivering the content and the basic skills instructor is responsible for providing the basic skills support needed for students to succeed in content coursework. In some colleges, both instructors are present for the instructional content, and in others, there is a 50% overlap. The basic skills instructor is contracted for an additional credit, called an “educational interview,” which provides time for instructors to work with students and connect them to additional academic and non-academic resources. Additionally, most colleges have an I-BEST coordinator and assistant; however, the primary responsibility for the program rests with the Basic Skills division.

The Pierce CNA program was targeted, in part, to meet the goals of ESL learners who had worked as health care professionals in their native countries and were seeking ways to re-enter the field; however the program is not limited to ESL learners. All instruction is delivered in English. The eight-credit certificate program spans two quarters. The first quarter, Foundations of Allied Health, is structured around the required certifications in CPR, HIPPA, First Aid, AIDS training and hand-washing. The second semester covers the related didactic and clinical requirements. The clinical component is a five-credit class that runs from 7:30 A.M. till 3:30 P.M. on Wednesdays. On Thursdays, students attend a support class from 1:00 till 4:00 P.M. and a didactic class from 5:00 till 9:00 P.M. The total time is 50 contact hours, 30 for the didactic content, 40 for the clinical and approximately 50 hours for academic and non-academic support.

**Faculty roles and collaboration.** Since Washington State delivers both Adult Basic Education and ESL through the community and technical colleges, I-BEST has been able to involve adult education and college-level vocational instructors in all levels of collaboration, curriculum development and leveraged funding. Instructors regularly attend workshops and are involved in curriculum development for new offerings. Faculty collaborate on all aspects of the program, which includes advising students on further education and training and program adaptations. I-BEST faculty development begins with a clearly stated hypothesis on team teaching: “In order for instructional teams to function effectively, as equal partners working in the same classroom, they must be trained in, investigate and analyze various types of team teaching, views of experienced team teachers, and issues effecting team teaching...”

**Key components of instruction.** I-BEST programs have two strands: traditional content coursework and support class where students are given help in mastering the content class. While content classes may include both I-BEST and traditional students, I-BEST participants engage in an additional 30 hours of instruction to review and prepare for the next class. Support classes are led by the basic skills instructor, with participation of the content instructor based on need. In Pierce’s CNA program, this arrangement translates into 30 hours of content in allied health topics, with an additional 30 hours of support in basic skills/ESL.

Since I-BEST relies on a combination of existing certificate programs and additional academic support, the principal instructional component is the integrated faculty approach to team teaching, which pairs basic skills and content faculty in planning, delivery of instruction and continuous improvement. According to Kerr, professional development is critical to program success. “Training is ongoing... I bring in teams once a

quarter and review the different kinds of models and require them to...demonstrate a fifteen minute lesson, and so it's a kind of 'learn by what we are doing'...The essential piece is the team."

**Impact on/outcomes for students.** In assessing the impact of contextualization on outcomes, Kerr remarked, "When students are learning something in the context of something they are interested in, they can immediately apply it and understand it. For ESL students, their reading scores go way up. Instead of reading about things that aren't part of their lives, they are reading about things they need to know and they can actually apply them, so it's that whole thing about experiential learning."

I-BEST also benefits from a substantive evaluation component that provides quantitative data on the program's success. In the first four cohorts of Pierce's CNA program, 54 students enrolled, with a 70% program completion rate; students showed a 93% course completion rate with a GPA of 3.3, which was higher than for non-participants. Learning gains, using federal and state measures for adult learning, were also substantial. Of the 38 students who post-tested after 80 hours of instruction, there were 19 federal reading gains, 74 state reading gains; 6 federal math reading gains, 23 state math reading gains; 9 federal reading gains and 40 state listening gains.

**Challenges and supports.** In addressing a core assumption of I-BEST, that students do not necessarily have to complete all levels of developmental work before they can begin college, Kerr comments, "I don't think the concern that these students aren't at a high enough academic level is really a concern, because they do just fine!" Instead, he identifies the logistical challenges of working across disciplines and the ongoing need for professional development to reinforce effective practice and continuous improvement.

I-BEST is noted for its pioneering state funding formula that provides fiscal support for team teaching, professional development, student support and coordination. While the program's strong outcomes make the case for its continuation, Kerr does not expect that I-BEST will be immune to cutbacks in funding in the current fiscal crisis. This will likely result in closer scrutiny of plans for expansion, but according to Kerr, the strong and consistent program outcomes from multiple evaluations position will be an important factor in its continuation.





## CONSIDERATIONS FOR IMPLEMENTING CTL

TODAY'S LEARNERS MUST BE ENGAGED DIFFERENTLY in order to prepare them for life and work in the 21st century—as argued in the case statement and made tangible in the narratives above. Students' unique challenges and needs present an imperative for transformation of community college practice, particularly as related to basic skills instruction. The experiences of the faculty and program directors featured in this primer as well as a growing body of related research indicate that CTL is an alternative strategy that holds promise for moving students towards self-sufficiency and life-long advancement.

As evidenced by the highlighted practices, faculty can take many approaches to CTL. Implementation can vary significantly depending on an instructor's interests and subject matter, students' needs and motivations and/or a college's educational and workforce development priorities. Development of one's CTL practice can take shape in small ways through a series of activities in a stand-alone classroom or through more comprehensive approaches in learning communities and cohort models. The modest number of practices presented in this primer coupled with a growing number of models developing in California community colleges and across the nation present a myriad of possibilities for how faculty can move forward with CTL in their own classrooms.

Whatever the implementation approach, the clear commonality among the examples featured is the choice of practitioners to use a context relevant to students' lives, communities and/or career goals in basic skills instruction. As highlighted in the previous section, faculty identified several other distinguishing features of their practice that connect to this decision. Engagement with CTL encouraged faculty collaboration on a range of activities and involvement in related professional development. The choice to contextualize led to the creation original curriculum and instructional materials and the utilization of interactive teaching to involve students with that material. In many cases, employment of CTL called for leveraging a range of institutional supports. Moreover, these practitioners noted that use of CTL meant a commitment to continuous improvement and a focus on how the strategy could impact students and improve their outcomes.

In addition to these common elements for CTL implementation, four key considerations emerge out of the practices featured. These considerations have implications for faculty, colleges, funders and policy makers alike interested in supporting CTL as an instructional innovation: resources, research, replicability/scalability and sustainability.

### RESOURCES

Many of the common elements that characterize the featured CTL practices have unique resource implications. To design a new practice, faculty often need release time for collaboration and curriculum and instructional material development. To implement a new strategy, instructors might require funds for small items like instructional materials or more significant expenses like team teaching. Support from and partnership with student services divisions of the college may also be vital to the success of the model. To sustain a CTL innovation, faculty are likely to need access to support in the form of program coordination, ongoing

professional development or facilitated data collection for and discussions about continuous improvement of their practice.

These resource implications vary according to the scope and scale of the CTL practice. A small infusion of funds can help fuel individual or small teams of faculty interested in trying CTL in their own classrooms. More holistic interdisciplinary or cross-functional models likely call for significant and long-term investments. All of the featured practices benefited from some form of direct or in-kind support from their institution and/or an external funder.

In California community colleges, faculty and institutions can leverage Basic Skills Initiative funding, Carl Perkins Career and Technical Education Act grants and an increasing number of foundation-funded initiatives offer other opportunities for faculty experimentation with contextualization of basic skills instruction. Based on the current research and interest in CTL, there are likely to be additional opportunities for fiscal support, such as short-term mini-grant opportunities for individual faculty as well as investments in larger-scale, sustained funding efforts focused on comprehensive program development.

## **RESEARCH**

As seen in the review of the literature and as demonstrated in the faculty stories, there is an abundance of anecdotal evidence and a growing body of outcome data that point to the positive impact of CTL on student behavior, performance, persistence and achievement in subsequent coursework and employment. However, experimental designs utilizing random assignment are few. An ongoing multi-college study of contextualized learning in allied health programs is currently underway through the Community College Research Center (Perin, in progress). Recent experimental studies also include the National Research Center for Career and Technical Education (NRCCTE), which looked at high school math outcomes in five states (Stone et al, 2006), and the National Center for Postsecondary Research (NCPR) study of learning community outcomes in Kingsborough Community College (Visher et al., 2008). The outcomes of both studies are positive, although the NCPR study has a broader unit of analysis (the learning community) than the NRCCTE study, which looks at the pedagogy that facilitates the transferability of math competencies.

Because of the limited institutional research capacity of most community colleges, evaluation is often an afterthought rather than an integral part of program design. This makes it difficult to compare program effectiveness across colleges as well as to make consistent data-based statements on the impact of CTL innovations. Going forward, it is recommended that new programs pay more attention to the role of initial assessment and ongoing evaluation as an integral component of CTL design.

To accomplish this, faculty should partner with institutional researchers before the program has been implemented to identify which questions they are addressing in their inquiries and the type of data that could answer these questions. Campus-based student learning outcomes coordinators or initiatives can also offer another source of support for developing related outcomes, choosing appropriate assessments and engaging in an analysis focused on continuous course or program improvement. As mentioned previously, practices like the Bridge-to-Biotech, Los Medanos Mathematics Department, the Career Advancement Academies/ Career Ladders Project, Daraja, Digital Bridge and I-BEST all provide examples of a formal program evaluation targeting continuous improvement. At both the institutional level and beyond, developing

the conditions for longitudinal tracking, the agreement on common data collection and the capacity to determine a valid comparison or control group will all contribute to a more in-depth understanding of program effectiveness.

Finally, practitioners, policy makers and funders alike would benefit from further research related to the range of rationales behind and ways for using contextualization in teaching and learning. For example, the majority of practices in this primer focus on developing students' basic skills in career contexts with the purpose of improving their readiness for related college-level coursework or entry into a particular occupation. At the same time, a few examples specifically connect basic skills development to students' personal identities and experiences in their neighborhoods, schools and communities and serve as an arena for developing their capacity to pursue social change. As these kinds of practices grow, they offer an additional lens through which to view CTL and beckon for additional research on how such strategies work to develop students' foundational skills and promote equity in CA community college instruction.

### **REPLICABILITY/SCALABILITY**

Intimately tied to resources and research are issues of replicability and scalability. Faculty often respond to discussions on contextualization with the comment, "I already do that in my classroom." Yet documentation, dissemination and expansion of CTL models beyond individual classroom and college practice remain a challenge. With appropriate resource allocation for effective implementation and a clear plan for collecting and analyzing student outcomes, faculty will be better positioned to expand their efforts in effective CTL practice.

Documentation of curriculum and materials development, a description of the collaborations that were critical to the success of the venture, a detailed understanding of the resources required and an overview of the initial and ongoing professional development needed to implement and continue innovation will allow faculty and staff to share substantive examples of their work with peers. Several featured practices, including the Bridge-to-Biotech, the Spanish to English Assistant Teacher Certificate and FastStart@CCD have all documented their models and developed relationships with peers in related colleges to explore replication. Developing communities of practice around a particular CTL model, as exemplified by the Career Advancement Academies and the Umoja Community, offers another way to disseminate effective practices, work collaboratively on issues of program improvement, identify opportunities for program extension to a larger population and develop a substantive body of evidence about the efficacy of CTL as an instructional strategy.

Programs like I-BEST show how conscious policy and diversified private and public funding can support measured, thoughtful scaling of CTL across an entire community college system. As noted by Mazzeo (2008) "many of the leading edge states implementing community college reforms have found creative ways to use a mix of state, federal and private dollars to support innovative practices" (p. 11). Models such as I-BEST, the Detroit Bridge Project and Ivy Tech Community College's embedded skill programs are examples of private foundations' interest in supporting the development of CTL as part of their agenda on increasing student success.

## SUSTAINABILITY

Sustainability is an increasingly significant aspect of the discussions around innovation. While foundations and other grant making organizations have the capacity to fund innovation, their concerns go beyond an initial proof of concept to the likelihood that successful programs will be institutionalized. Two recent publications give programs and colleges a way to evaluate the long term fiscal impact of innovation through a cost benefit analysis. In both *Basic Skills as a Foundation for Student Success in California Community Colleges* and *Calculating the Productivity of Innovation*, the authors introduce a methodology that calculates the costs and revenues of specific practices (CSS, 2007; Corash & Baker, 2009). These methodologies give institutions and policy makers a way to calculate the time it will take to recoup an initial investment in program improvement, as well as a way to project the long term fiscal benefit of the innovation to the institution. “There are real, college-level economic reasons that alternate approaches to basic skills at the very least go a long way towards paying for themselves, and in many cases may very well result in a net economic benefit to the college” (CSS, 2007, p. 7).

While grants or a special allocation may seed a project, funds alone will not maintain innovation. Faculty interest and leadership are necessary elements of the sustainability of any effort, irrespective of its scale. Initiatives that contribute to institutional change at the programmatic level must be integrated into the campus culture, as Rose Asera has noted with the SPECC projects sponsored by the Carnegie Foundation. A change effort develops “sustainability” as it becomes part of the institutional narrative and is woven into the framework of institutional evaluation and review (2008, p. 21). In addition, a sustainable programmatic effort that has the support of the administrative leadership who “repurpose structures” or develop ways of crossing campus boundaries is likely to develop roots (p. 22).



## CONCLUSION

THIS PRIMER BEGAN WITH A QUESTION about the status of students' readiness for the 21st century workforce. The authors conclude with thoughts on how CTL can strengthen the California Community College system's capacity to provide expert education and training to the state's workforce in decades to come. The examples featured in this document demonstrate the key role that dedicated and passionate faculty play in the development of innovation and the evolution of effective practice. The Basic Skills Initiative provides colleges with both a mandate and an initial allocation of resources designed to support innovation and shared learning across the system. Public, private and non-profit interest groups, the legislature and national and local foundations are all working in concert with the Initiative to sustain this critical movement. The authors hope that the examples of excellence cited in this document and the voices of dedicated faculty and program leaders will add to this momentum and inspire others to join the cycle of action and reflection in CTL practice.

What emerges from these examples is the unmistakable evidence that faculty are the force that fuels transformational change in basic skills instruction. In each of these practices, faculty propel every aspect of design, experimentation and revision. Their efforts provide examples of how a meaningful and motivational context can support transformations in learning and promote measurable gains in basic skills. The variety of CTL models offer multiple options for faculty, regardless of their subject matter or discipline, to engage with CTL at different levels of scale. The authors hope that the common elements identified across these examples and the reflections of practitioners on issues of resources, evaluation, dissemination and program sustainability will provide useful benchmarks for faculty and staff when considering CTL as an option for increasing student success.

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## APPENDIX – FACULTY INTERVIEW PROTOCOL

Primary Question	Possible Probes:
<p>Program Design</p> <p>How would you describe your program/lessons to other educators who might not be familiar with contextualized education? (Is there an articulated philosophy?)</p>	<p>What high-level goal(s) do you have for students in this course/program?</p> <p>What kind and level of basic skills do you address in your course/program</p> <p>How do you identify which competencies to cover in your course(s)?</p> <p>What “context” do you employ in this course?</p> <p>What career path are you preparing students for?</p>
<p>How did this program/course design develop, evolve?</p>	<p>Who drove the program development--academic, voc ed faculty?</p>
<p>How did you get involved as faculty?</p>	<p>Which department has primary responsibility?</p> <p>Who manages your project?</p> <p>How is/was your work funded?</p>
<p>Provide any other details about your program design.</p>	<p>Is it credit/noncredit?</p> <p>What is schedule/length of course/program?</p> <p>How do you organize your curriculum? (chunks, modules, mini assignments that lead to culminating report/project?)</p>
<p>Target Population, Recruitment &amp; Assessment</p> <p>How would you describe the target population for this strategy?</p>	<p>What requirements do you have of students for course/program participation?</p> <p>How do you identify, outreach to students?</p> <p>What partners are involved in your process?</p>
<p>What kinds of assessment do you use to determine academic readiness? What other screening, assessment tools do you use?</p> <p>Who administers these assessments?</p>	

### **Pedagogy**

Can you please share a syllabi or the learning outcomes for your course?

How are the instructional strategies used in your course/program different from traditional classes/program?

Provide an example of a CTL lesson, project.

How does student take active part in the learning process?

How does the context you provide excite or interest students?

How do you know context enhances students' learning?

How do you connect competencies/skills students are learning to the context you've created?

How do you create opportunities for students to demonstrate mastery of competencies/skills?

What products and/or projects do students produce?

How does contextualization affect your coverage of the curriculum?

What instructional materials, resources, tech do you use?

How do you engage students with those instructional tools?

How do they facilitate the CTL process, students' learning?

What student support services do you engage, if any, to encourage student success?

### **Outcomes**

What kind of measurements do you use to determine mastery, transferability of skills?

What key benchmarks do you set for students?

Why do you think CTL works?

Do you (program) track outcomes? If so, what outcomes do you track?

Do you have any reports that highlight outcomes (if so, please send)?

### **Institutional Role & Overarching Questions**

What do you feel about the overall effectiveness of contextualized learning?

What are your personal goals for instructional, program improvement?

What do you see as the challenges of contextualized learning?

What conditions support/inhibit your practice?

What kind of role does your institution play in the program (design, resources, professional dev, strategic planning, partnerships, etc.)?

What role to partnerships play in design and implementation? (partnerships w/ other faculty, student services, employers, CBOs, intermediaries/TA providers, associations, advisory committees, etc)

Is there anything I haven't covered that you think is important for us to understand about your program or contextualized learning?