CALIFORNIA STATE UNIVERSITY, MONTEREY BAY

Award for Innovation 2015
Cover Page

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List of Participants

- California State University, Monterey Bay
- Hartnell Community College

Application Abstract

California State University, Monterey Bay (CSUMB) in partnership with Hartnell College, have developed and implemented an innovative cohort-based, three-year Bachelor of Science degree program in Computer Science and Information Technology (CSIT) called *CSIT-In-3.* The program represents a new model for bachelor's degree completion as well as for improving enrollment, retention, transfer, and graduation for disadvantaged and underrepresented students in a high skill field. To increase bachelor's degrees in CSIT for low income and underrepresented students, the partner institutions fully implemented the following new or revised program components since January 10, 2014:

- Full implementation of an articulated, transferrable, and accredited three-year Bachelor of Science degree option in Computer Science and Information Technology;
- Enrollment of 34 new students who comprise cohort 2; increasing enrollment to 60 overall;
- Delivery of a revised Math Intensive, to support improved college preparation/readiness;
- Full implementation of support services, including tutoring, enrichment, field trips, summer bridge, block enrollment, grade monitoring, and the Student Accountability Group;
- Provided full scholarships to all 60 enrolled students through Matsui Foundation;
- Achieved a persistence rate of 87.5%, nearly 30 points higher than STEM programs overall;
- Transferred the first cohort of *CSIT-in-3* students to CSUMB with a 100% transfer rate.

CSIT-in-3 aligns with the priorities of the Awards for Innovation in Higher Education by: eliminating impediments to success; closing achievement gaps for underrepresented students; enabling bachelor's degree completion in less than four years; and easing transfer for underrepresented students in higher education. Evaluation data supports this concept to-date.

Assurance and Signature

"I assure that I have read and support this application for an award. I understand that if this application is chosen for an award, my institution will be required to submit, for approval by the Committee on Awards for Innovation in Higher Education, a report indicating proposed uses of the award funds and, as the fiscal agent, will be responsible for distributing funds to any other participating entities. I also understand that, if this application is selected for an award, my institution will be required to submit reports to the Director of Finance by January 1, 2018, and by January 1, 2020, evaluating the effectiveness of the changes described in this application."

Signed,

12-18-14

Eduardo M. Ochoa, Ph.D.
President
California State University, Monterey Bay

Date

CONTEXT

1. Specific programmatic or institutional goals set by the participants in this application. California State University, Monterey Bay (CSUMB), in partnership with Hartnell Community College (Hartnell), has developed and implemented an innovative three-year Bachelor of Science (BS) degree program in Computer Science and Information Technology (CSIT) called *CSIT-In-3.* The program represents a new model for bachelor's degree completion centered on student cohort learning communities, community college/university partnership, and clearly defined, accelerated course pathways as mechanisms for improving enrollment, retention, academic success support, transfer, graduation and placement post graduation for disadvantaged and underrepresented students in the high demand field of computer science.

To increase bachelor's degrees in CSIT for low income and underrepresented students, the partner institutions set the following majors goals:

- Reorganize administrative and academic support resources at CSUMB and Hartnell to create a fully articulated, transferrable, and accredited three-year BS degree option in CSIT;
- Increase enrollment in CSIT by 40 percent through broad outreach, recruiting, and college preparatory activities;
- Achieve an 80 percent retention rate through academic and student services and financial aid;
- Achieve a 90 percent transfer rate from Hartnell to CSUMB; five times the current rate;
- Achieve an 80 percent CSIT graduation rate at CSUMB; more than double the current rate;
- Identify specific components of innovation focused on student preparation, student pathway, academic support services, and placement to be scaled and replicated.

1.1 How achieving these goals ultimately will increase the number of bachelor's degrees awarded. The program's goals directly address the major obstacles faced by disadvantaged and underrepresented students in science, technology, engineering, and mathematics (STEM) programs. These include: college readiness (summer bridge and math intensive course; 96% of incoming Hartnell students are not college-ready in math); academic support (educational planning, tutoring, supplemental instruction); student services (counseling, academic monitoring, enrichment activities); and financial aid (full scholarships eliminating the need for outside employment; 90% of students are low income).

Achieving the stated goals through the project's established activities align with the priorities of the Awards for Innovation in Higher Education by: eliminating impediments to success; closing achievement gaps for underrepresented students; enabling students to complete bachelor's degrees in less than four years; and easing transfer, particularly for student groups that are underrepresented in higher education.

1.2 When and how program goals were developed and how they are used on an ongoing basis. The challenges described in detail within Section 2 below prompted the two institutions to devise and test new paradigms to increase enrollment and success among low-income, underrepresented students within high skills fields. Discussions about a three-year bachelor's degree program began four years ago, initiated by deans and faculty at both CSUMB and Hartnell. Program implementation has been driven by two grants from the National Science Foundation, which recognized the concept's potential for improving student outcomes; and the Matsui Foundation, which has provided significant scholarship support.

2. Statistical profile of the students served. CSUMB and Hartnell serve the Monterey Bay area including most of the 1,000 square mile Salinas Valley, referred to as the "salad bowl of the world." It includes a diverse regional population that is largely Latino/a, low income, with low educational attainment, and high seasonal unemployment. Over 82% of Hartnell's students are first generation. As a result, these students have been severely underrepresented in STEM, with few degrees and transfers, especially in CSIT (which offers nearly 60% of all STEM jobs).

The first two cohorts of students enrolled in the *CSIT-In-3* program had the following profile, disaggregated by the required characteristics:

Table 1: *CSIT-In-3* Student Demographics

Profile Category	Cohort 1 (n=32)	Cohort 2 (n=32)
Female	38%	47%
Male	62%	53%
Hispanic/Latino	86%	94%
White	14%	3%
Pacific Islander	0%	3%
Black/African American	0%	0%
Asian	0%	0%
American Indian/Alaskan Native	0%	0%
Unknown	0%	0%
First Generation College Student	84%	82%

2.1 Proportion of students who are current or former foster youth, students with disabilities, low-income students, and veterans. One hundred percent (100%) of students are low income, per federal definition. Currently, there are no students who are former foster youth, students with disabilities, or veterans. Outreach activities resulted in contact with youth and young adults in all categories, including special outreach through veterans' service organizations and Hartnell's Veteran's Educational Services program.

2.2 Analysis of the factors that affect the ability of students to earn bachelor's degrees, graduate within four years, and/or transfer. In designing this project, CSUMB and Hartnell conducted a comprehensive needs assessment and environmental scan that identified: available resources; student outcomes; gaps in service and support; unmet student needs; and methods and resources needed to address those needs. The partners reviewed current literature and best practices. The needs assessment identified the following factors, including the particular factors that disproportionately affect students who are underrepresented in higher education:

- Preparation – Approximately 96 percent of incoming Hartnell students are not ready for college-level math, in which they need to enroll and succeed in the CSIT program. This means they must take one or more basic skills math courses, delaying their entry into CSIT or other STEM majors (Assessment Test Data, 2013);
- Lack of understanding of computer science as an academic field of study – Only one of the 14 comprehensive high schools in Monterey County offers computer science classes, leaving a majority of students with no exposure to computer science through high school;

- Academic support – Limited access to direct, impactful academic support services including tutoring, study skills training, college expectations, and counseling is a major impediment for underrepresented students. As documented by a symposium on best practices in STEM for Hispanic serving community colleges, academic support, effective pedagogy, and supportive pathways are key to Latino success in college (National Science Foundation, 2002).
- Financial challenges – At CSUMB, nearly 63 percent of students receive financial aid. Thirty-three percent of students who chose not to continue their education cited finances as the top reason (Student Survey data, 2009). At Hartnell nearly 90 percent of students receive financial aid. As many as 30 percent of Hartnell STEM students don't have funds for textbooks and rely on classroom copies (STEM Student Survey, 2008). Several studies cite the cost of a college as a major barrier to Latino enrollment, persistence, and success.
- Outside employment – To survive financially, 75 percent of Hartnell students are employed outside of school *20 hours per week or more* (MESA Survey on Student Work Patterns). According to the American Council on Education (2006), students who work 20 or more hours per week experience limitations in class schedule, facilities access, number of classes, and class choice. Recent U.S. Department of Education, National Center for Education Statistics data show that income level has a direct bearing on both time required to achieve a degree as well as the level of degree attained.
- Time-to-degree – Inadequate student preparation and support structures combined with the pressures on low income students to work, often results in extending the time-to-degree. According to a review of time-to-degree transfer rates, only three percent of Hispanic students were transfer-ready in two years (Hartnell Matriculation Data, 2012). Research strongly indicates that students, particularly low-income students, who need longer time to complete a degree, also tend to have higher dropout rates (Bound, Lovenheim, Turner, 2007).

2.3 Factors influenced by changes to policies, practices, or systems. The above factors have been and are being addressed by changing policies, practices, and systems. The factor and the change that impacted it are listed briefly here and detailed in later sections:

- *Factor 1: preparation for college* – this factor is addressed through programs to improve college-readiness for local high school students, including: Math Intensive, a two-month alternative for meeting the math eligibility, featuring weekly workshops and eight hours of out-of-class weekly practice; Summer Bridge, a week long program focused on preparing and integrating students into the college culture and academics; and an AP computer science programming course offered in Salinas and King City to motivated high school students.
- *Factor 2: support structures during college* (academic, social, transfer, career readiness) – this factor is addressed through building of cohort learning communities, 9 hours of weekly tutoring and "power hours;" skills enhancement activities, enrichment activities, career preparation activities; grade monitoring by faculty and staff; and field trips/conferences.
- *Factor 3: financial issues* (including need to work) – this factor is addressed through full scholarships for all three years provided by the Matsui Foundation. Long-term, students will have access to regular financial aid, including an endowed STEM scholarship program.
- *Factor 4: time-to-degree* – The policy change needed to implement a predefined pathway of courses for cohorts of students directly addresses this factor. Students are given block enrollment in designated courses and take courses year-round (see Appendix B). This policy is completely different from the current model where the students are primarily responsible for navigating their own course pathway through changing schedules at one or multiple schools keeping in mind a maze of transfer/graduation requirements.

INNOVATIONS

3. Key policies, practices, and/or systems in place prior to January 10, 2014, that were initiated to achieve the goals identified in Item 1. More than four years ago, in 2010, CSUMB and Hartnell deans and faculty began assessing the challenges facing underrepresented and disadvantaged students seeking educational opportunities in computer science. Given the obstacles and the resources available, and after a review of the literature and best practices (discussed below), CSUMB and Hartnell committed to an innovative path: devising a cohort based three-year bachelor's degree option coupled with significant student support structures and financial assistance as a way to improve outcomes. Key policies, practices, and systems implemented prior to 01/10/14 are discussed in this section.

It is important to note that there is no separate degree for *CSIT-In-3* students. The program uses the same courses as the traditional CSIT bachelor's degree, but schedules them in a compact way and enrolls students in blocks (discussed under Item 4) to enable completion in three years. It simply differs in efficiency, engagement, outreach success, completion rate, time-to-completion, overall cost, proficiency, and value to both students and industry.

Building this program did require deliberate and thoughtful actions informed by research, extensive discussions, the present state of knowledge in the field, best practices, and reflection on prior experience at both CSUMB and Hartnell. The project's main strategies (policies and practices) developed in 2012-13 were based on research and designed in direct response to the needs assessment detailed earlier:

Cohort-based learning communities – The use of cohorts/learning communities has proven to be effective in both short-term success and long-term retention (Tinto, 1997, others). More specifically as it relates to this program, cohort-based learning communities increase the success of underrepresented and first-generation students in STEM majors (Taylor, et. al., 2003). As demonstrated by research and based on the experience and data collected by the *CSIT-In-3* program staff, a key advantage of a cohort program is the ability to build a culture of high expectations, work ethic, support and commitment, combined with the ability to provide necessary administrative, academic and enrichment activities to a cohort of students. Without the cohort at the center, such efforts dissipate across varied sets of students without building consistent and continuous improvements to achieve the goals of the project.

Pathway through two-year college – CSUMB's policy decision to design the *CSIT-In-3* pathway through Hartnell is based on data that shows this to be an effective pathway for the students targeted in this program. First, data from the National Student Clearinghouse (2012) shows that underrepresented and low-income students tend to begin their college careers at two-year colleges, as these are more accessible and affordable options. Thus, starting postsecondary education at a two-year college is an important step for many students in preparing for a four-year university. In particular, students from underserved communities have a stronger affinity for and comfort level with their local community college (Mullin, 2012).

Three-year bachelor's degree – The three-year degree is an emerging concept in the United States, though it has been practiced widely in Europe since 1989. The shorter time to completion dramatically reducing college costs – perhaps as much as 25 percent – is cited as one of its

primary benefits (Center for College Affordability and Productivity, 2010). However, more extensive evaluation data from Southern New Hampshire University shows that not only can the concept be applied with success in the U.S., but it can also reap broad benefits. According to the data (Bradley, Painchaud, 2010), Southern New Hampshire's three-year program resulted in retention rates between 81 and 93 percent with an average graduation rate of 77 percent between 1997 and 2005. Building a fast-track pathway provides an opportunity to develop precise and rigorous components that decrease time-to-degree, increase retention, and reduce cost. These components can then be scaled and replicated to serve a broader body of students in four-year pathways.

Year-round enrollment – The policy decision to schedule students year-round was not only based on the three-year timetable for degree completion. Research shows that continuous engagement through the summer and winter without significant breaks leads to increases in both retention and graduation rates (Cooper, et. al., 1996). This validates the three-year degree model in which students enroll during winter breaks, the summer term, and complete summer internships.

3.1 The impact of these policies, practices, or systems, to date has been significant. The table below shows the program's initial persistence and transfer rates compared to others:

Table 2: Comparing *CSIT-In-3* Initial Transfer and Persistence Rates 2014

CSIT-In-3 Transfer Rate	Hartnell Latino 4 Yr. Transfer Rate	*CSIT-In-3* Persistence Rate	Hartnell CSIT Persistence Rate
84.0 %	**18.0%**	**84.0%**	**59.4%**

In the year before this concept was developed, only one (1) student transferred from Hartnell to CSUMB in Computer Science (Hartnell STEM Transfer Data, 2010).

3.2 Lessons learned and how the program leadership responded to each issue include the following, generated by evaluative data and feedback (see also Item 11, Evaluation):

- Computer science courses, content and sequencing, were not consistent or standardized across both partner institutions. In response, program leaders have moved to standardize content and sequencing by using the model curriculum set by the Association for Computing Machinery (ACM is the world's largest educational and scientific computing society);
- The accelerated pacing of the program requires summer and winter intercessional courses to enable three-year completion. This has required program leaders to schedule courses that best match the shortened time frames of the winter break and summer term to improve learning and progress toward timely completion.
- The level of intense academic support invested by program staff in the initial years of the project has unintended consequences on the ability of the program to be sustained, scaled, and replicated. In response, program leaders are adapting policies and operations as well as looking for ways to better leverage existing resources. One key example of this would be identifying ways to improve students' math-readiness within the existing high school infrastructure instead of remediating through the spring Math Intensive.
- Connecting tech industry leaders, who are very interested in addressing diversity challenges in Silicon Valley, with a program at a non-elite institution has proved challenging. As a response, the program created the "Tech Pipeline Proposal" to inform and engage industry leaders about the need to partner with open-access colleges and programs like *CSIT-In-3*.

4. Key changes to policies, practices, and/or systems initiated since January 10, 2014 intended to achieve the goals identified in Item 1 *(6 pages maximum)*

Based on the program structure and policy decisions made in 2013 and lessons learned to-date, the *CSIT-In-3* program was implemented and operational in 2014. Key practices that **support the *CSIT-In-3* program** in 2014 include the following:

Curriculum/Organization – The three-year course pathway starting at Hartnell College and leading to completion of a bachelor's degree in Computer Science and Information Technology at CSUMB was in place for the 2013-14 year. Administrators at both institutions have committed to adhere to the pathway schedule by offering all courses during the designated semester so that students can graduate in three years. The table below presents the course unit load for *CSIT-In-3* students for the three-year period. The table also lists the institution at which the courses will be offered for each of the semesters or terms. Detailed sample course sequences are presented in Appendix C.

Table 3: *CSIT-In-3* Unit Load Schedule

	Fall	Winter Intercession	Spring	Summer
Year 1	Hartnell = 14 units CSUMB = 4 units Total = 18 units	Hartnell = 3 units CSUMB = 0 units Total = 3 units	Hartnell = 14 units CSUMB = 4 units Total = 18 units	Hartnell = 7 units CSUMB = 0 units Total = 7 units
Year 2	Hartnell =1 4 units CSUMB = 4 units Total = 18 units	Hartnell = 3 units CSUMB = 0 units Total = 3 units	Hartnell = 0 units CSUMB = 18 units Total = 18 units	**Summer Internship Experience**
Year 3	Hartnell = 0 units CSUMB = 18 units Total = 18 units	Hartnell =3 units CSUMB = 0 units Total = 3 units	Hartnell = 0 units CSUMB = 15 units Total = 15 units	**Start Exciting Career**

Outreach/Enrollment – To recruit the second *CSIT-In-3* cohort for academic year 2014-2015, project staff followed a recruitment effort with Monterey County high schools, similar to the effort for the first year. Outreach included staff hosting 11 information nights at Hartnell and CSUMB and visiting 14 high schools, presenting to over 500 prospective students in targeted math classes. The 2014-2015 outreach and recruitment activities produced the following results:

- 83 students started applications;
- 51 students were interviewed based on completed applications and meeting qualifications;
- 48 students started math intensive to meet the calculus readiness requirement before fall 2014 courses;
- 34 students completed math intensive and calculus readiness requirements and were admitted to *CSIT-in-3* as cohort 2.

College Prep/Math Intensive – Program leaders and faculty developed and implemented a Math Intensive program for all students accepted into the CSIT-In-3 program. The Math Intensive prepares students to meet the math requirement of *CSIT-In-3* while also instilling high expectations, work ethic and cohort unity among the students. Math Intensive was started in

March 2013 (cohort 1) and revised and started in February 2014 (cohort 2). The program covers algebra I, algebra II, geometry, and trigonometry. Students are required to attend Saturday workshops led by a local high school math teacher and to complete 8+ hours a week of practice on their own time. The Math Intensive instructor and project staff and faculty tracked student independent practice using ALEKS (for cohort 1) and Khan Academy (for cohort 2). Upon successful completion of the Math Intensive, students enroll in precalculus at Hartnell during the summer session. After passing precalculus, students are eligible for calculus in the fall.

Practices fully implemented in 2014 that **support student academic support services**, include the following:

Study hours – Monday through Thursday students have one hour of required daily study time organized on campus. Students can work independently or in groups and tutoring is available during these days/times.

Tutoring and Power Hours – These optional study times are organized throughout the week. Tutoring and Power Hours are primarily in computer science, math, English, and science courses. Tutoring is delivered by students who have previously completed the course for which they are tutoring. Tutors participate in tutor training throughout the semester. Power Hours are organized and conducted by the Computer Science Education Coordinator with the help of tutors. Approximately nine hours per week of tutoring/Power Hours were available to *CSIT-In-3* students during fall semester and over 20 hours per week during spring semester.

Peer Tutoring – The program implemented a peer tutors program and uses planned interactions to elevate tutoring capabilities for selected students (peer tutors). The CS Education Coordinator delivers ongoing training, working weekly with peer leaders to implement best practices, avoid common errors and clarify documented programming misconceptions. These peer tutors then meet weekly with selected groups of new programmers to work in concert through prepared problem sets. This program formalizes best practices in small group instruction and avoids ad-hoc nature of open tutoring sessions.

Friday Cohort Enrichment (FCE) – For three hours every Friday, students participate in FCE. During this time students work on developing additional skills and projects to enhance classroom learning; build a cohesive cohort; ease the transition to the college culture and community; and begin career preparation (in year 2). Activities include book club; time-management workshops; preparation for large projects; practicing difficult concepts; team building; small projects; problem solving; and internship application preparation support.

Saturday Monthly Cohort Enrichment (SMCE) – For five hours on one Saturday each month, students participate in SMCE. During this time students work on large projects and/or tackle more complicated concepts. Activities address relevant CSIT topics, such as workshops on synthetic biology by SynBio; open source development by OpenHatch and creating a personal website; a development competition through Windward Code Wars; and integrated projects in particle simulation and bioinformatics.

Grade monitoring – Project staff and faculty fully implemented a program to monitor student grades and progress on a monthly basis in 2014 and worked with students to teach them to

monitor their own progress. Each semester, the Computer Science Education Coordinator and faculty meet with students to discuss progress and develop action plans with students identified as being in jeopardy of falling behind.

Field trips/Conferences – Events that have been implemented both before and after 01/10/14, include these (this provides a sampling of the kind of enrichment program being developed for *CSIT-In-3* students):

- Google, 4/26/13 (cohort 1);
- EA Games and Intel, 7/25/13 (cohort 1);
- SheCodes (supporting women software developers), 8/9/13 (cohort 1);
- Code Camp, 10/5/13 (cohort 1);
- Monterey Bay Aquarium Research Institute, 10/11/13 (cohort 1);
- "Documented" film screening, 1/28/14 (cohorts 1 and 2);
- Ideas of March (programming competition), 3/18/14 (cohort 1);
- Game Developers Conference, 3/21/14 (cohort 1);
- Anita Borg Institute, Women of Vision Awards Banquet, 5/8/14 (cohort 1);
- Google and Computer History Museum, 5/23/14 (cohort 2).

Summer Bridge – In late July/early August, newly admitted *CSIT-In-3* student cohorts participate in a weeklong, all day summer bridge program at Hartnell College. The program focuses on an orientation to the program; team building; college-readiness; and an introduction to computer science concepts. Some of the specific topics covered during the daily sessions include professionalism; academic reading and writing; problem solving; program expectations; college financial literacy; cohort building; and an introductory computer science activity using Picobot (an introductory computer science language and exercises in robot programming).

Methods and practices fully implemented in 2014 that **support student support services**, include the following:

Block enrollment – *CSIT-In-3* students are automatically block enrolled in cohort courses to ensure they are grouped in the designated classes and section numbers that will lead to completion in the three-year timeframe.

Housing – Dormitory housing on the CSUMB campus is available to all *CSIT-In-3* students.

Student Leaders – At the beginning of the fall and spring semesters, students can apply to become cohort leaders. There are five to six leaders each semester who meet with their small groups once a week to work on computer science problems as well as discuss personal and academic challenges and successes, as needed. Leaders meet with the Computer Science Education Coordinator once a week for a check-in and training.

Methods and practices fully implemented in 2014 that are **specifically directed toward transfer and graduation** in the *CSIT-In-3* program include the following:

Cross enrollment – *CSIT-In-3* students are enrolled as Hartnell students for the first 1.5 years of the program. During this time, students take most of their courses at Hartnell, but also cross-enroll in one course at CSUMB during every fall and spring semester. This cross-enrollment

allows students to familiarize with CSUMB processes, campus, culture, and faculty in order to ease the transition to becoming a full-time CSUMB student for the second 1.5 years of the program.

Automatic transfer – To be admitted into the *CSIT-In-3* program students must apply and be accepted to Hartnell College. Once admitted into *CSIT-In-3*, students are guaranteed transfer to CSUMB provided they are in good standing, meeting all program and academic requirements at the time of transfer.

Methods and practices fully implemented in 2014 that are **specifically directed toward overall student access and success** in the *CSIT-in-3* program, including **financial aid**:

Matsui Scholarships – The Matsui Foundation out of Salinas, California has committed over $3 million to provide scholarships for all eligible students in each of the first three *CSIT-In-3* cohorts. These scholarships are promoted in recruitment and outreach events and communications. The scholarships enable students to fully concentrate on their demanding schedules and eliminate the need for outside employment. The scholarships also allow students to live on campus during their CSUMB enrollment, reducing travel time and cost, further facilitating academic success.

4.1 Why the changes initiated will achieve those goals. Program adjustments have enabled program leaders and faculty to better address student needs and allocate resources that will enhance student outcomes, specifically academic success in *CSIT-In-3*.

The program's fully implemented activities directly address the major obstacles faced by disadvantaged and underrepresented students in STEM programs. As discussed under Item 1, these include: college readiness (summer bridge and math intensive course; 96% of incoming Hartnell students are not college-ready in math); academic support (educational planning, tutoring); student services (counseling, academic monitoring, enrichment activities); and financial aid (full scholarships eliminating the need for outside employment; 90% of students are low income).

Implementing these activities and policies, and achieving the stated goals through the project's established activities align with the priorities of the Awards for Innovation in Higher Education by: eliminating impediments to success; closing achievement gaps for underrepresented students; enabling students to complete bachelor's degrees in less than four years; and easing transfer, particularly for student groups that are underrepresented in higher education.

Program leaders and faculty expect that ongoing evaluation will continue to produce changes/adjustments to program strategies, policies, and activities. Ongoing refinement of the model will support *CSIT-In-3* success as well as its replicability with other schools and in other STEM subjects and programs.

4.2 Expected impact of the changes. The full implementation of a successful three-year bachelor's degree model has the potential to exert far-reaching impacts. The impact (near and longer-term) of the activities/policies/strategies that have been fully implemented in 2014,

include the following (see also Item 6, relating to cost savings of the program; and Item 12, target outcomes through 2018-19):

❖ **Impacts related to specific proposed increases in the number of students obtaining CSIT degrees at CSUMB or completing credits at Hartnell toward transfer to a baccalaureate degree include**:

- Enrollment of 25-30 Computer Science and Information Technology majors committed to completing the three-year program; representing a 40 percent increase in CSIT majors overall at CSUMB (34 students have been enrolled for the 2014-15 cohort);
- An 80 percent retention rate in *CSIT-In-3* (retention rate to-date is 84%)*;*
- An 80 percent transfer rate from Hartnell (five times the current rate; 2014 transfer rate is 84%); and
- An 80 percent graduation rate in *CSIT-In-3*; significant increase on the current <u>four</u> <u>year</u> CSIT graduation rate of transfer students of about 30 percent at CSUMB.

To-date, the *CSIT-In-3* program is exceeding the program's targeted outcomes.

❖ **Impacts related to activities that will be institutionalized as a result of the program include**:

- An improved computer science transfer pathway from Hartnell Community College to CSUMB;
- Curriculum material and activities that can be utilized to offer summer bridge experience, integrating experience and academic support to students in a cost effective manner using innovative approaches based on new pedagogy and the use of technology;
- A process to reexamine and redesign STEM programs to better overcome student obstacles and increase outcomes;
- A focused, efficient pathway through an accredited Bachelor of Science degree in Computer Science and Information Technology.

5. Planned changes to policies, practices, and/or systems to be implemented after January 9, 2015, intended to achieve the goals identified in Item 1 *(2 pages maximum).*

Tech Pipeline and Internships – The major change in 2015 will be the implementation of the Tech Pipeline and the first summer of student internships. The computer science industry in general, and Silicon Valley in particular, have identified the lack of qualified graduates and lack of diversity as critical challenges facing the future of the field. Program leaders have developed an extensive proposal to partner with industry to create an end-to-end educational pipeline, from high school through university to industry. Such a pipeline will have the following impacts:

- *Tech pipeline impacts on students*: improved learning through updated programs linked to industry; access to working professionals through guest speakers, mentors, and advisory board members; access to cutting-edge technology internships; improved graduation rates; increased post-graduate school enrollments; increased job placements upon graduation.
- *Tech pipeline impacts on K-12 schools, Hartnell, and CSUMB*: improved program content through access to latest advances in technology and practice; enhanced instruction through faculty exposure to industry; improved student learning outcomes; improved academic outcomes including graduation rates; increased job placements for students upon graduation; and development of a model that can be replicated in other academic programs.
- *Tech pipeline impacts on industry*: development of a local supply of qualified engineers, scientists, and professionals able to fill growing shortages of high skill workers; increasing workforce diversity; ability to influence curriculum well in advance of graduation thus reducing the need to re-train workers upon hiring; reduction in hiring and recruitment costs; enhanced community profile; increased profits.

Timeline: intern program specifications completed January 10, 2015; student applications reviewed, February 2015; partners and industry match students to internship placement April 2015; students begin internships June 2015; internship program evaluation September 2015; adjustments to curriculum and student preparation based on evaluation data in September-December 2015; circling back to intern program specifications and applications in January 2016. See Appendix D for additional details.

Curriculum/Organization – In 2015, project activities will focus on continuing to align and sequence curriculum to ensure pathway courses build from one semester to the next. Additionally, next year's project evaluation will more heavily focus on finding an alternative and/or additional metric to grade point average (GPA) to better measure student learning.

Timeline: curriculum alignment and sequencing is ongoing. For 2015, changes/updates will be developed between January and June 2015; and implemented starting in fall 2015.

Preparation – Program leaders either will continue to offer the AP Computer Science Massive Open Online Course (AP CS MOOC) as an after school option to students in Salinas and King City or will work with local high schools to create similar options within the existing programs. The Math Intensive will be offered as needed and math preparation outreach will be expanded to a larger group of students earlier in high school. Timeline: Ongoing throughout 2015.

Outreach/Enrollment – Activities in 2015 will build on the successes of 2013 and 2014, including staff and faculty visits to local high schools; information sessions at Hartnell and CSUMB; and updated web-based information and materials. These outreach efforts will be complemented by the development and deployment of a web application modeled after industry standard CRM (customer relationship management) tools, which will allow for more efficient registration, tracking, and communication with students interested in STEM education.

Timeline: Recruiting students and delivering the Math Intensive in January-June 2015; interviewing applicants in May-June, 2015; accepting 30-35 students for cohort 4 in June 2015; Conducting the summer bridge in July 2015; and enrolling cohort 4 in August 2015.

Support/Retention – Activities in 2015 will build on the successes of 2013 and 2014. However, slight adjustments will be made based on year 1 evaluation data. Also, project staff will continue to monitor and report retention rates for both cohort 1 and cohort 2 so that, as needed, program adjustments can be made and resources re-allocated to best support student academic success.

Timeline: Revisions implemented January, 2015 throughout program year.

Transfer/Graduation – The first *CSIT-In-3* transfer of students from Hartnell to CSUMB will occur in January 2015. This event will trigger the implementation of CSUMB's student academic and support services, including tutoring; counseling; academic advisement and grade monitoring; and housing, among other supports.

Timeline: Hartnell transfer students will start classes at CSUMB on January 20, 2015.

Evaluation/Dissemination/Replication – Project staff, faculty, and the evaluation team will continue to implement the evaluation plan. Activities will be adjusted based on initial results. As the evaluation team is able to draw conclusions from evaluation data, results will be disseminated to the broader computer science and education communities. Evaluation data will also be used to develop adaptive pathways to provide 3.5 to 4.5-year options for students who may need the additional time to learn and mature into computer science professionals.

Timeline: Ongoing. See also, Item 11.

5.2 Expected impact of planned changes. Ongoing program revisions based on data and evaluation, will support the program's long term impacts: increased CSIT enrollments, transfer rates, persistence rates, graduation rates, and improved overall outcomes for underrepresented and disadvantaged students. See also impacts detailed under responses to Questions 4.2 and 12.

5.3 Evidence of commitment to future changes. Evaluation, including the ongoing collection and assessment of quantitative and qualitative program data, will be the lifeline of long-term *CSIT-In-3* success. Implementing a focused, accelerated, and articulated degree from Hartnell to CSUMB is a new concept that redefines the traditional higher education paradigm. Its success is dependent upon its ability to be integrated into the college culture and because it advances and improves student outcomes. This will *require* ongoing adjustments, revisions, and perhaps large-scale changes. Please see Item 11, Evaluation, for details on how the program will use data and feedback to make other/future program changes in 2015 and beyond, as needed.

6. How the changes described in above responses will impact the average cost to award a bachelor's degree *(1 page maximum).*

CSUMB and Hartnell have reviewed and assessed the impact of the *CSIT-In-3* program considering costs borne by the state, the participants in the application, and students, as well as the magnitude of that impact. First, a table detailing funding provided by the State of California followed by the cost of a college/university education at both Hartnell College and CSUMB.

Table 4: California Higher Education Support Funding Per Full-Time Equivalent Student, 2014-15*	
Higher Education System	**Per Student Funding 2014-15**
California State University	$12,823
California Community Colleges	$ 6,266

* California State Legislative Analysts Office. 2014. Analysis of the Governor's Higher Education Budget for 2014-15 Available: http://www.lao.ca.gov/reports/2014/budget/higher-ed/higher-ed-021214.aspx

The estimated student costs to attend Hartnell and CSUMB in AY2014-15 are detailed below. Estimates are from each institution's Financial Aid Office (Hartnell http://www.hartnell .edu/net-price-calculator; CSUMB http://financialaid.csumb.edu/2013-2014-cost-attendance).

Table 5: Hartnell College and CSUMB: Resident Undergraduate Expenses 2014-15			
Expenses	**Hartnell College** (with parents)	**CSUMB** (with parents)	**CSUMB** (on campus)
Tuition and Fees	$ 1,656	$ 5,693	$ 5,693
Room & Board/Contribution	$ 4,500	$ 4,500	$10,112
Books and Supplies	$ 1,665	$ 1,236	$ 1,288
Personal	$ 1,464	$ 1,464	$ 1,365
Transportation	$ 1,445	$ 1,483	$ 900
Total	***$10,730***	***$14,376***	***$19,405***

Impact of *CSIT-In-3* on costs borne by the State of California. At Hartnell College, 30 percent of STEM students require four years (eight semesters) to transfer to a university program. Based on costs to the state $6,266 per CCC student, per year, *CSIT-In-3*, requiring only 1.5 years, will save the State $15,665 per student, per year ($6,266 x 2.5 years off transfer timeline). At CSUMB, time-to-degree can require six years. Based on costs to the state of $12,823 per CSU student, per year, *CSIT-In-3*, requiring only 1.5 years at CSUMB, will save the State $38,469 per student, per year ($12,823 x 3 years time saved).

Impact of *CSIT-In-3* on costs borne by students and their families. As discussed, the Matsui Foundation, Salinas, CA, is providing full scholarships to *CSIT-In-3* students. Such support will save students and their families between $38,000 and $44,000 in completing a bachelor's of science degree, as well as significantly elevated completion rates. Long-term, financial aid combined with STEM endowed scholarships from Hartnell will enable the program to sustain support for students (see Item 10, Sustainability).

7. Risks or tradeoffs involved in the changes being implementing and methods to monitor and mitigate them. *(2 pages maximum.)*

Given the existing evaluative educational metrics for STEM transfer and program completion within the California Community College and CSU systems, the most significant risk would be to do nothing. As current research shows (Couturier, Policy Meets Pathways, 2014), there is no silver bullet for solving the challenges to postsecondary STEM success for underrepresented students. Instead, dramatic improvements in student success will require states and colleges to build visionary designs with multiple, integrated student interventions (Jenkins, *Redesigning Community Colleges for Student Success: Overview of the Guided Pathways Approach*, 2014). The *CSIT-In-3* program represents such a visionary design by taking an existing four-year program and compressing into three years across two institutions, with structured student support services. As with any new approach, risks and trade-offs are inherent:

Risks in implementing *CSIT-In-3* –

- High expectations for academically underprepared, first generation students. The program requires students to take heavier course loads, as well as summer and winter inter-term classes. Students who find the pace to be too demanding and stressful may be at risk for dropping out. To-date, this challenge has been observed with a handful of students; however, immediate intervention and support services have mitigated this risk (see 7.1 below);
- Introducing students into a very demanding fast paced program with a different learning culture. Entering an accelerated, technology-based program may be head-spinning for students and increase the risk of failure. To-date, that is not happening in *CSIT-In-3* and program leaders and faculty remain vigilant to ensure students are supported (see 7.1);
- A new model for degree acquisition that conflicts with tradition, existing operation and procedure, and institutional culture may lead programs with unique requirements to collapse. The presidents and academic leadership at both institutions have expressed strong support for the program and program leaders are working within the institution to build it as an *alternative* (not a substitute) to the standard four-year degree pathway structure.

Tradeoffs in implementing *CSIT-In-3* –

- The increased pace of the program places extra demands on faculty and staff and may reduce the amount of individual attention they can provide for each student;
- The accelerated, three year model will not meet the needs of many in the target population; the three-year program requires students willing and able to make a strong commitment to the program and the requirements for progressing through and completing it;
- Some students may feel they are sacrificing the traditional college experience, social life and extracurricular activities; unable to take part in on- and off-campus experiences, and to make meaning of those experiences as well. *CSIT-In-3* includes opportunities for informal and social activities, bonding with peers, and other features to mitigate this trade-off.

Risks and tradeoffs are mitigated by these factors –

- Significantly reduced costs to attend college for students and their families;
- Lower opportunity costs. A significant, if underappreciated, cost of attending college is wages forgone while in school. Students who finish in three years can enter the workforce earlier and earn additional wages. With an average starting salary for new bachelor's degree recipients in CSIT in 2013 of $40-50,000, the additional year of employment can add up to a

considerable earnings differential (Data: Economic Modeling Specialists, Inc., 2013);
- Enhanced institutional reputation through improved student outcomes (transfer/graduation);
- Reduced administrative costs for both CSUMB and Hartnell;
- Increased capacity for both CSUMB and Hartnell by transferring or graduating students sooner, opening up more slots for new students;
- Adaptive pathways that provide students for whom the fast-track may not be appropriate with 3.5 to 4.5 year options without compromising the crucial benefits of this program;
- In the long run, elements can be institutionalized to improve enrollment, retention, academic success support, transfer, graduation and placement post-graduation for all students.

7.1 Potential adverse effects on student groups that are underrepresented in higher education. For populations that most need to increase college success, specifically those targeted through this program – lower-income and minority students – the three-year degree can be arguably construed as a nonstarter due to financial realities, college preparation issues, and family obligations. It can, therefore, result in high dropout rates (Hurley and Harnisch, 2012). These and other potential adverse impacts were outlined in the risks and trade-offs above. To guard against adverse impacts, program leaders have committed to ongoing, rigorous evaluation to measure not only academic outcomes, but also student feedback, stress, and other factors that may pose obstacles to success, not otherwise addressed in the program's activities, student support, or scholarships. Program leaders are using this evaluation feedback to make immediate and long-term adjustments to ensure success of a maximum percentage of cohort students.

To gauge student experiences and perceptions, and to identify potential adverse effects, the program's evaluation team conducted a series of small focus groups with *CSIT-In-3* students in spring 2014. Results indicated that, overall, the potential adverse impacts of the program on underrepresented students have been mitigated, as summarized in the results shown here:

1. Are *CSIT-In-3* time requirements reasonable?	Not reasonable	Somewhat	Very reasonable	No response
	0%	11%	82%	7%

2. Stress level in meeting *CSIT-In-3* obligations?	Really high	Okay/reasonable	Low
	14%	75%	11%

3. Are you being challenged enough?	Too challenging	About right	Not enough
	11%	75%	14%

4. Feel connected/ supported to peers/cohort?	Not at all	Somewhat	Just right
	0%	25%	75%

Finally, program leaders and faculty have identified another characteristic that is required for *CSIT-In-3* students: grit. In this context, grit is passion, perseverance, stamina, and the ability to focus on long-term goals. It is not linked to high intelligence and cannot be measured through GPA. "Grit" can help students overcome circumstances and perceived lack of ability; it is unrelated to standard measures of talent (Duckworth, 2013, TED Talks Education). Grit is a qualitative factor evaluated in the interview process for new applicants. High retention and transfer rates, to-date, validate the importance of this quality. Future evaluations will attempt to identify non-GPA factors, like grit or others, to measure student potential and success.

SUSTAINABILITY

8. Key strengths and assets for encouraging a culture of innovation and adaptability within and across all entities participating in the application. *(2 pages maximum)*

Institutional support for *CSIT-In-3* over the last four years is a program strength and key asset indicating that both CSUMB and Hartnell are committed to developing a culture of innovation and adaptability on their respective campuses (please see letters from both presidents in Appendix A). The growing culture of innovation at both partner campuses is what enabled CSUMB and Hartnell faculty to freely explore alternatives to traditional higher education models in an effort to improve student outcomes. Circumstances and factors that are program strengths, assets, and/or motivators in promoting a culture of innovation and adaptability include these:

Long-standing collaboration between CSUMB and Hartnell faculty. CSUMB and Hartnell have established a close working relationship over the past decade, recognizing the benefits of leveraging each institution's strengths and complementing each other's weaknesses. This relationship has resulted in excellent internship programs and multiple outreach/recruitment efforts to attract underrepresented students into STEM majors.

Location (Location, Location). CSUMB and Hartnell campuses, located within five miles of each other, are also at the intersection of large migrant agricultural community in Salinas Valley and an innovative, high-tech culture in Silicon Valley. The institutions' deep-rooted relationships with the K-12 system in Monterey County and the strong relationships they are building with Silicon Valley, uniquely position CSUMB and Hartnell to push beyond traditional boundaries of higher education to develop new models to better serve all students.

Cohort/Student-centered program. The investment both institutions have made in cohort programs has provided them with a platform to implement and test innovative ideas including curriculum delivery by crossing course boundaries; academic support through building mentoring relationships between cohorts; and breaking down limitations of existing process, practices and procedures. The ability to do this within each institution, as well as to collaboratively leverage services from either institution for this purpose, has been and will continue to be a critical strength for both partners.

Breaking down "silos." CSUMB and Hartnell have identified the risk of "silo thinking" as a potential impediment to effectively connecting partners, which, ultimately, is an impediment to innovation and program success. "Silo thinking" occurs in many institutions of higher education when people resist working outside their normal institutional or program boundaries (silos). As is well documented in the business literature, silo thinking is inefficient and can undermine productivity and success (Comerford, 2010; Stone, 2004). Silo thinking and behavior can manifest in numerous ways to stifle innovation and adaptability: individual student silos; institutional silos, program silos, academic silos, course silos; even silos between semesters or academic calendar dates. Instead, the partners are building and demonstrating methods to break down silos: through learning communities of students; integrating courses; faculty interactions across disciplines – all in an effort to be open to innovation, strengthen student learning, and improve outcomes. Just as the *CSIT-In-3* curriculum is integrated, so too must be the partnership and participants in implementing this project.

Integrating more project focus into learning. CSUMB and Hartnell are developing and implementing more project-based courses and activities that involve groups and are cross-disciplinary in nature. This naturally frees students to explore, adapt, and innovate individually and through groups and cohorts. It also provides encouragement and support for students to demonstrate their ability and passion through outside class projects. Project- and group-based active learning, in several forms, have been identified as promising and effective in improving student outcomes as reported in the findings presented at two workshops sponsored by the National Research Council (2011) and in an extensive review of the literature (Froyd, *Promising Practices in Undergraduate STEM Education*, 2008).

8.1 Sustaining the changes made and, ultimately, achieving the goals identified in this application. The changes and innovations embodied in *CSIT-In-3* must be sustained by carefully evaluating individual components of the program to determine their impact and value, then institutionalizing the processes and structures needed to sustain the necessary components. Further details on the approach for institutionalizing these critical components and the financial resources supporting the effort are described in Item 10.

8.2 Leadership, institutional commitment, and existing relationships among the application participants. CSUMB and Hartnell College have partnered on various initiatives to address computing education challenges during the past decade. The *CSIT-In-3* program's main leadership team has been in place since the development of the concept over four years ago. The team is led by:

- Dr. Sathya Narayanan (PhD, MS Computer Science), Director of the Computer Science and Information Technology program at CSUMB, Program Director;
- Mr. Joe Welch (MS Computer Information Systems; MS Space Systems Operations), is a Computer Science professor at Hartnell, Co-Program Director.
- Other members of the *CSIT-In-3* team include CSIT faculty at CSUMB; Computer Science faculty from Hartnell; *CSIT-In-3* staff, K-12 teachers; technicians; data analysts; and an external evaluator.

More importantly, the team is documenting and standardizing all program elements and processes, so that *CSIT-In-3* is not dependent on one or two people for its continued operation and success. Institutional commitment has been documented throughout the proposal and is further validated by letters from the two presidents (Appendix A).

8.3 External partnerships and resources being leveraged to support this program include, first, the program's industry advisory board:

- Raquel Romano, Senior Software Engineer, Google;
- Sibley Bacon, Senior Engineering Manager, Google;
- Erik Eldridge, Senior Software Engineer, Twitter;
- Pat Patterson, Developer-Evangelist-Architect, Salesforce;
- Vanita Nemali, Hiring Manager, Engineering Lead, Salesforce.

Second, leveraged resources include those provided by: CSUMB's Monterey Bay Advanced Networking Education Consortium; Hartnell's College-to-University Success Program; CSUMB and Hartnell's MESA programs; and CSUMB's Undergraduate Research Opportunities Center.

9. Strategies for engaging stakeholders. *(1 page maximum)*

California State University, Monterey Bay and its partner, Hartnell College have engaged a wide range of program stakeholders in developing and implementing *CSIT-In-3*, including students, faculty, other education agencies and institutions, community members, and industry leaders. Strategies and methods used to engage these stakeholders are discussed here:

All stakeholders and community members – have been engaged through the program's online presence and web site (http://csumb.edu/csit) and through regional and national media reports, including: National Public Radio's Weekend Edition; KQED public radio in the Bay Area; the Telemundo television network; and on Ed Source an online education non profit highlighting strategies for student success nationwide, among other hard copy and online articles.

Students – have been engaged through: outreach visits by program leaders and faculty to 14 high schools, presenting to over 500 prospective students in targeted math classes annually; dissemination of digital program materials and application packets; participation in the Math Intensive preparation program; the program's interview process; and through the evaluation process, such as the focus groups conducted in 2014.

Students and parents – have been engaged through 11 informational meetings held at Hartnell and CSUMB on the program, its requirements, and the application process.

College/university administrations – are engaged through regular briefings and participation in evaluation activities, such as the focus groups.

High school teachers/counselors – have been engaged through visits to high school classrooms; professional development activities through leveraged programs; and dissemination of digital and hard copy program information.

Other education agencies and institutions – have been engaged through delivery of Power Point presentations on the program's components and rationale, such as the one delivered to Mr. Tom Torlakson, the California Superintendent of Public Instruction in 2014.

Industry leaders – have been engaged through: site visits and program field trips to company locations, such as Google, EA Games, and Intel, among others; and during meetings and Power Point presentations of CSUMB's Tech Pipeline Proposal.

CSUMB also employs a multi-level strategy to disseminate results and products from the *CSIT-In-3* program. The program director and co-program director lead dissemination, with support from each institution's CSIT faculty and staff, and public affairs offices. Program leaders are always vigilant for opportunities to share best practices, lessons learned and student outcome data to educational stakeholders and others with interest in duplicating the accelerated pathways for achieving success for underrepresented, disadvantaged student groups.

Altogether, robust program engagement has built a solid on- and off-campus community infrastructure that is supporting achieving the goals described in Item 1 and in implementing the changes to policies, practices, and/or systems described in the Innovations section.

10. How the changes described in this application will be sustained within existing financial resources. The structure for sustaining the *CSIT-in-3* program has already been established. The *CSIT-In-3* program received initial funding from the National Science Foundation's 'STEP Graduate 10K' program and Hartnell College's Title V program. These funds supported the initial design, development, and implementation of the critical program components. NSF and Title V grant funds, combined with existing institutional resources that support computer science and information technology degree programs at both institutions, firmly established the program components. Because *CSIT-In-3* is not a new program, its innovation is rearranging *existing* programs and resources. It uses existing faculty, learning materials, classrooms and laboratories. Long term, these components will be supported and sustained by the normal operation of the computer science and information technology programs at both institutions. However, other, essential program features/changes are also key to the long-term sustainability and success of *CSIT-in-3*. These include:

10.1 Block registration. *CSIT-In-3* program students are registered together in a predefined pathway each semester. Long-term program sustainability requires that these pathways be adaptive to student outcomes and provide a wide range of students with opportunities to succeed. The infrastructure for this, already in place, is regularly assessed to maintain responsiveness.
10.2 Scheduling support activities. Program leaders and faculty must ensure that time windows be reserved for Friday Cohort Enrichment, study hours, peer mentoring, and tutoring.
10.3 Aligning curriculum. As discussed under 3.1, Lessons Learned, on page 5, activities to refine curriculum alignment and cohort enrichment are continually being developed, implemented, evaluated and modified. This will result in completing a Transfer Model Curricula agreement as well as standardizing content and sequencing using the model curriculum by the Association for Computing Machinery. These will be published online and available to anyone.
10.4 Student preparation. As documented under 2.2, most local students are not ready for college-level math. Yet, *CSIT-in-3* is a rigorous academic program. For long-term sustainability, the program must continue the existing math intensive program and AP CS MOOC courses (page 11) to engage and prepare high school students for a challenging bachelor's degree in computer science. Students must also exhibit *grit* (7.1 on page 16) to overcome this obstacle.
10.5 Streamlining the financial aid process, essential for sustainability, will bring all available financial resources together to ensure students can access the financial resources they need. CSUMB and Hartnell have devised and are implementing a strategy to address this issue.
10.6 Cost. *CSIT*-In-3 will reduce costs to the state and respective systems; $15,665 per student, per year at Hartnell College and $38,469 per year, per student at CSUMB (see Item 6).

The ultimate way to sustain this fast track program and achieve future goals is contingent on the continued success of the students. Innovative measures already built into the program will accomplish this while also addressing the goals outlined in the application: 1) developing a complete picture of each student including content knowledge/skills, professional development, and soft skills; and 2) efficiently delivering academic support services to cohorts of students.

Future work will be needed to scale and replicate these efforts to engage and graduate larger numbers of underrepresented students in high demand STEM fields like CSIT. This can be achieved by expanding access to college preparation services to students earlier in high school and by engaging more community colleges to provide computer science pathways based on the innovative model developed by CSUMB and Hartnell.

EVALUATION

11. How the program is being evaluated. CSUMB has contracted with Julie Shattuck, MA, Principal, Shattuck Applied Research + Evaluation who is working with a team led by CSUMB's Dr. Bude Su to design and conduct the evaluation study for this project. Dr. Su, director of CSUMB's Master's program in Instructional Science and Technology, leads internal evaluation of CSIT programs. Ms. Shattuck has 20 years of experience evaluating and conducting research on formal and informal STEM initiatives in higher education, including those sponsored by the National Science Foundation. Evaluation components are below, edited for space.

Evaluation Methods. A combination of qualitative and quantitative methods in formative and summative processes is used to examine the extent to which the project accomplishes its overarching goals and long-term outcomes. For comparison, data will be collected for students participating in *CSIT-In-3*, as well as for students participating in traditional computer science programs at CSUMB and Hartnell. Quantitative methods include: student recruitment, retention, transfer and graduation data; course grades; academic integrity management data. Qualitative methods include: surveys/feedback; interviews; focus groups; observation.

Evaluation Approach. A collaborative approach is being utilized for carrying out the evaluation study of this project and assessing its broader impacts.

Evaluation Questions. The primary questions the evaluation study addresses includes:

1. Does the *CSIT-In-3* program increase the number of CSIT bachelor's degree graduates at CSUMB? Does it increase STEM/CSIT bachelor's degrees earned by Latino and women students? This will be observed in both a near-term (<4 years) and long-term (>4 years).
2. Does the *CSIT-In-3* program increase the number of students transferring from Hartnell to CSUMB in computer science? This will be measured both near term and long term.
3. Do students participating in a collaborative three-year program (that includes a two- and four-year college) have higher rates of retention, persistence, transfer and graduation when compared to a statistically valid comparison sample of non-participating students in a traditional four-year bachelor's degree? This will be measured long-term (>4 years).
4. Are *CSIT-In-3* students equally as prepared upon graduation to compete with other bachelor's degree students from comparable institutions for jobs? (long-term, >4 years).
5. Does a three-year program save the college/state money compared to a traditional four-year bachelor's degree? Does it save students' money? (long-term, >4 years).
6. What support activities/program structures are necessary for student success: tutoring, progress monitoring, field trips/speakers, two-year college partnership with four-year university, cohort model, scholarships/students not working outside the program, internships/research experiences, and year round classes?

11.1 How changes described in the Innovations section will achieve the goals identified in response to Item 1. This has been addressed. Please see 3.1, 4.1, 4.2, 5.2, 8.1.

11.2 How evaluative feedback will inform future changes. Program leaders and faculty serve as an evaluation team, constantly reviewing and assessing formative data to determine the effectiveness of methods and strategies. Formative data is regularly used to adjust the program. Please also see 3.2 for detail on how evaluative feedback has driven program adjustments.

12. Target outcomes for each academic year through 2018-19 for the measures identified in your response to Item 11 *(Two pages maximum)*

The *CSIT-In-3* target outcomes are shown below for each academic year through 2018-19. As detailed earlier, enrollment, transfers and transfer rates pertain to students at Hartnell. Persistence pertains to students enrolled throughout the three years at both institutions. And graduates and graduation rates pertain to students who are awarded Bachelor of Science degrees in CSIT from CSUMB. All the measures identified below are included in Item 11. However, Item 11 also includes evaluation research questions that, at this time, cannot be quantified or reasonably projected; thus the need to research them. However, the program's key, essential outcome measures – *the measures that determine program success* – are all shown below.

Table 6: *CSIT-In-3* Target Outcomes Through 2018-19

Outcomes	2014-15	2015-16	2016-17*	2017-18*	2018-19*
Enrollment	60	92	92	92	92
Transfers, #	28	29	30	30	30
Transfer Rate	84% (27/32)	90% (29/32)	93% (30/32)	93% (30/32)	93% (30/32)
Persistence Rate	87%	87%	87%	90%	87%
Graduates, #	NA	25	26	27	27
Graduation Rate	NA	78% (25/32)	81% (26/32)	84%(27/32)	84%(27/32)

*Starting in 2016-17 and each succeeding year, three cohorts will be enrolled in the program at the same time. Program capacity is projected to remain constant through 2018-19.

Demographically, as shown in Item 2 earlier, the program's students are approximately 90 percent Latino, 90 percent low income, and 38 percent female. Based on Hartnell's long-term enrollment trends, it is projected that the program's proportion of Latino and low income students will remain comparable. However, the program will continue to make a deliberate and concerted effort at recruiting, enrolling, transferring, and graduating more female students. While 38 percent (the current female enrollment level) exceeds the proportion of women in most CSIT postsecondary programs, both institutions will work to achieve 50 percent female enrollment by 2018-19.

12.1 How targets were chosen. The target outcomes above were based on a number variables, parameters, and requirements. These include the following:

- CSIT program capacity at CSUMB and Computer Science program capacity at Hartnell College as determined by respective institutions and systems (CCC and CSU);
- The availability of full-time and adjunct faculty; current teaching loads; and maximum allowable teaching loads, per contracts;
- The required academic and student support services to support students in an accelerated

program and the availability of services to support program students;

- Current and future computer science facilities at Hartnell and CSUMB; classroom and laboratory capacity; classroom and laboratory availability; quality of available hardware and software;
- Financial requirements so that students would not need outside employment; current and projected costs to attend a CCC and CSU; cost-of-living for Monterey County; other costs associated with college attendance (see Item 6);
- Availability of financial aid for program students; scholarship support; grants and waivers; current and future sources of support (see Item 6).

After considering all the above factors and variables, it was determined that Hartnell could successfully enroll and support cohorts numbering 32-34 students. Based on projected retention and transfer rates, this would result in transferring 28-30 students from Hartnell to CSUMB, and graduating 25-27 students per year in *CSIT-In-3*. To date, the program's persistence and transfer rates are in-line with projections. When combined with positive student feedback (see Item 7.1), CSUMB's *CSIT-In-3* outcomes to-date indicate the program is on track to achieve its goals of increasing underrepresented and low income student enrollment, transfer, and graduation in computer science and information technology.

12.2 The most recent baseline measures for each target outcome for each participant in the application by academic year that data reflects.

The table below shows the program's initial baseline persistence and transfer rates compared to the most recent program outcomes as of January, 2015:

Table 7: Comparing *CSIT-In-3* Initial Transfer and Persistence Rates 2014

Hartnell Latino 4 Yr Transfer Rate	*CSIT-In-3* Transfer Rate	Hartnell CSIT Persistence Rate	*CSIT-In-3* Persistence Rate
18.0%	**84.0%**	**59.4%**	**87.5%**

Data above was generated by Hartnell College Management Information Systems (2014) using the Cognos management software. Data on CSUMB graduation rates will not be available until 2016.

Lastly, in the year before this concept was developed, only one (1) student transferred from Hartnell to CSUMB in Computer Science (Hartnell STEM Transfer Data, 2010). Clearly, *CSIT-In-3* is having a major impact on student enrollment and success.

Note to readers: *full citations of all references cited in this document are available upon request. The application package made no accommodation for references cited and using footnotes would have restricted the information required for accurate consideration of the proposal. Thank you.*

Appendix A

Exhibit 1 – List of all entities participating in the application.

- California State University, Monterey Bay, Seaside, CA
- Hartnell Community College, Salinas, CA

Exhibit 2 (page ii) – Letter from Dr. Eduardo M. Ochoa, President, California State University, Monterey Bay.

Exhibit 3 (page iii) Required assurance and signature.

Exhibit 4 (page iv) – Letter from Dr. Willard C. Lewallen, President, Hartnell College.

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December 18, 2014

Award for Innovation Selection Committee
California Department of Finance
Education Systems Unit – Innovation Awards
915 L Street, 7th Floor
Sacramento, CA 95814

RE: Support for California State University, Monterey Bay's Application for an Award for Innovation in Higher Education 2015

Dear Committee:

California State University, Monterey Bay (CSUMB) is fully in support of this application for the Innovation Award in Higher Education. As federally designated Hispanic Serving Institutions (HSI) serving the local community and in keeping with their respective missions, CSUMB and Hartnell College have come together to form a partnership dedicated to student success.

CSUMB is pleased to continue to be a strong and committed leader in the CSIT-in-3 program, a three-year bachelor's degree program in computer science and information technology. Based on experience and data generated by the program to-date, this innovative new model for bachelor's degree completion is improving enrollment, retention, transfer, and graduation for disadvantaged and underrepresented students in a highly-skilled STEM field. Ultimately, the goal is to change the economic trajectory of the Salinas Valley and Monterey County region.

This program helps CSUMB advance a culture of innovation and adaptability that enable us to meet critical educational challenges and empower communities that have not been able to fully access higher education. Higher education needs to explore, develop, test, revise, and implement alternative models for degree completion and success that will support the unique needs of underrepresented students, particularly in high skill, high demand fields, like computer science.

Please know that CSUMB, its administration, faculty, and staff are committed to this program and to the innovative approaches it is testing that can serve as a catalyst for future advances across this campus in years to come.

Sincerely,

Eduardo M. Ochoa
President

Assurance and Signature

"I assure that I have read and support this application for an award. I understand that if this application is chosen for an award, my institution will be required to submit, for approval by the Committee on Awards for Innovation in Higher Education, a report indicating proposed uses of the award funds and, as the fiscal agent, will be responsible for distributing funds to any other participating entities. I also understand that, if this application is selected for an award, my institution will be required to submit reports to the Director of Finance by January 1, 2018, and by January 1, 2020, evaluating the effectiveness of the changes described in this application."

Signed,

12-18-14

Eduardo M. Ochoa, Ph.D.
President
California State University, Monterey Bay

Date

HARTNELLCOLLEGE

OFFICE OF THE PRESIDENT
Willard Clark Lewallen, Ph.D.
Superintendent/President

wlewallen@hartnell.edu

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December 17, 2014

Award for Innovation Selection Committee
California Department of Finance
Education Systems Unit – Innovation Awards
915 L Street, 7th Floor
Sacramento, CA 95814

Support for California State University, Monterey Bay's Application for an Award for Innovation in Higher Education 2015

Hartnell Community College District is pleased to continue to be a strong and committed lead partner in the *CSIT-in-3* three-year bachelor's degree program in computer science and information technology. The experience and data generated by the program to-date is demonstrating that this innovative model for bachelor's degree completion is improving enrollment, retention, transfer, and graduation for historically disadvantaged and underrepresented students. And it is equipping them with the skills to succeed in high-demand and high-wage jobs.

Through a cohort model the program leads to bachelor's degree completion in three years. To our knowledge it is the only program of its kind in the U.S. where a community college and a university are equal partners in delivering such a program. It aligns with President Obama's education initiatives in reducing the cost of higher education and shortening time to completion. Additionally, the program supports equity in higher education opportunity and attainment as 89% of the students are Latino/Hispanic, 40% are women, and 83% are first generation college students.

This program not only helps Hartnell College achieve its institutional mission to the community, but it advances a culture of innovation, adaptability and relevance. This culture enables us to meet critical educational challenges and empower communities that have not been able to fully access higher education. This culture also commits us to explore, develop, test, revise, and implement alternative models for degree completion and success that will support the unique needs of historically under-represented students to fully engage with employers and contribute to our regional economy.

Please know that Hartnell College, its administration, faculty, and staff are committed for the long term to this program and to the innovative approaches it is implementing and assessing that can serve as a catalyst for future advances across this campus and with our education and industry partners in years to come.

Regards,

Willard Lewallen

Willard Lewallen, Ph.D.
Superintendent/President

Growing Leaders *Opportunity. Engagement. Achievement.*

HARTNELL COLLEGE MISSION STATEMENT
Focusing on the needs of the Salinas Valley, Hartnell College provides educational opportunities for students to reach academic goals in an environment committed to student learning, achievement and success.

Appendix B

3. Key policies, practices, and/or systems in place prior to January 10, 2014, that were initiated to achieve the goals identified in Item 1. The impact of these policies, practices, or systems, to date. Lessons learned. *(Appendix B, limited to 10 pages maximum.)*

Exhibit 1: CSIT-in-3 Original Vision Statement and Outline, 2012

HARTNELL COLLEGE

CALIFORNIA STATE UNIVERSITY Monterey Bay

CSIT-In-3

Bachelor's Degree Program in 3 Years
Program Description – Fall 2012

Hartnell College and California State University, Monterey Bay (CSUMB) plan to offer a collaborative three-year bachelor's degree program in computer science and information technology beginning in fall 2013. A cohort of 25-30 students will be admitted into this program and will take classes at Hartnell during the first year and half of the program and classes at CSUMB during the second year and a half.

This program will consist of the following elements:
1. **Cohort-based program:** Students will take classes together and participate in outside classroom cohort activities to build a strong community of learners.
2. **Course schedule:** A specific schedule will be developed for the students by the program advisor, with a course schedule and cohort activities for each semester. Students will follow the schedule developed by the program advisor.
3. **Financial aid:** Every effort will be made to support the students in the cohort to receive financial support through local foundations, state, federal scholarships, and paid work-study opportunities. Students will be strongly encouraged to focus on their education and not commit to external employment responsibilities.
4. **Student success services:** Students will receive outside classroom support to ensure success in the program including tutoring, workshops, professional development, guest talks and field trips throughout the year.
5. **Summer internship experience:** During the second summer of the program, students will be placed in paid summer internship opportunities with partner organizations for ~8 to 10 weeks, with the experience culminating in an internship symposium.
6. **Assessment and Evaluation:** Student learning will be assessed throughout the three years and the program as whole will be evaluated to measure its effectiveness.

Eligibility Requirements
Students accepted into this program must meet the following requirements:
1. Cumulative GPA of 3.0 or higher in their most recent education. If a student has a GPA lower than 3.0, student must submit a one page statement explaining the reason for the lower GPA and how they will be able to succeed in the CSIT-In-3 program.
2. Students must have taken pre-calculus before starting the program.
3. Commitment to following the prescribed schedule and participating in the program activities for the three-year duration.

Timeline

1. Advertisement of the program: July through November
a. CSIT-In-3 open houses: August through October
b. High school visits: August through November
c. Material and training for recruiters/counselors at Hartnell, CSUMB and high schools: August through September
2. Application window to CSIT-In-3: November 30 – April 8
3. Advising events: November through January
4. Hartnell scholarships (S-STEM, etc.) deadline: December 20
5. Engagement and tutoring events: February through May
6. Summer bridge: End of June through Mid July
7. Hartnell early registration: April 22, 2013
8. First cohort begins in fall 2013
9. Repeat 1 through 7 for next cohort each year

Budget (Fall 2012 to Spring 2017)

1. Program director/advisor: 4 unit buyout per semester
2. Program coordinator: $55K per year plus fringe benefits
3. Financial aid/scholarship support
a. $10K x 25 students (Fall 2013-Summer 2014)
b. $10K x 50 students (Fall 2014-Summer 2015)
c. $10K x 75 students (Fall 2015-Summer 2016)
d. $10K x 75 students (Fall 2015-Summer 2017)
4. External evaluator: $20K per year
5. Summer internship experience (each year starting in Spring '15-Summer '15)
a. Internship coordination: $30K
b. Summer student pay: $12 x 40 hours x 12 weeks x 10 students plus fringe benefits
6. Support services:
a. Summer bridge programs: $15K per year
b. Field trips, guest lectures, meetings/events: $10K per year

Outcomes

1. Increase number of students from the Monterey Bay/Salinas Valley regions graduating with a bachelor's degree in computer science
2. Increase number of underrepresented minority students from the Monterey Bay/Salinas Valley regions receiving bachelors degree in computer science
3. First ever three year program as an articulated pathway between a junior college and a four year state university
4. Shorten the timeframe for students to join the workforce to 3 years from the standard 4+ years
5. A model for three year program that can be duplicated in other regions of the state leveraging investments in junior colleges and state universities
6. Evaluation of the efficacy of cohort based activities on student learning in computer science
7. Evaluation of student learning in an accelerated three year program

Exhibit 2: CSIT-in-3 Sample Three Year Pathway, 2013.

CSIT-In-3

Sample Three Year Pathway

Hartnell Courses & CSUMB Courses

Fall 2013 (Year 1) - 18 Units

Course Number	CSS 1	ENG 1A	MAT 3A	HIS 17B	CST 286
Course Name	Intro to CS and Prog Fund	College Comp and Reading	Calculus – I	US History	Physics of Computing
Units	4	3	4	3	4

Winter 2013 (Year 1) - 3 Units

Course Number	MUS 5				
Course Name	Ethnic Music				
Units	3				

Spring 2014 (Year 1) - 17 Units

Course Number	SOC 5	ENG 2	CSS 7	CSS 2A	BIO 42
Course Name	Intro to Soc Problems	Critical Thinking	Discrete Structures	Obj Oriented Programming	Human Biology
Units	3	3	4	4	3

Summer 2014 (Year 1) - 7 Units

Course Number	CSS 2B	SPE 1A	Cohort		
Course Name	Data Structures	Essentials of Pub Speaking	Activities and Projects		
Units	4	3			

Fall 2014 (Year 2) - 18 Units

Course Number	POL 1	CSS 41	CSS 3	ENG 1B	CST 338
Course Name	American Pol Inst	Operating Systems	Comp Arch & Assembly Prog	College Lit & Composition	Software Design
Units	3	4	4	3	4

Winter 2014 (Year 2) - 3 Units

Course Number	PHIL 10				
Course Name	Ethics				
Units	3				

CSIT-In-3

Sample Three Year Pathway

Hartnell Courses & CSUMB Courses

Spring 2015 (Year 2) - 18 Units

Course Number	CST 300	CST 336	MATH 370	CST 438	CST 462S
Course Name	Pro Seminar	Internet Programming	Logic & Computation	Software Engineering	CS and Service Learning
Units	4	4	4	4	2

Summer 2015 (Year 2) - 0 Units

Course Number					
Course Name	Internship/Research Projects				
Units	0				

Fall 2015 (Year 3) - 18 Units

Course Number	CST 400	CST 496	CST 205	CST 370	CST 363	CST 495
Course Name	Senior Capstone	Directed Study	Multimedia & Programming	Algorithms	Database Systems	Open Src SW
Units	2	2	4	4	4	2

Winter 2015 (Year 3) - 3 Units

Course Number	ECON 1				
Course Name	Prin of M-Economics				
Units	3				

Spring 2016 (Year 3) - 15 Units

Course Number	CST 400	CST 496	CST 328	CST 373	CST 495	
Course Name	Senior Capstone	Directed Study	Digital Art & Design	Ethics in Comm & Tech	Mobile Applicat	
Units	2	2	4	4	3	

Exhibit 3: Motivating Rationale for Original Project, 2012.

Academic Integrity Management (AIM) of a collaborative three year computer science degree program
http://csitin3.hartnell.edu
Motivating Rational

The need to increase number of college graduates in STEM, in particular in computer science and information technology fields, is well known. Increasing the number of underrepresented and first-generation students in the CSIT field is a crucial component in addressing this need. Such an increase in underrepresented students will increase the number of college graduates while also supporting upward mobility and expanded opportunities to underserved communities. Many projects are being implemented by educational institutions and funding agencies to attract and support underrepresented students through existing college programs with varied levels of success.

Meanwhile, three-year pathways for bachelor's degree programs have been proposed to address college affordability concerns. Typically, these proposals define a three-year pathway (course sequence) for high-achieving, self-motivated students to follow in order to graduate earlier, saving them money and decreasing the time before they can join the workforce.

In this project, we are building a three-year program (combining a three-year course sequence with a strong student success support program), which targets predominantly underrepresented and first generation students as a fundamentally new approach to attract such students into highly-competitive and demanding majors like computer science and information technology. This three-year program will be offered in partnership between Hartnell College (2-year college) and California State University Monterey Bay (University). Please visit http://csitin3.hartnell.edu for further information on the program.

This approach is built on the following ideas:

1) Cohort-based learning communities increase the success of underrepresented and first generation students in STEM majors [1].
2) Continuous engagement through the summer and winter without significant breaks leads to increases in both retention and graduation rates[2].
3) The sooner students graduate the more likely they are to complete their degree program.
4) Starting post-secondary education at a two-year college is an important step for many students in preparing for a four-year university [3]. In particular, students from underserved communities have a stronger affinity for and comfort level with their local community college.
5) Monitoring student performance and providing support on challenging topics reduces the likelihood of students becoming discouraged and dropping out. Such support also increases the likelihood that students pass crucial introductory/gateway courses.
6) Many students from underserved communities struggle in college due to non-academic reasons like a lack of guidance through the course pathway to graduation. These students will thrive when provided with clear and well-defined degree pathway as they continue to make progress towards their goal of graduating from college.
7) Lower tuition costs will open the door to students who otherwise may not have considered higher education.

Objectives

● Attract 30 students into the CSIT-In-3 program every year starting Fall 2013 for three consecutive years

● Graduate at least 80% of the students in each cohort within three years

● Summer internship experience for at least 80% of the students in the cohort during the second summer

● Academic Integrity Assessment and Evaluation report published 6-months after the graduation of each cohort

● After completing CSIT-In-3, all students find relevant employment or be accepted into a graduate program

Outcomes

● 75 students to receive associate's degree followed by bachelor's degrees in computer science at the end of five years – ~25 each year beginning at the third year of the project

● 25 students receive associate's degree and working towards their bachelor's degree at the end of five years

● 25 students completed 80% of their associate's degree requirement working towards completion of both associates and bachelor's degree at the end of five years

● The academic success support programs developed by this project institutionalized using existing and new efforts funded by the cost savings demonstrated by this project

● A model for collaboration between a community college and university to offer effective 3 or 4 year pathways for students to graduate on time

● A thorough evaluation report on the effectiveness of the support programs at the end of each year

● An Academic Integrity Assessment and Evaluation report published 6-months after the graduation of each cohort to assess and demonstrate the quality of the degree program

● A symposium for other community colleges and CSUs interested in adopting this model - dissemination and collaboration starting from the second year of the project

● Project website with all relevant information for duplication of similar effort in other institutions along with at least 3 publications and presentations in educational research conferences for dissemination of best practices

Academic Success Support Programs

There will be three types of support activities developed for the student cohorts:

● **Learning Community**

a Summer bridge program: Prepare them for the three year program with study skills, time management, teamwork and to establish clear expectations from the program staff and between themselves. This summer activity will focus on building a comprehensive and supportive learning community.

b Weekly work time: Students will get together every week to work on their course work.

c Cohort-building activities: Students will participate in field trips, social events and competitions to strengthen the cohort.

● **Academic Support:** Student academic performance will be continually tracked and interventions will be offered based on the following activities:

a Faculty/Instructor Meetings: All the instructors of courses that the three year cohort students are in will get together once every month to exchange notes and information on student performance. PI, AIM Coordinator and other project staff will participate in these meetings to develop a clear learner profile for each students to identify needs and plan intervention.

b Tutoring Support (Individual/Group): Depending on the needs identified, tutoring will be scheduled to help students through challenging content.

● **Professional Development:** Students will be participate in the following activities to support them through the demands of an rigorous college education and prepare them for their career:
a Internship preparation workshop: Prepare them with resume writing, interview skills, project planning and tracking, workplace expectations.

b Summer internship experience for 10-12 weeks during the second summer for about 80% of the cohort.

c Speaker series: Cutting edge technology exposure along with opportunity to meet role models will be developed through invited speaker series.

d Tools and resources will be developed to teach 21st Century Skills to the students in the cohort.

e Engaging hands on projects: Students in the cohort will be given the opportunity to apply what they are learning in classroom in applied project work outside the classroom on a regular basis. This will develop teamwork skills in students while helping them see the utility of the knowledge and skills they are gaining in classroom.

Academic Integrity Assessment and Evaluation
Two forms of evaluation will be conducted to collect and analyze data that will inform the design of the degree program and the support activities.
● **Major related courses assessment:** An evidence based demonstration of the quality of the CSIT-In-3 major learning outcomes will be conducted through the following steps:
a Evidence of student learning for a random collection of students from each course will be collected. This evidence will be evaluated independently without reference to the grade to ensure quality.

b The courses will be evaluated independently against the ACM curriculum and/or another course offered at an equivalent level at a different university to ensure that the material covered is comparable to other degree programs and student outcomes are comparable to other degree programs.

c CSIT-In-3 student work will be compared with students in our traditional pathway to ensure the that increased workload for these students is not negatively affecting student performance.
● **21st Century Skills assessment:** Tools and resources from Assessment & Teaching of 21st Century Skills will be used to assess the students.

● **Evaluation of support activities:** An external evaluator will study the outside classroom support activities to measure their usefulness, identify what aspects of these activities are useful and what aspects are not necessary.
Data from these activities will be used to improve the quality of the educational experience for the students and to demonstrate the quality of CSIT-In-3 program as equivalent, if not better than traditional four-year programs.

Project Management Team
PI: Sathya Narayanan Ph.D (CSUMB): Responsible for overall project management, planning of AIM activities and assessment of the culminating courses with emphasis on capstone project quality.
Co-PI: Joe Welch (Hartnell): Responsible for coordination between two institutions, planning of AIM activities and assessment of the math and science courses in the CSIT-In-3 pathway.

Academic Integrity Management (AIM) Coordinator: A new position funded by this project to coordinate and organize AIM activities along with coordination of assessment and evaluation. This position will also provide technical project help for research projects and internship projects to students. Person hired will have a bachelor's degree in computer science with two years of software development experience or a master's degree in computer science.

AIM Faculty Team
Computer Science faculty at Hartnell College and CSUMB will be take lead in AIM assessments and evaluation of various courses within the degree program along with the support activities for these courses to ensure student success.

- **Sonia Arteaga Ph.D (Hartnell):** CSS3, CSS9, CSS 41
- **YoungJoon Byun Ph.D (CSUMB):** Software Engineering Concentration Courses
- **Kate Lockwood Ph.D (CSUMB):** CSS1, CSS2A, CSS2B courses
- **Pam Wiese (Hartnell):** CST 205, CST 363, CST 370

The faculty team will also be involved in other AIM activities in collaboration with the PI and the AIM coordinator.

Sustainability
Successful development of this program will achieve:
1) Increased participation and success of underrepresented students in computer science field including Hispanics and women.
2) Cost savings for institutions both through increased utilization of the resources, early graduation of students and complementary use of resources in the two institutions.
3) Significant cost savings to students increasing college affordability to a population that may not have access higher education otherwise.
4) Potential increase in the economic productivity by moving students into the economy one year earlier.
The sustainability of the project will be based on a cost model developed by the project staff to utilize the savings in points 2-4 to justify the additional cost incurred by the proposed project. Using this approach all necessary AIM activities will be institutionalized incorporating into existing efforts or by the implementation of new efforts. The new cost model combined with documentation for duplicating such three year programs in other institutions will be developed at the end of the fourth year of the project.

Reference:
[1] Taylor, Kathe, William S. Moore, Jean MacGregor, and Jerri Lindblad. (2003). Executive Summary. Learning Community Research and Assessment: What We Know Now. Washington Center for Improving Higher Education. Retrieved on September 15, 2009 from http://www.evergreen.edu/washcenter/resources/upload/Pages_from_ImpactLC.pdf.
[2]Cooper H., Nye B., Charlton K., Lindsay J., Greathouse S. (1996). The effects of summer vacation on achievment test scores: A narrative and meta-analytic review. Review of Educational Research, 66(3), 227–268.
[3]http://www.insidehighered.com/news/2012/09/10/data-show-key-role-community-colleges-4-year-degree-production?utm_medium=referral&utm_source=pulsenews).

Appendix C

Key changes to policies, practices, and/or systems initiated since January 10, 2014 intended to achieve the goals identified in Item 1. Why the changes initiated will achieve those goals. Expected impact of the changes. *(Limited to 15 pages maximum.)*

Exhibit 1: A revised/updated sample three-year sequence of courses for *CSIT-In-3*.

H: indicates a course completed at Hartnell; **C:** indicates a course completed at CSUMB

	Fall	Winter	Spring	Summer
Year 1	CSS 1 – Intro to CS & Prog. Fundamentals (4 units) **H**	MUS 5 – Ethnic Music in the US (3 units) **H**	SOC 5 – Intro to Social Problems (3 units) **H**	CSS 2B – Data Structures & Algorithms (4 units) **H**
	ENG 1A – College Composition & Reading (3 units) **H**		ENG 2 – Critical Thinking & Writing (3 units) **H**	SPE 1A – Essentials of Public Speaking (3 units) **H**
	MAT 3A – Analytic Geometry & Calculus 1 (4 units) **H**		CSS 7 – Discrete Structures (4 units) **H**	Cohort activities and projects
	HIS 17B – United States History B (3 units) **H**		CSS 2A – Object Oriented Programming (4 units) **H**	
	CST 286 – Physics of Computing (4 units) **C**		BIO 42 – Human Biology (3 units) **H**	

	Fall	Winter	Spring	Summer
Year 2	POL 1 – American Political Institution (3 units) **H**	PHIL 10 – Ethics (3 units) **H**	CST 300/300L – Major Proseminar Lecture/Lab (4 units) **C**	Internship/research projects
	CSS 41 – Operating Systems (4 units) **H**		CST 336 – Internet Programming(4 units) **C**	
	CSS 3 – Computer Architecture & Assembly Language Prog (4 units) **H**		MATH 370 – Logic & Computation (4 units) **C**	
	ENG 1B – College Literature & Composition (3 units) **H**		CST 438 – Software Engineering (4 units) **C**	
	CST 338 – Software Design (4 units) **C**		CST 462S – Computer Science & Community (2 units) **C**	

	Fall	Winter	Spring	Summer
Year 3	CST 400 – Senior Capstone Project Planning (2 units) **C**	ECON 1 – Principles of Macroeconomics (3 units) **H**	CST 401 – Capstone Lab (2 units) **C**	Graduated/ Employed
	CST 496 – Directed Study (2 units) **C**		CST 496 – Directed Study (2 units) **C**	
	CST 205 – Multimedia Design & Programming (4 units) **C**		CST 328 – Digital Art & Design (4 units) **C**	
	CST 370 – Design & Analysis of Algorithms (4 units) **C**		CST 373 – Ethics in Communications & Technology (4 units) **C**	
	CST 363 – Database Mngmnt: Methods & Applications (4 units) **C**		CST 495 – Special Topics: Mobile Applications (3 units) **C**	
	CST 495 – Special Topics: Open Source Software (2 units) **C**			

Exhibit 2: Excerpts from 2014 Updated Summer Bridge Orientation Power Point presentation.

Summer Bridge Purpose

- **One line objective:**
- Students will embody and practice commitment learning. They are accountable and will intervene and act accordingly.

CSIT-In-3

Mission Statement

A CSIT-In-3 student who embraces high-expectations, has a tenacious work ethic, and commits to the cohort learning community, upon graduation, will be well-prepared to compete with graduates from any top 10 computer science programs for opportunities in the industry or academia.

1 through 5	6 through 10
MIT	Oxford
Stanford	Cambridge
Carnegie Mellon	ETH Zurich
UC Berkeley	National U of Singapore
Harvard	Princeton

CSIT-In-3

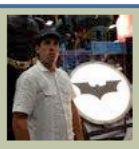
Program Team Introductions

Joe Welch
Co-Director
Hartnell Faculty

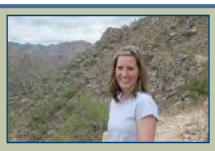
- Guide the ship
- Make big decisions
- Handle policy exceptions
- Teaching

Sathya Narayanan
Co-Director
CSUMB Faculty

Katie Cunningham
CS Education Coordinator
All things academic:
- Fri & Sat enrichment
- Study time
- Performance tracking



Melvin Jimenez
Program Manager
Logistics support & recruitment:
- Course registration
- Financial aid, scholarships
- Field trips & speakers
- Recruitment & math prep



Leslie Kern
Program Coordinator
21st Century Skills:
- Writing enrichment
- Leadership program
- Internship program

Outcomes for the week

- Establish high expectations for cohort(Grit/GPA, work effort, commitment to cohort)
  - Active learning
  - Engaged in all activities
  - What do you want to learn (Mazur)? What do you want to take away?
- Writing and communication excellence - Proficient academic skills
- Teambuilding
- Information and opportunities in computer science

CSIT-In-3

Daily Plan - Monday

Time	Event
AM	Group arrangements Daily Plan
	Introductions Dr. Lewallen – Hartnell College Dr. Irwin - CSUMB
	Study Skills - Connect - Notetaking
	Handbook -> Commitment/GRIT
	Picobots
Lunch	
PM	Study Skills - Communicate - Email
	Why these courses?
	Study Skills - Communicate – Writing
Wrap-Up	Survey Q&A Homework Review student notes

CSIT-In-3

Exhibit 3: Revised/updated 2014 CSIT-in-3 Handbook

CSIT-In-3

Handbook

Fall 2014

HARTNELL COLLEGE

CALIFORNIA STATE UNIVERSITY Monterey Bay

A CSIT-In-3 student who embraces high expectations, has a tenacious work ethic, and commits to the cohort learning community, upon graduation, will be well-prepared to compete with graduates from any top 10 computer science program for opportunities in the industry or academia.

The singular goal of CSIT-In-3 is to prepare students to compete and succeed in the professional field of computer science. Simply graduating with a CSIT degree, regardless of GPA, is not the measure of success for cohort students. The students must demonstrate very high standards of professionalism, communication, analysis, inquiry and dogged perseverance. CSIT-In-3 students must **achieve high levels of mastery**, **demonstrate relentless effort – Grit**, and **exhibit cohort commitment**.

Mastering Academics

GPA

Mastery of material is evidenced by GPA, and CSIT-In-3 students should always have the goal of a 4.0 GPA. Additionally, to continue in the program, CSIT-In-3 cohort members are required to earn a GPA of 2.5 or higher every semester - fall, winter, spring, and summer. Also, a minimum grade of "C" or better must be earned in all degree applicable units (CSS courses at Hartnell, CST courses at CSUMB).

- A student whose GPA is 2.0 or above but below 2.5 at the end of a semester will receive notice from the program and will need to earn a GPA of 2.5 or higher in all subsequent semesters.
- A student whose GPA is below a 2.0 at the end of a semester is ineligible to continue in the program.
- A student whose GPA is 2.0 or above but below 2.5 for any two semesters (consecutive or not) is ineligible to continue in the program.

Internship

The CSIT-In-3 mentor team will provide guidance and support in identifying internship placements for cohort students fully exhibiting these characteristics: (1) demonstrating Grit and (2) achieving very high-quality academic performance. The types and number of internship opportunities an individual student will get is entirely dependent on her/his ability to demonstrate value to the potential organization.

Failing a Course

Because of the accelerated, cohort-based nature of CSIT-In-3, failing a course is not acceptable. A student who earns a letter grade of 'D' or 'F' in any course is ineligible to continue in the program.

GRIT

Demonstrating Relentless Effort

CSIT-In-3 cohort members are required to demonstrate their willingness to work relentlessly, achieve, demonstrate inquiry and passion in mastering skills, integrate knowledge and earn results. Both Grit and GPA are used to assess a cohort student's effort and mastery in preparing for an internship program.

Important characteristics in exhibiting relentless effort and Grit are (Blue chips):

- Tireless study and practice to master the tools and techniques of computer science. (GPA does not necessarily indicate mastery.)
- Selection and completion of CS project work beyond what is expected and assigned in class.
- Attendance, inquiry and engagement during all (optional and required) academic support sessions, enrichment sessions and CS community learning opportunities (open source skills and contributions, skill development workshops, etc.)

Characteristics and behavior that do NOT represent Grit are (Red chips):

- Missing classes and required/optional enrichment activities.
- Arriving late and leaving early from classes and required/optional enrichment activities.
- Not taking advantage of tutoring support or optional enrichment activities even though there are demonstrable gaps in student's knowledge or skillset.
- Requesting exceptions and finding reasons for missing cohort events.
- Missing assignments or working on assignments in the last minute.
- Not EXHAUSTING ALL resources (faculty office hours, tutoring, online content) to achieve mastery.

Content knowledge and skill sets that demonstrate Grit:

- A respectable GPA above the minimum expectations of a potential future employer.
- Multiple projects that demonstrate the ability to solve problems and achieve results.
- Ability to clearly and concisely communicate knowledge, skillsets, and contributions to projects.

Cohort Commitment

CSIT-In-3 students realize that they are in a unique learning community that requires high levels of cooperation. Other cohort students are the future professional network for each CSIT-In-3 student. CSIT-In-3 cohort members commit to **ALWAYS be part of the solution** by embodying the values described below. CSIT-In-3 students will personally exhibit these characteristics as well as encourage similar behavior in classmates:

1. **Cooperation:** You are part of a cohort. Foster an encouraging, respectful environment.
2. **Self-motivation:** You have to be the most enthusiastic person pursuing your goals.
3. **Embracing the potential for failure:** Discomfort is often where great things happen.
4. **Time on task:** Genius/creativity/innovation are 99% perspiration.
5. **Being accountable:** Primary responsibility for your success lies on your shoulders. Own it.
6. **Expecting more:** Excellence should be your norm. Give 100% and then give more.
7. **Communicating clearly:** Being able to express a good idea is almost as important as having it.

Administrative Policies

Professional and Program Preparation

To master CSIT-In-3 academic and program material, it is essential that CSIT-In-3 students are prepared. CSIT-In-3 students always have appropriate materials. They obtain textbooks and other supplies

(binders, folders, paper, and parking pass) before the start of class, and have a functional laptop with appropriate software (antivirus, etc.) installed.

Schedule

CSIT-In-3 students know their academic schedule and plan other events (appointments, etc.) around required activities, which include courses, study sessions, and enrichment. The CSIT-In-3 Cohort Student Calendar is a convenient way to keep track of this schedule, and is available at the following URL: [https://sites.google.com/site/csitin3/current-students]. However, the official and continuously updated sources for event dates and locations are listed below, and students should check these sources for the most current information:

- CSUMB courses: CMS Student via my.csumb.edu
- Hartnell courses: PAWS for Students via hartnell.edu
- Study sessions and enrichment: Email from CSIT-In-3 team

The classes, tutoring sessions and events listed on the Cohort Calendar are required, and students are expected to schedule other necessary personal events around this schedule. Occasionally, a speaker or other event may need to be scheduled in the evening. In this case or in the event of any other schedule changes, the program will give students as much advanced notice as possible.

Academic Calendar Dates

The CSIT-In-3 cohort schedule is a blend of the academic calendars from both Hartnell College and from CSUMB. Important academic calendar dates are available in the following official locations:

- CSUMB: catalog.csumb.edu/introduction/calendars
- Hartnell: hartnell.edu/academics/calendars/

The CSIT-In-3 mentor team will also communicate most of these events (class start dates, final exam week dates, holidays, etc.) through the CSIT-In-3 Cohort Student Calendar. There are two brief breaks each year - one before winter session and another before summer session. Otherwise, students need to plan for full engagement in academics, study, and projects for the duration of the program.

Attendance

Attendance and active participation in class, study time, and cohort enrichment activities are critical to being successful in CSIT-In-3. This is an accelerated program with very high expectations and students are strongly advised to attend every CSIT-In-3 related activity. In each fall, spring and summer semester, CSIT-In-3 cohort members are allotted two days of absences from required cohort activities for any reason – illness, car trouble, sick child, etc. There is no allotment of absences during winter session. Any absences during winter session are considered exceptions and must be requested accordingly.

Under the absence policy:

- The student is responsible for all missed course assignments, tests, and quizzes. He/she should work directly with instructors to make up missed work in accordance with course policies.

- The student is responsible for getting any notes, handouts, or assignments from a fellow classmate or from the course instructor.
- A partial day is counted as one of the two allotted absences.

Notifying the Program of Absences

Absences within the two-absence limit should be reported to kcunningham@csumb.edu. Whenever possible, students are encouraged to give advanced notice of an absence. Otherwise, absences should be reported as soon as possible after the absence. *It is the student's responsibility to notify course instructors in accordance with course policies.*

Exceptions

Requests for exceptions will be considered in extreme circumstances (i.e. long-term illness). Requests should be emailed to snarayanan@csumb.edu, copy jwelch@hartnell.edu well in advance of absence.

Retaking previously completed courses

If a student has earned a grade of 'A' or better in any previously completed non-CS course required in CSIT-In-3, then they do not have to retake the course. This can be applied to one course maximum in each fall and spring semester and does not apply to summer or winter sessions. The student must notify the mentor team of their interest in not retaking a course one semester ahead of time. The mentor team will work with the student to define an equivalent level of CS focused objective for completion during this available time.

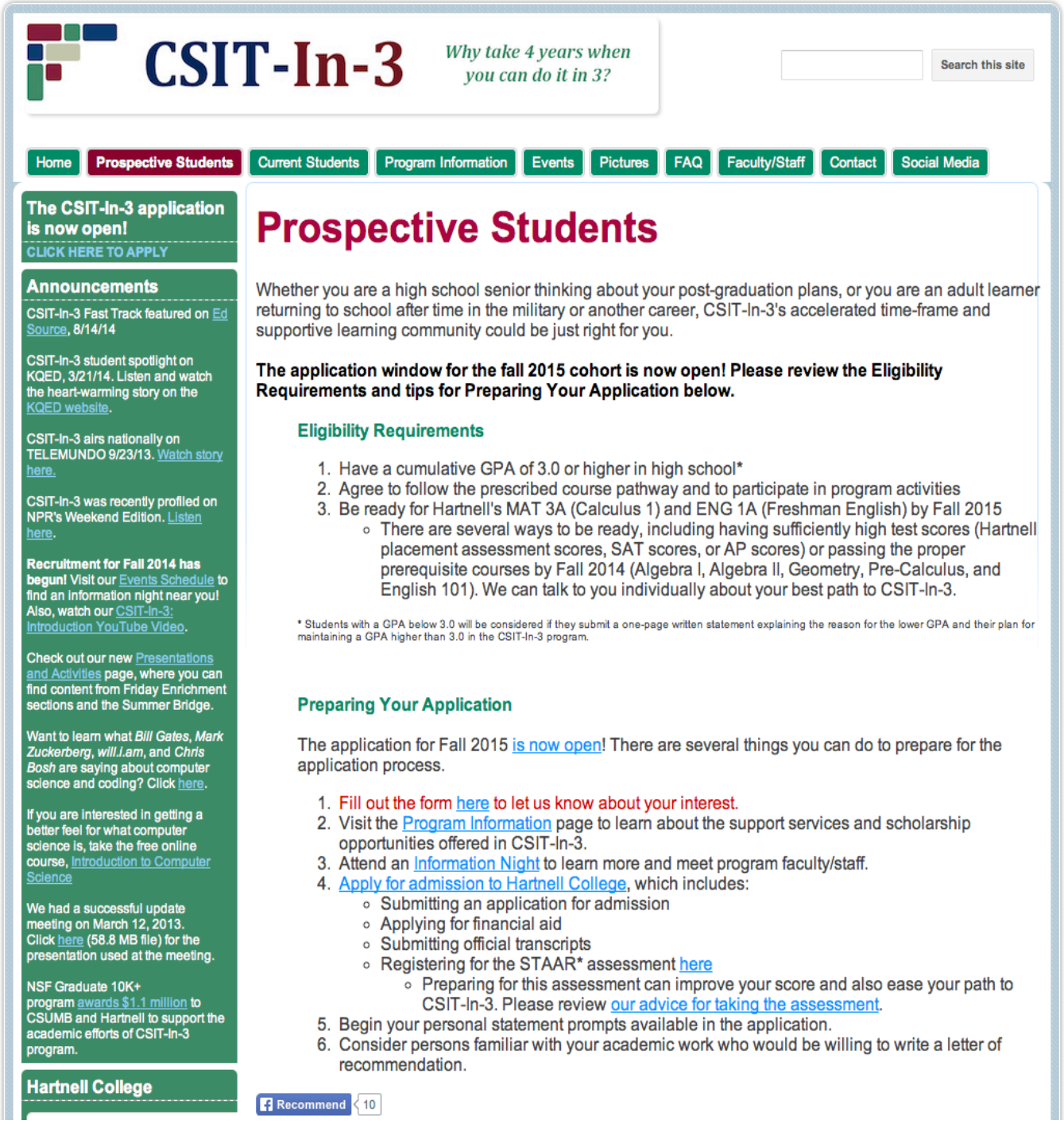
Email

Email is a primary mode of communication between program staff, faculty, and students. Students should check email at least once a day. Program information will be communicated via email (schedule changes, field trip details, cohort enrichment assignments, etc.), and students are responsible for being aware of that information and acting accordingly. Students should check both their Hartnell and CSUMB e-mail each day. Personal e-mail addresses will not be the preferred method of communication.

Contacts

Name	Position	Email	Phone
Sathya Narayanan	Co-director/Faculty	snarayanan@csumb.edu	Email preferred
Joe Welch	Co-director/Faculty	jwelch@hartnell.edu	Email preferred
Katie Cunningham	Computer Science Education Coordinator	kcunningham@csumb.edu	831-582-3995
Melvin Jimenez	Program Manager	melvjimenez@csumb.edu	831-582-4737
Leslie Kern	Program Coordinator	lkern@csumb.edu	831-582-5078

Exhibit 4: Screenshot of new program web page for prospective students.



CSIT-In-3

Why take 4 years when you can do it in 3?

Search this site

Home | Prospective Students | Current Students | Program Information | Events | Pictures | FAQ | Faculty/Staff | Contact | Social Media

The CSIT-In-3 application is now open!

CLICK HERE TO APPLY

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NSF Graduate 10K+ program awards $1.1 million to CSUMB and Hartnell to support the academic efforts of CSIT-In-3 program.

Hartnell College

Prospective Students

Whether you are a high school senior thinking about your post-graduation plans, or you are an adult learner returning to school after time in the military or another career, CSIT-In-3's accelerated time-frame and supportive learning community could be just right for you.

The application window for the fall 2015 cohort is now open! Please review the Eligibility Requirements and tips for Preparing Your Application below.

Eligibility Requirements

1. Have a cumulative GPA of 3.0 or higher in high school*
2. Agree to follow the prescribed course pathway and to participate in program activities
3. Be ready for Hartnell's MAT 3A (Calculus 1) and ENG 1A (Freshman English) by Fall 2015
   - There are several ways to be ready, including having sufficiently high test scores (Hartnell placement assessment scores, SAT scores, or AP scores) or passing the proper prerequisite courses by Fall 2014 (Algebra I, Algebra II, Geometry, Pre-Calculus, and English 101). We can talk to you individually about your best path to CSIT-In-3.

* Students with a GPA below 3.0 will be considered if they submit a one-page written statement explaining the reason for the lower GPA and their plan for maintaining a GPA higher than 3.0 in the CSIT-In-3 program.

Preparing Your Application

The application for Fall 2015 is now open! There are several things you can do to prepare for the application process.

1. Fill out the form here to let us know about your interest.
2. Visit the Program Information page to learn about the support services and scholarship opportunities offered in CSIT-In-3.
3. Attend an Information Night to learn more and meet program faculty/staff.
4. Apply for admission to Hartnell College, which includes:
   - Submitting an application for admission
   - Applying for financial aid
   - Submitting official transcripts
   - Registering for the STAAR* assessment here
     - Preparing for this assessment can improve your score and also ease your path to CSIT-In-3. Please review our advice for taking the assessment.
5. Begin your personal statement prompts available in the application.
6. Consider persons familiar with your academic work who would be willing to write a letter of recommendation.

Recommend 10

Exhibit 5: Partial screenshot from new/updated Frequently Asked Questions page online.

CSIT-In-3

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Hartnell College

FAQ

1. **Is this a CSUMB program or a Hartnell program?**
   This program is offered by both CSUMB and Hartnell. Students will take courses primarily at Hartnell during the first 1.5 years with a few courses at CSUMB and primarily at CSUMB during the second 1.5 years with a few courses at Hartnell. Even though classes will be scheduled in different campuses, CSIT-In-3 cohort will have a seamless, single program experience throughout the three years. Look at the sample degree pathway on the program information page. The bachelor's degree at the end of this program will be awarded by CSUMB.

2. **How many students will be accepted in to the program?**
   We anticipate accepting 30 students into the program - qualified, enthusiastic and interested students will be accepted into the program on a first come first serve basis.

3. **If I am interested in this program, which institution should I apply to?**
   To apply to the **CSIT-In-3** program, you should apply to Hartnell College first. Please visit our prospective students page for further instructions.

4. **How much will this program cost me?**
   Based on the tuition fees of academic year 2012-2013, the estimated tuition for degree completion for California resident students will be less than $13,000. This does not include cost of living or any additional fees beyond tuition.

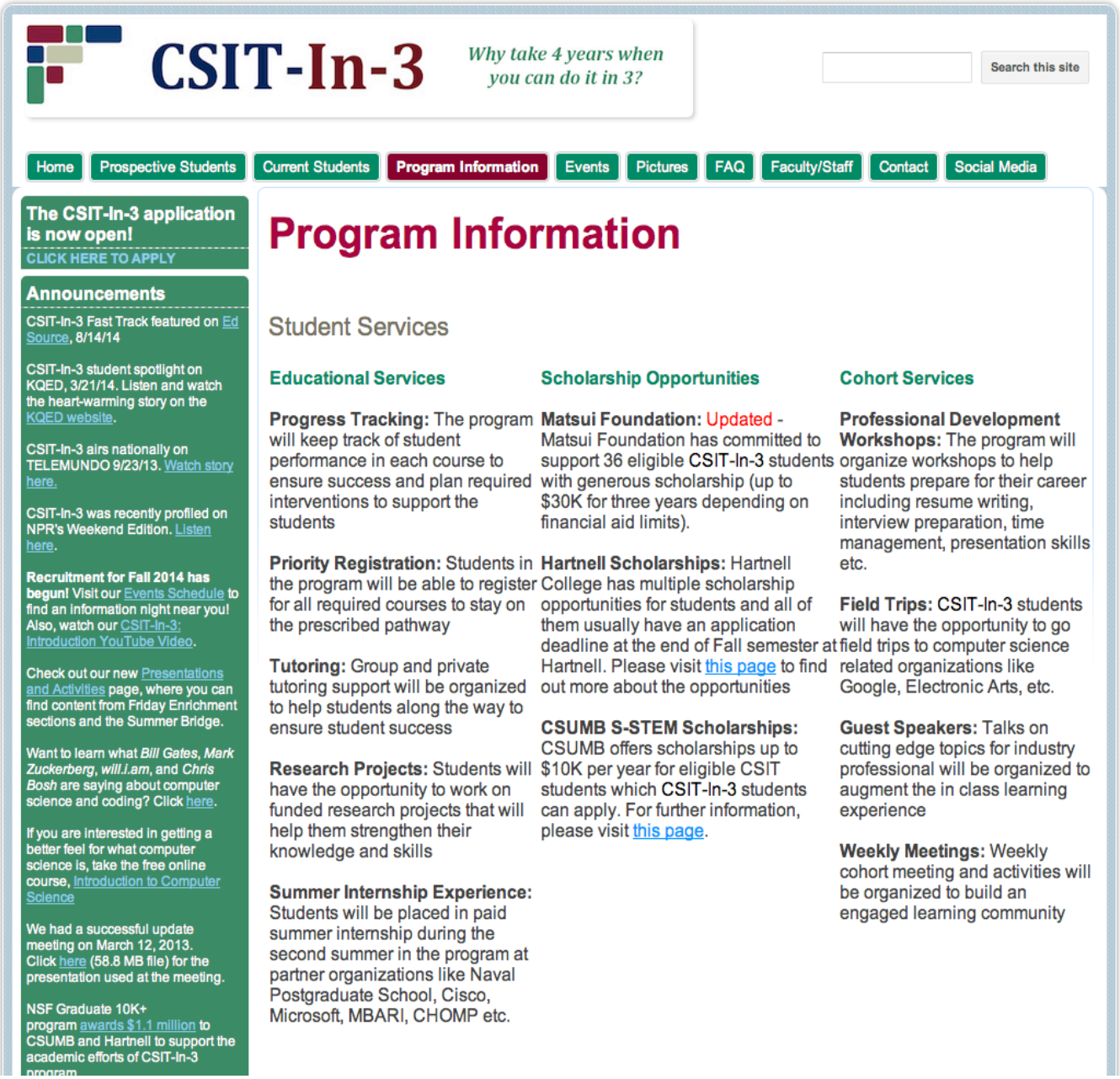
Year	School Enrolled	Tuition
Year 1	Hartnell	$2070
Year 2	Hartnell/CSUMB	$966/$2985
Year 3	CSUMB	$6108
	Total	$12,129

5. **I know that the CSIT program at CSUMB has four different concentrations - which concentration will I be graduating as part of CSIT-In-3?**
   CSIT-In-3 program is being offered only for the Software Engineering concentration at this point. The program will expand to include other concentration in the future - we do not know at this point when that would be.

6. **How will transfer from Hartnell to CSUMB happen?**
   The program staff will guide you through the transfer process and ensure that it is seamless. You will have to apply for admission into CSUMB through the normal transfer process and you will receive guidance through every step of the way.

7. **Am I required to complete the CSIT degree program in three years?**
   CSIT-In-3 program is an accelerated pathway through the traditional CSIT degree program. It is

Exhibit 6: Partial screenshot of new/updated program information page online.



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Program Information

Student Services

Educational Services

Progress Tracking: The program will keep track of student performance in each course to ensure success and plan required interventions to support the students

Priority Registration: Students in the program will be able to register for all required courses to stay on the prescribed pathway

Tutoring: Group and private tutoring support will be organized to help students along the way to ensure student success

Research Projects: Students will have the opportunity to work on funded research projects that will help them strengthen their knowledge and skills

Summer Internship Experience: Students will be placed in paid summer internship during the second summer in the program at partner organizations like Naval Postgraduate School, Cisco, Microsoft, MBARI, CHOMP etc.

Scholarship Opportunities

Matsui Foundation: Updated - Matsui Foundation has committed to support 36 eligible CSIT-In-3 students with generous scholarship (up to $30K for three years depending on financial aid limits).

Hartnell Scholarships: Hartnell College has multiple scholarship opportunities for students and all of them usually have an application deadline at the end of Fall semester at Hartnell. Please visit this page to find out more about the opportunities

CSUMB S-STEM Scholarships: CSUMB offers scholarships up to $10K per year for eligible CSIT students which CSIT-In-3 students can apply. For further information, please visit this page.

Cohort Services

Professional Development Workshops: The program will organize workshops to help students prepare for their career including resume writing, interview preparation, time management, presentation skills etc.

Field Trips: CSIT-In-3 students will have the opportunity to go field trips to computer science related organizations like Google, Electronic Arts, etc.

Guest Speakers: Talks on cutting edge topics for industry professional will be organized to augment the in class learning experience

Weekly Meetings: Weekly cohort meeting and activities will be organized to build an engaged learning community

Exhibit 7: Copy of letter to parents of new CSIT-in-3 students

CSIT-In-3

Dear CSIT-In-3 family,

We are thrilled to have your student joining us in our program for the next three years. CSIT-In-3 is an exciting and transformative experience for your student, where he or she will gain the skills needed to join the field of Computer Science in only three years. However, due to the intensity of the program, CSIT-In-3 also poses special challenges you should know about. We would like to provide you with more details about the program that will help your family support your student's success.

CSIT-In-3 time commitments:

- CSIT-In-3 students take all the courses they would normally take in 4 years in a compressed three-year period, along with additional enrichment activities. This means that your student will be very, very busy until graduation.
- Students are required to attend classes year round, not just in fall and spring semesters. Courses are scheduled over winter break and in the summer.
- In fall, students will have approximately 25 required hours of CSIT-In-3 classes and activities each week. In addition, students must study 30 - 35 hours a week to stay on top of course material.
- Generally, required activities are scheduled Monday-Friday, 9am-5pm, with optional tutoring available evenings and weekends. There will also be one mandatory all-day Saturday event per month. Students regularly stay late on campus to study, often until 9 or 10 pm.
- Students are not able to take on additional commitments, like part time jobs.

How you can support and encourage your student in CSIT-In-3:

- Provide or encourage students to find a quiet study environment with materials like paper, pencils, and their textbooks. If there isn't a good space available at home, encourage your child to study on campus or in the library.
- Be understanding. Even when at home, students will be spending a significant amount of time on their computers.
- During weekends and holiday breaks, students will usually have projects or studying to complete, preventing them from being able to take long trips or participate in all family events.
- Time and Stress Management - Realize that the workload will be challenging. Assist in supporting time to study regularly each day and avoid scheduling or planning conflicting activities. Your CSIT-IN-3 student will benefit from your continuous encouragement.

The CSIT-In-3 academic program is a demanding and life-changing experience for your student. Your assistance will best enable the success of your student. If you have any questions or would like additional information regarding the program, please don't hesitate to reach out to us.

Sincerely,

CSIT-In-3 Team

http://csitin3.hartnell.edu • csitin3@hartnell.edu

Appendix D

5. Planned changes to policies, practices, and/or systems to be implemented after January 9, 2015, intended to achieve the goals identified in Item 1. Expected timeline for implementing changes. Expected impact of planned changes. Evidence of commitment to future changes. *(Limited to 10 pages maximum.)*

Exhibit 1: Outline for CSUMB's research internship and partnership with industry.

Diversity in Computing : Tapping into Open Access Colleges
CSUMB-Industry Partnership
DRAFT PLAN

Objective
CSUMB is aiming to broaden participation in computing by investing in the following three pillars along with excellent curriculum based on ACM 2013 curriculum standards:
1. Engagement with Monterey County High schools and focused recruitment to attract more women and minorities to computer science (45% women, 85% Hispanic and 90% first generation).
2. Cohort based program pathways to guide, support, and encourage students through their college education.
3. Outside classroom support through cohort enrichment activities, study time with tutoring support and extra curricular projects.

Need
The program has an important need to build partnerships with industry through the final stages of student preparation and placement of the students in high end technology companies leading to a rich alumni network. The partnership will be built on the following three pillars:
1. Time and resource commitment from the industry partner to work with our team to strengthen the student preparation and placement.
2. Active feedback loops through which student preparation on the academic side can be strengthened to meet the industry need and the interview/selection process on the industry side can improved to avoid *unconscious bias and stereotype threat* (ref).
3. Both sides working together to provide every opportunity to place as many students as possible in great internship/job opportunities.

Please see detailed proposal here.

Risk
Without such demonstrable pipeline to be competitive for opportunities in Silicon Valley, students in the pipeline will leak out not realizing their potential.
Objectives and milestones for the partnership
This document contains initial thoughts on how the proposed research partnership can be built and answers to frequently answered questions. If you have any questions or comments, please contact: snarayanan@csumb.edu, jwelch@hartnell.edu or lkern@csumb.edu.

CSUMB – Industry Partnership Timeline 2015	
Objective/Activity	**Completion Date**
Establish research team with industry members, CSIT program staff, and faculty to define, implement and evaluate all aspects of the partnership. ▪ Industry partners identify two members and assign responsibility to develop partnership. One from the human resource department and one CS/software engineer to work with the CSIT program staff. ▪ CSIT program staff assigned to work in the team: Dr. Sathya Narayanan, Director of CSIT; Joe Welch, CS Faculty; and Leslie Kern, Internship Coordinator.	Nov 30, 2014
Research team to establish procedure for student selection and matching with internship opportunities with the industry partners.	Jan 10, 2015
Research team to develop and establish data collection/sharing procedure and policy. ▪ CSUMB's research compliance policy as framework for the partnership. ▪ Include the procedures needed to handle privacy, security requirements and any other requirements of the industry partner. ▪ What specific data will be collected, will it include identifying information, etc. will be defined by the team.	Feb 10, 2015
Any NDA or other legal contract/agreements to be signed by the two parties if needed.	Feb 28, 2015
Student application packages submitted to the team.	Feb 29, 2015
Industry members make selection decision in consultation with stakeholders within the company.	Mar 31, 2015
Entire team meets to evaluate, discuss selection decisions, make any changes based on discussion. Data set identified, analysed and documented to inform student preparation process for next year.	April 15, 2015
Students matched with internship project and assigned mentor.	April 30, 2015
HR member from industry partners leads and completes the on boarding process for getting students ready for internships.	May 30, 2015
Mentor works with students to prepare them for the internship including a written project plan.	May 30, 2015
Students start internships.	June 1, 2015
Entire team communicates during month of July to monitor and evaluate student performance, collect data, analyze and document to inform preparation and selection process.	Month of July
Surveys, focus groups and other instruments used to collect feedback from mentors, stakeholders, team members, student interns to evaluate the entire process.	Early August
Internship Symposium to present student work and the results from data analysis of all partnerships.	Mid August
Use evaluative data and feedback to adjust program; continue implementation.	2015-Ongoing

Frequently Asked Questions

1. What is the investment needed from us?
a. **Answer**: The primary investment is the time of the two employees assigned to this partnership. It is crucial that this time allotment is not done as a volunteer effort beyond their everyday duties, but is considered part of their responsibilities to work on this project, provide guidance, mentorship, help and support. Secondarily, there is the commitment to take our students as interns this is a good faith commitment and not a legal obligation in anyway. We understand that you should believe that the interns will bring value to your organization before you can take them on board.

2. Would the feedback we provide about a particular student be shared with the student themselves?
a. **Answer**: No, not necessarily. We would like to consolidate the feedback and learn from it to improve our preparation of all students. Based on the requirements of the partners, we are happy to define the extent of the data sharing. Industry partner can choose to remove identifying information and generalize their feedback and suggestions for improvement.

3. What if we do not see a match for any of your students?
a. Answer: We sincerely believe this would be extremely rare. We hope that we can work together to find opportunities for at least a few students. But, if it doesn't work, the team will look at the reasons and consider implementing solutions that will increase the likelihood of placing a few students in the following year(s).

4. How many students are involved in the program?
a. **Answer**: CSIT program has 370 students total, out of which about 100 of them are in various stages of the cohort based programs. Additional 60 students are taking AP CS after school class with us in two location with the hope of moving into our cohort programs.

5. How many students will be graduating this year?
a. **Answer**: About 50 students will be graduating in spring 2015 and another 40 will be looking to do a summer internship during summer 2015.

6. Do you have an alumni program?
a. **Answer**: CSUMB has an alumni program. Since our program is only 6 years old, we do not have a large alumni program.

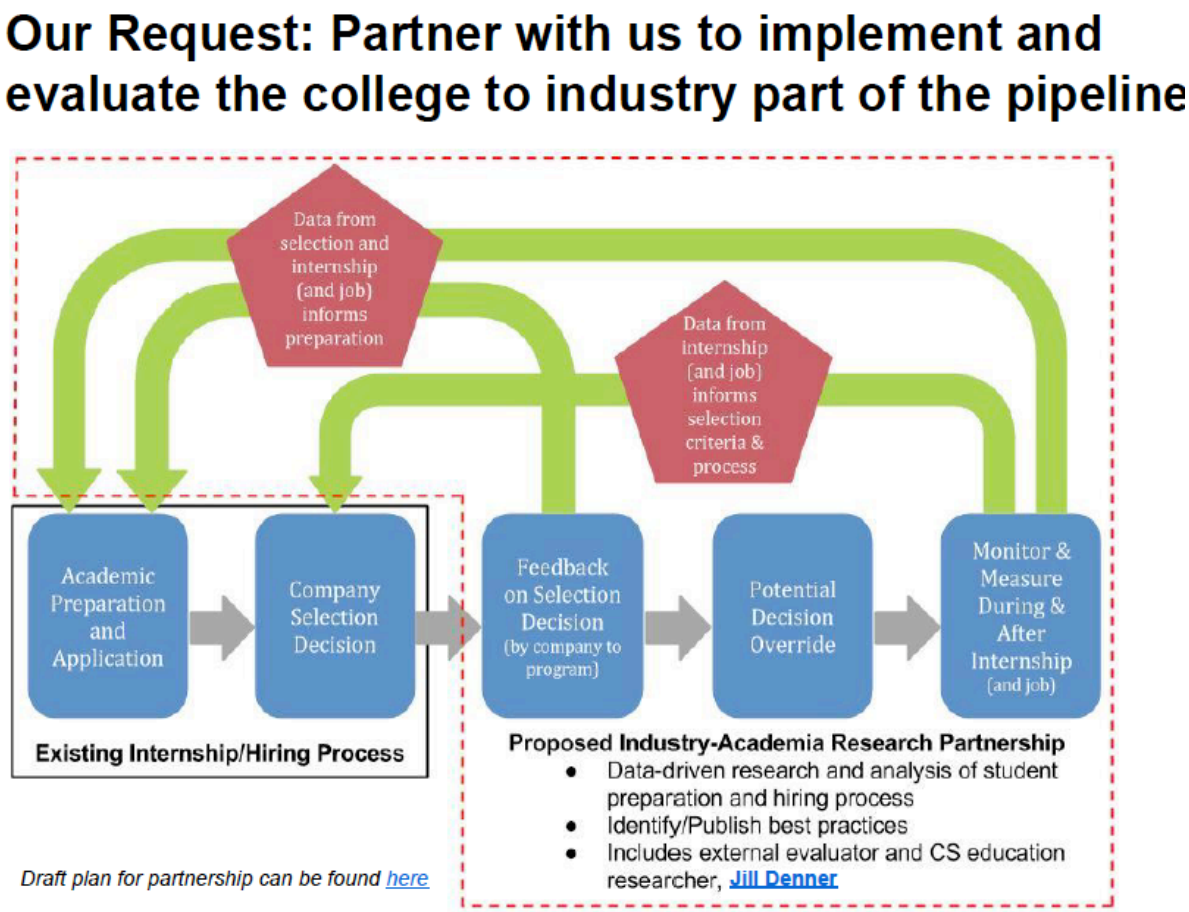
7. Is there a structured way for alumni to meet 1:1 with current students?
a. **Answer**: Beyond giving guest talks in our seminar classes and networking events organized by career services we do not have a structured way for alumni to meet 1:1 with current students.
8. Where is your curriculum published?
a. **Answer**: We are currently conducting a wide ranging review of our curriculum

based on the ACM 2013 curriculum. Course syllabus and schedules for most class can be found at http://itcd.csumb.edu/curriculum

9. Can we get a sample of the top ten student's resumes?

a. **Answer**: Yes, we will happy to share our student resumes with you.

Exhibit 2: Power Point Slides from CSUMB Industry Partnership Model Presentation



Outcomes of research & analysis

	Summer 2015	Summer 2016	Summer 2017	Summer 2018
Pool of potential employees				
Well-prepared students for internships	40	65	100	100-140
Well-prepared graduates for jobs		32	42	70-120
Best practices developed				
Recruiting women and minorities		v1	v2	
Intern preparation & Hiring practice		v1	v2	
Job preparation & Hiring practice			v1	v2

Summary

Why this model?

- Currently no comprehensive effort exists to fix the leaks in the tail end of the pipeline - this model does
- This model proposes sustained engagement for 4 years - not a one-off intervention
- Allows to iterate, improve and replicate

Why us?

- Seven years experience working on CS education issues within open access institutions
- Invested in entire pipeline - high school through gainful employment
- Have a working model
- One hour south of Silicon Valley

Why you?

- The data and best practices resulting from the proposed partnership are critical to broaden the technology pipeline and meet future demand
- The college to industry part of the pipeline cannot be completed without your involvement

Appendix E

6. How the changes described in above responses will impact the average cost to award a bachelor's degree. *(Limited to 5 pages maximum)*

Exhibit 1: Matsui Foundation *CSIT-in-3* revised scholarship commitment letter, 2014.

Matsui
FOUNDATION

HARTNELL COLLEGE
OFFICE OF THE PRESIDENT
APR 24 2014
RECEIVED

April 22, 2014

Dr. Eduardo Ochoa, President
California State University, Monterey Bay
100 Campus Center
Seaside, CA 93955

Dr. Willard Lewallen, President
Hartnell College
411 Central Avenue
Salinas, CA 93901

Dear President Ochoa and President Lewallen:

On behalf of the Matsui Foundation, it gives us great pleasure to announce a positive revision of the commitment made in 2012 to your institutions' three-year Computer Science/Informational Technology Bachelors Degree Program. The Foundation's commitment to this program remains extremely strong as evidenced by our partnership in the program through the providing of scholarships for 24 of the program's first cohort participants.

The Matsui Foundation is pleased to inform you that beginning with the 2014-15 academic year the number of students offered scholarships in the CSIT-In-3 Program will increase from 24 to 36. This commitment will be assured for a new three-year period consisting of 2014-15, 2015-16, and 2016-17.

The sequence for selection of applicants for the scholarship remains the same as that used for Cohort 1. The sequence is that program faculty select students for the program and then subsequently make recommendations to the Foundation for students to receive a Matsui Scholarship. The Matsui Scholarship Program does prioritize students with financial hardship to receive the scholarship, and therefore it is the hope of the Foundation that at least 50% of students recommended for a Matsui Scholarship will meet the Foundation's hardship criteria. Students not qualifying under the hardship criteria will be considered under merit criteria.

THE MATSUI FOUNDATION
A CALIFORNIA NONPROFIT BENEFIT CORPORATION
ENTITY ID: CORP 2568112 FEDERAL ID: 20-0483500

1645 OLD STAGE ROAD • SALINAS, CA 93908
O 831 422-6433 x 205 • F 831 759-2748

Page Two
April 22, 2014

Each of the offered 36 scholarships will be for a maximum of $30,000. It is fully the expectation of the Matsui Foundation that each of the qualifying scholarship recipients will first utilize any and all financial aid for which he or she is eligible, and then utilize the Matsui Scholarship revenue to further help pay for the cost of attendance. The Matsui Scholarship revenue is made available incrementally with a maximum of $4,000 for each the first, second and third semester, and $6,000 for each the fourth, fifth and sixth semester, cumulatively reaching $30,000 in total scholarship eligibility.

The Matsui Foundation's hope is that this increased commitment will further assist in ensuring the success of this highly innovative program.

Best regards,

Andy Matsui

Teresa Matsui Sanders

Exhibit 2: Matsui Foundation revised scholarship commitment budget

Hartnell/CSUMB CSIT-In-3
Cohorts (1) (2) (3) & (4)

B U D G E T

(Revised 4-22-14)

Year						Total
1	192,000 (1)					192,000
2		240,000 (1) 288,000 (2)				528,000
3			288,000 (1) 360,000 (2) 288,000 (3)			936,000
4				432,000 (2) 360,000 (3) 288,000 (4)		1,080,000
5					432,000 (3) 360,000 (4)	792,000

Includes only Cohorts (1) (2) (3) & (4).

Does not includes a Cohort (5) which would increase year (5) total to $1,080,000.

Exhibit 3: Copy of original Memorandum of Understanding between Hartnell College and CSUMB establishing the CSIT-in-3 program, the structure of which is resulting in significantly reduced costs for a Bachelor's Degree.

MEMORANDUM OF UNDERSTANDING
BETWEEN
HARTNELL COLLEGE
&
CALIFORNIA STATE UNIVERSITY MONTEREY BAY

The objective of this MOU is the development, in partnership with Hartnell College, of a pathway and program that will support students graduating from CSUMB with a Bachelor's degree in Computer Science and Information Technology in three years. This program will provide educational and career opportunities for students, while addressing a regional and national need for trained professionals in computer science.

This **joint program** will start with identification and recruitment of students in high school, and will support selected students throughout their 3-years in college, at both Hartnell College and California State University Monterey Bay, with scholarships, advising, tutoring, internships and project opportunities. Qualified students will be admitted at Hartnell and later at CSUMB assuming they meet eligibility requirements. The program will be **cohort**-based, aiming for 15 students minimum in year one and at least 20 students minimum thereafter. The current target is to have the first cohort of students begin courses at Hartnell in Fall 2013, with a new cohort starting each subsequent fall.

To actualize this program, Hartnell College (HC) and California State University Monterey Bay (CSUMB) do hereby enter into this agreement with one another. The provisions of the agreement are the following:

Hartnell College and California State University Monterey Bay agree to jointly develop and offer the necessary academic coursework leading to a 3-year BS degree in Computer Science and Information Technology. This program will be cohorted, and the cohort will begin its coursework at Hartnell, and finish and graduate in three years with a BS degree in Computer Science and Information Technology at CSUMB.

To this end, the parties agree as follows:

1. This agreement applies only to the students who are seeking to complete a Bachelor of Science in Computer Science and Information Technology at CSUMB in three years, and are willing to follow the prescribed pathway through the degree program.

2. Program representatives from Hartnell College and California State University Monterey Bay will recruit and enroll the students for this program. The pilot program will begin in the Fall of 2013 and will be for 3 years of cohorts.

3. The students will all follow the prescribed pathway, as a cohort. Both institutions commit to offering the courses according to the pathway, and to guaranteeing seats for the entire cohort according to the pathway. These guaranteed courses include both major courses and general

Page 1 of 2

education courses at Hartnell College and CSU Monterey Bay. The prescribed pathway has been evaluated by CSUMB graduation evaluators and will be posted for both Hartnell and CSUMB students and advisors to follow

4. To remain in the program, students must remain in good standing, with a cumulative GPA in major-related coursework of 3.0, and must complete all the prescribed both major and general education courses in step with the cohort. Any student falling below a GPA of 3.0 will be placed in a probationary status within the program for one semester, allowing time to remediate the GPA to 3.0 (for major related courses). Students not able to then attain a GPA of 3.0 (for major related courses) will not be able to continue in the program, and will not be guaranteed a graduation date.

5. Hartnell will admit and enroll one cohort annually in the fall. CSUMB will guarantee admission to cohort students successfully completing the Hartnell component, as transfer-ready students.

6. The institutions will work together to coordinate institutional and collaborative efforts directed to achieving program goals. Such efforts include, but are not limited to, student recruitment, coordinating program events, scheduling academic support, and recording program data and observations. The institutional support will be funded by a resource sharing commitment between Hartnell College and CSUMB.

7. The progress of the students will be assessed annually, and reported to the agreeing parties.

8. The duration of this agreement is for three years and then subject to review by the collaborating parties.

9. This MOU constitutes the entire agreement between the members stated above. This MOU may be modified, altered, revised, extended or renewed by mutual written consent of all parties, by the issuance of a written amendment, signed and dated by all the parties.

This MOU shall commence on July 1, 2012 or as designated and agreed upon by each institution.

6/11/12

Dr. Dianne Harrison, President — Date
California State University, Monterey Bay

Kevin R. Saunders
Administrator in Charge

6/6/12

Dr. Phoebe Helm, President — Date
Hartnell Community College District

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Appendix F

8. Key strengths and assets for encouraging a culture of innovation and adaptability within and across all entities participating in the application. **Leadership, institutional commitment, and existing relationships among the application participants**. *(Limited to 10 pages maximum.)*

Exhibit 1: Original Memorandum of Understanding outlining the structure for innovative CSIT-in-3.

MEMORANDUM OF UNDERSTANDING
BETWEEN
HARTNELL COLLEGE
&
CALIFORNIA STATE UNIVERSITY MONTEREY BAY

The objective of this MOU is the development, in partnership with Hartnell College, of a pathway and program that will support students graduating from CSUMB with a Bachelor's degree in Computer Science and Information Technology in three years. This program will provide educational and career opportunities for students, while addressing a regional and national need for trained professionals in computer science.

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education courses at Hartnell College and CSU Monterey Bay. The prescribed pathway has been evaluated by CSUMB graduation evaluators and will be posted for both Hartnell and CSUMB students and advisors to follow

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This MOU shall commence on July 1, 2012 or as designated and agreed upon by each institution.

6/11/12

Dr. Dianne Harrison, President Kevin R. Saunders Date
California State University, Monterey Bay Administrator in charge

6/6/12

Dr. Phoebe Helm, President Date
Hartnell Community College District

Page 2 of 2

Exhibit 2: Statement outlining CSUMB's and Hartnell's vision for the project in 2012.

HARTNELL COLLEGE

CALIFORNIA STATE UNIVERSITY Monterey Bay

CSIT-In-3

Bachelor's Degree Program in 3 Years
Program Description – Fall 2012

Hartnell College and California State University, Monterey Bay (CSUMB) plan to offer a collaborative three-year bachelor's degree program in computer science and information technology beginning in fall 2013. A cohort of 25-30 students will be admitted into this program and will take classes at Hartnell during the first year and half of the program and classes at CSUMB during the second year and a half.

This program will consist of the following elements:

1. **Cohort-based program:** Students will take classes together and participate in outside classroom cohort activities to build a strong community of learners.
2. **Course schedule:** A specific schedule will be developed for the students by the program advisor, with a course schedule and cohort activities for each semester. Students will follow the schedule developed by the program advisor.
3. **Financial aid:** Every effort will be made to support the students in the cohort to receive financial support through local foundations, state, federal scholarships, and paid work-study opportunities. Students will be strongly encouraged to focus on their education and not commit to external employment responsibilities.
4. **Student success services:** Students will receive outside classroom support to ensure success in the program including tutoring, workshops, professional development, guest talks and field trips throughout the year.
5. **Summer internship experience:** During the second summer of the program, students will be placed in paid summer internship opportunities with partner organizations for ~8 to 10 weeks, with the experience culminating in an internship symposium.
6. **Assessment and Evaluation:** Student learning will be assessed throughout the three years and the program as whole will be evaluated to measure its effectiveness.

Eligibility Requirements

Students accepted into this program must meet the following requirements:

1. Cumulative GPA of 3.0 or higher in their most recent education. If a student has a GPA lower than 3.0, student must submit a one page statement explaining the reason for the lower GPA and how they will be able to succeed in the CSIT-In-3 program.
2. Students must have taken pre-calculus before starting the program.
3. Commitment to following the prescribed schedule and participating in the program activities for the three-year duration.

Timeline

1. Advertisement of the program: July through November
    a. CSIT-In-3 open houses: August through October
    b. High school visits: August through November
    c. Material and training for recruiters/counselors at Hartnell, CSUMB and high schools: August through September
2. Application window to CSIT-In-3: November 30 – April 8
3. Advising events: November through January
4. Hartnell scholarships (S-STEM, etc.) deadline: December 20
5. Engagement and tutoring events: February through May
6. Summer bridge: End of June through Mid July
7. Hartnell early registration: April 22, 2013
8. First cohort begins in fall 2013
9. Repeat 1 through 7 for next cohort each year

Budget (Fall 2012 to Spring 2017)

1. Program director/advisor: 4 unit buyout per semester
2. Program coordinator: $55K per year plus fringe benefits
3. Financial aid/scholarship support
    a. $10K x 25 students (Fall 2013-Summer 2014)
    b. $10K x 50 students (Fall 2014-Summer 2015)
    c. $10K x 75 students (Fall 2015-Summer 2016)
    d. $10K x 75 students (Fall 2015-Summer 2017)
4. External evaluator: $20K per year
5. Summer internship experience (each year starting in Spring '15-Summer '15)
    a. Internship coordination: $30K
    b. Summer student pay: $12 x 40 hours x 12 weeks x 10 students plus fringe benefits
6. Support services:
    a. Summer bridge programs: $15K per year
    b. Field trips, guest lectures, meetings/events: $10K per year

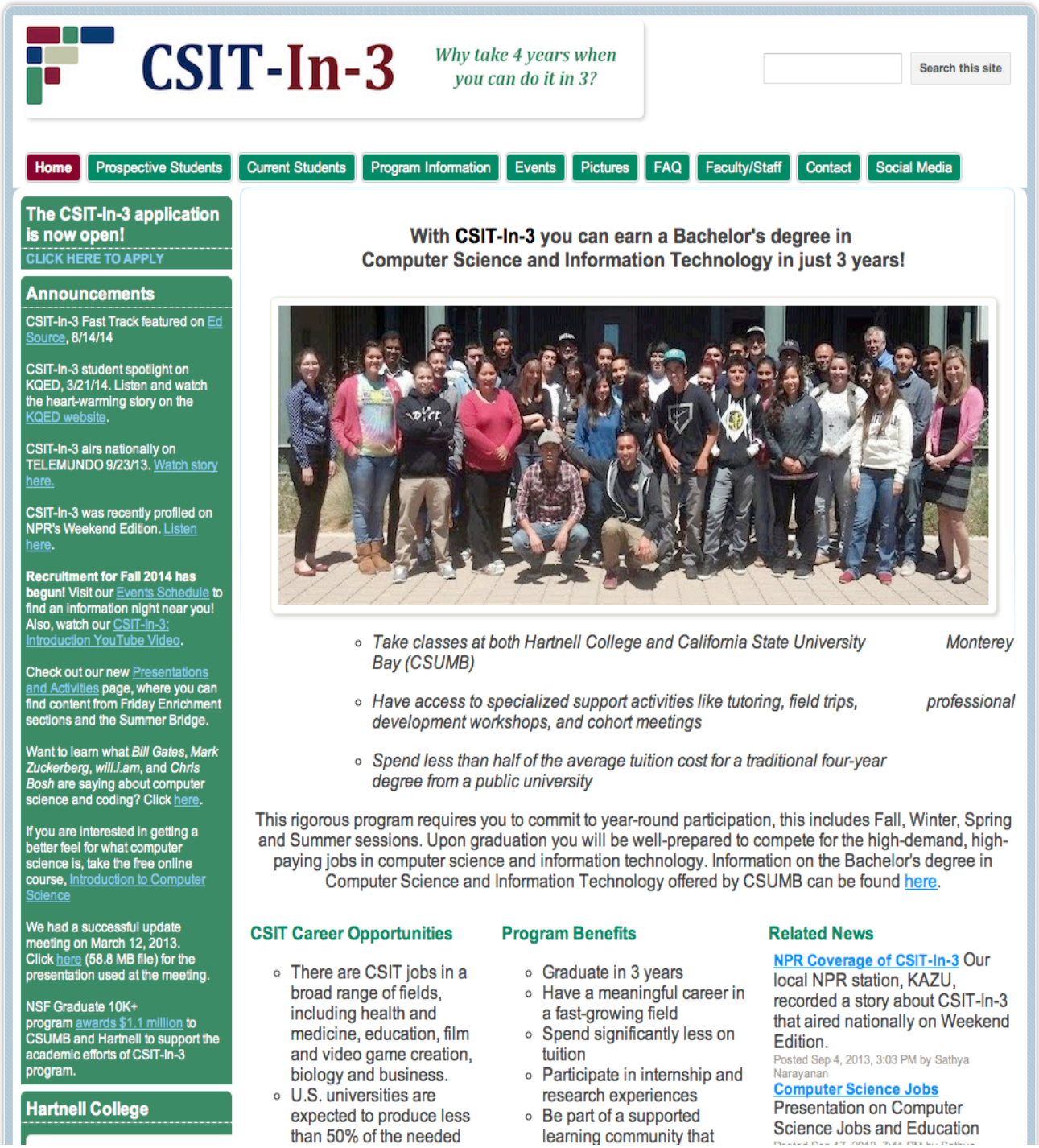
Outcomes

1. Increase number of students from the Monterey Bay/Salinas Valley regions graduating with a bachelor's degree in computer science
2. Increase number of underrepresented minority students from the Monterey Bay/Salinas Valley regions receiving bachelors degree in computer science
3. First ever three year program as an articulated pathway between a junior college and a four year state university
4. Shorten the timeframe for students to join the workforce to 3 years from the standard 4+ years
5. A model for three year program that can be duplicated in other regions of the state leveraging investments in junior colleges and state universities
6. Evaluation of the efficacy of cohort based activities on student learning in computer science
7. Evaluation of student learning in an accelerated three year program

Appendix G

9. Strategies for engaging stakeholders. *(Limited to 10 pages maximum.)*

Exhibit 1: Screenshot from CSIT-in-3 program web site featuring several links to engage the public, prospective students, and other educators.



CSIT-In-3

Why take 4 years when you can do it in 3?

Search this site

Home | Prospective Students | Current Students | Program Information | Events | Pictures | FAQ | Faculty/Staff | Contact | Social Media

The CSIT-In-3 application is now open!

CLICK HERE TO APPLY

Announcements

CSIT-In-3 Fast Track featured on Ed Source, 8/14/14

CSIT-In-3 student spotlight on KQED, 3/21/14. Listen and watch the heart-warming story on the KQED website.

CSIT-In-3 airs nationally on TELEMUNDO 9/23/13. Watch story here.

CSIT-In-3 was recently profiled on NPR's Weekend Edition. Listen here.

Recruitment for Fall 2014 has begun! Visit our Events Schedule to find an information night near you! Also, watch our CSIT-In-3: Introduction YouTube Video.

Check out our new Presentations and Activities page, where you can find content from Friday Enrichment sections and the Summer Bridge.

Want to learn what *Bill Gates*, *Mark Zuckerberg*, *will.i.am*, and *Chris Bosh* are saying about computer science and coding? Click here.

If you are interested in getting a better feel for what computer science is, take the free online course, Introduction to Computer Science

We had a successful update meeting on March 12, 2013. Click here (58.8 MB file) for the presentation used at the meeting.

NSF Graduate 10K+ program awards $1.1 million to CSUMB and Hartnell to support the academic efforts of CSIT-In-3 program.

Hartnell College

With CSIT-In-3 you can earn a Bachelor's degree in Computer Science and Information Technology in just 3 years!

- *Take classes at both Hartnell College and California State University Monterey Bay (CSUMB)*
- *Have access to specialized support activities like tutoring, field trips, professional development workshops, and cohort meetings*
- *Spend less than half of the average tuition cost for a traditional four-year degree from a public university*

This rigorous program requires you to commit to year-round participation, this includes Fall, Winter, Spring and Summer sessions. Upon graduation you will be well-prepared to compete for the high-demand, high-paying jobs in computer science and information technology. Information on the Bachelor's degree in Computer Science and Information Technology offered by CSUMB can be found here.

CSIT Career Opportunities

- There are CSIT jobs in a broad range of fields, including health and medicine, education, film and video game creation, biology and business.
- U.S. universities are expected to produce less than 50% of the needed

Program Benefits

- Graduate in 3 years
- Have a meaningful career in a fast-growing field
- Spend significantly less on tuition
- Participate in internship and research experiences
- Be part of a supported learning community that

Related News

NPR Coverage of CSIT-In-3 Our local NPR station, KAZU, recorded a story about CSIT-In-3 that aired nationally on Weekend Edition.

Posted Sep 4, 2013, 3:03 PM by Sathya Narayanan

Computer Science Jobs

Presentation on Computer Science Jobs and Education

Exhibit 2: Screenshot of CSIT-in-3 media page with links on the left to numerous media stories and features, both national and regional in distribution.

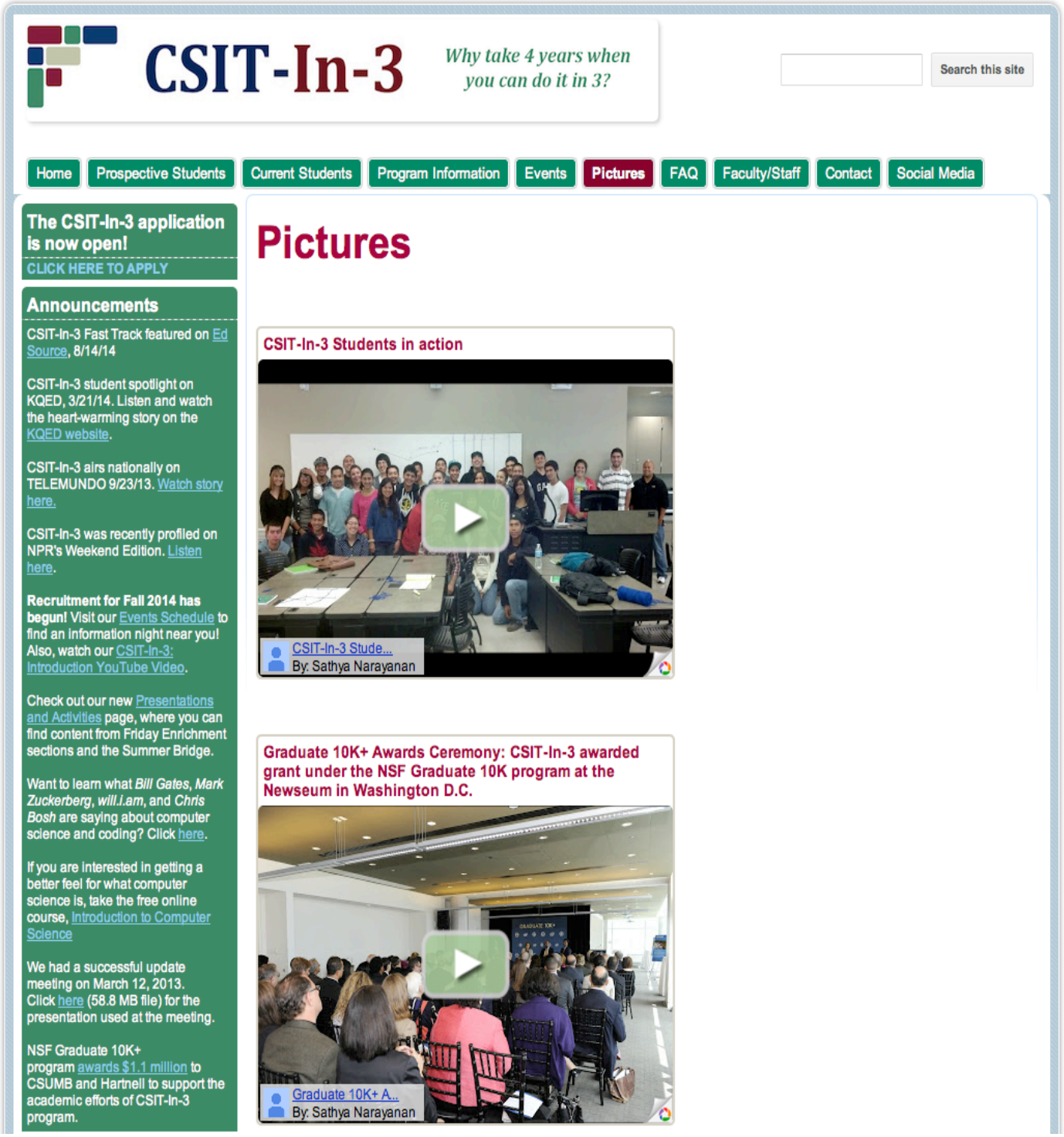


Exhibit 3: Brief excerpts from two independent news reports; one from KQED, San Francisco public radio/television/web-based organization; and one form EdSource.org.

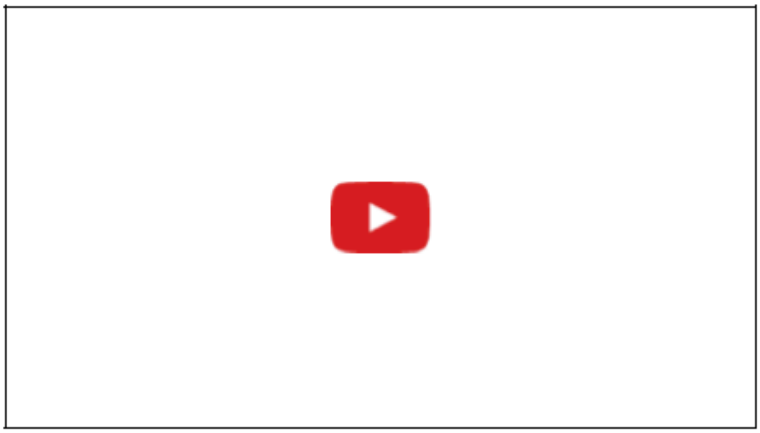
KQED News

NEWS FIX (HTTP://WW2.KQED.ORG/NEWS/PROGRAMS/NEWS-FIX)

From Fields to Code, College Program Helps Farmworkers Make the Leap

By Ana Tintocalis (http://ww2.kqed.org/news/author/anatintocalis) and Jeremy Raff (http://ww2.kqed.org/news/author/jeremyraff)
MAR 21, 2014

SHARE



Leticia Sanchez hopes learning computer science will help her land a high-paying career that will let her support her family, and allow her mother to stop working in the lettuce fields. Video by Jeremy Raff.

Rogelio Mendoza mows the front lawn outside his family's modest home in Salinas. It's a warm weekday evening, and his wife, Norma, is cooking dinner for their three boys.

"Carne, beans and some posole ... that's what's we're having today," says Norma as she serves her oldest son, Alonso, who just came home from a long day of classes at Hartnell Community College in Salinas.

The-21-year-old is the first in the family to attend college.

Alonzo Mendoza is a computer science student at the community college in Salinas, CA. "I don't want him to spend his life in the fields like his father," said his mother, Nora. (Jeremy Raff/KQED)

Alonso says some days he feels like "his head is going to explode" with so much new information. But he admits that schoolwork is much better than farmwork.

"Having your back hurt, and your arms hurt ... you can't compare that kind of tired to having your mind stress over homework," Alonso says.

Alonso's father, Rogelio, has been planting and harvesting in the fields for more than 30 years. Alonso joins his dad during the summers spending long hours picking lettuce and strawberries.

"You get home ... and you don't even want to talk to nobody," Alonso recalls. "I would fall asleep on the floor ... then wake up and it's already time to go back to work."

Experiencing that kind of manual labor motivated Alonso to graduate from high school.

He says teenagers who drop out of school tend to work in three places: the mall, a fast-food restaurant or the fields.

"(Young people) don't see themselves doing something big in life," he says. "They get paid $10 an hour and they settle for that."

But Alonso refuses to settle.

About a year ago, he was registering for his classes at Hartnell College when he learned about the Computer Science and Information Technology-In-3 Program (https://sites.google.com/site/csitin3/), an accelerated degree program specifically for students of farmworker families.

In partnership with California State University, Monterey Bay, Hartnell is promising a bachelor's degree in computer science in just three years.

From EdSource.org –

Highlighting Strategies for Student Success

Enter keywords...

COLLEGE & CAREERS > CAREER PREPARATION

MICHELLE MAITRE/EDSOURCE TODAY

Instructor Joe Welch, left, works with students Jose Sanchez Garcia, middle, and Benito Sanchez, who are using Arduino open-source software to program an LED light display at Hartnell College in Salinas.

Students on computer science fast track

August 14, 2014 | By Michelle Maitre | 1 Comment

3 Like

37 Tweet

Appendix H

12. Target outcomes for each academic year through 2018-19 for the measures identified in your response to Item 11. The most recent baseline measures for each target outcome for each participant in the application by academic year that data reflects. How targets were chosen. *(Limited to 10 pages maximum.)*

Exhibit 1: Excerpt from the Year One Evaluation Report, Table of Contents and pages 1-3.

Cal State Monterey Bay and Hartnell College

CSIT-In-3
Year 1 Evaluation Report

APPLIED RESEARCH + EVALUATION
Program Evaluation • Research • Policy Studies
1205 Pacific Avenue, Suite 206
Santa Cruz, CA 95060
831.457.0313 | www.shattuckevaluation.com

May 2014

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Year 1 Evaluation Introduction

Primary evaluation activities in year 1 included student focus groups and staff/faculty interviews, CLA and SLE tests, a baseline survey, and student focus groups about summer bridge. This report contains summaries of each these evaluation activities and their findings. Evaluation activities and materials were developed and implemented by Julie Shattuck, external evaluator; Dr. Bude Su, internal evaluator; Dr. Kate Lockwooed, internal evaluator; and Dr. Sathya Narayanan, PI.

Focus Group and Interview Report

Introduction

This report presents the findings from a set of focused discussions with students from the Year 1 Cohort, a selected group of CSIT-In-3 staff, and Hartnell College and CSUMB faculty and administrators. The activity was scheduled as a mid-year "check in" to inform staff of early progress and is an element of the comprehensive assessment and evaluation program.

The findings from both groups are intended to enrich strategic conversations about staff investments in project strategies and assist them in the following activities: (1) gauging early student perceptions and outcomes from their participation as they relate to the project's stated goals; (2) reflecting on the quality and value of the support, services, and opportunities provided to students; (3) documenting stakeholder views of the progress and potential of the CSIT-In-3 model; and (4) determining priorities for program enhancements, use of staff time, and distribution of financial resources.

This report also presents some key messages, followed by findings from the student focus groups and one individual interview, as well as interviews with the staff, faculty, and administrators. Appendix A contains the Student Focus Group Guide, Appendix B contains the Staff, Faculty, and Administrator Interview Guide, and Appendix C contains the Logic Model Components for Interviews with Staff, Faculty, and Administrators. Readers are encouraged to review the documents to contextualize the findings in the report.

Overarching Messages

Year 1 startup. The first year of any new initiative is usually very challenging and time-consuming. Early on it includes the task of rapidly hiring staff, recruiting students, and forging new partnerships and agreements–all in conjunction with designing, piloting and evaluating new elements. Limited resources and overtaxed staff and faculty are often a big concern. There seems to be no easy way around this phenomena for CSIT-In-3, except to carefully assess progress and lessons learned in Year 1 and forge ahead with the job of integrating the second cohort and to continue to carefully evaluate and chart new courses of action as necessary. Isolating essential elements and ways to economize on effort will be important as Cohort 2 comes on board.

The CSIT-In-3 mission. It is still too early to tell if the 3-year model is viable, sustainable, and a successful alternative to the 4-year CSIT degree for the targeted students. Key questions need to be explored to determine whether there are certain students who are more likely to succeed in a fast-

tracked, more time intensive setting than others. A more targeted approach to recruitment may be required. Also, more content and professional preparation may be needed in advance. Informants for this report indicate that the degree pathway that is being forged is very encouraging, yet there is more work to be done across institutions at the resource allocation, policy, and program levels to ensure that all stakeholders are on board to ensure success and that the pathway is fully institutionalized.

The project team. The assembled team is competent, committed, and invested in ensuring that the pilot year is a success. Students were very satisfied with the quality and level of support provided by the CSIT-In-3 team and felt that their concerns and input were generally heard. The PIs agree that the huge investment of time will not be sustainable into the future or realistic in the "real world" for scaling the effort. Instructional faculty have been especially impacted by the additional time burden of the accelerated program, yet feel the additional supports and opportunities have benefitted the traditional students and noticeably raised the bar for all of the students. Staff and faculty have gone above and beyond to ensure that students have the one-on-one mentoring, tutoring, and support they need to survive and thrive in the program. The individualized support has enabled some who are treading on rough waters to persist and make the grade. Others, staff says, may need to be asked to drop or join Cohort 2 to meet academic performance requirements or instead take the traditional 4-year route.

Bridging the preparation disadvantage. With most students coming through the door with a moderate to high educational and content disadvantages, success boils down to developing grit and an undying passion to claim the BS degree and the perceived professional benefits. It is a fact that most of the first cohort took a personal risk entering a field they were relatively unfamiliar with and a commitment that was daunting, yet appealing. Many were unprepared for the amount of time they would have to invest and the extent to which other activities would need to be curtailed. As one now seasoned student stated: ***"A lot of definitions have changed for me, like the way I think about my work ethic. I now have to work even harder. I tended to be independent in courses and not rely on others for help. Now I value the cohort because I have more accountability. I have to be perceived as someone who will succeed." If everyone is working hard, I have to. It's a vibe thing!"***

Cohort as a lifesaver. The cohort has provided indispensable life support for most. Students referenced it as both a family and a support system, and the mechanism that has enabled them to trudge through the rigors of the accelerated program with only a dimly lit prize in view. The cohort community has helped students work though their doubts and confusion, share mutual concerns, and be heard by peers experiencing the same struggles. The cohort clearly is an essential and non-negotiable element for the majority of students in this group. Staff and faculty have had to regularly troubleshoot behavioral issues and some splintered relationships among students. At times, some students demonstrate a lack of professional maturity, but there are signs that most are responding to the coaching they receive. Perhaps staff and more upfront training did not anticipate these situations in professionalism, handling diversity positively, and teamwork may be in order. With a new cohort coming on board, there is an opportunity to use lessons learned during the first year to provide more focused preparation and training. Cohort 1 is undoubtedly a valuable resource for imparting some well-earned wisdom and support.

The big questions. Is this model workable and sustainable for the target population? Who are the individuals that are succeeding and what are their characteristics? Who is failing and would a 4-year program be a better option? What adjustments could be made to enable them to succeed?

What are the essential elements and inputs from both Hartnell and CSUMB? What is the cost in staff and faculty time? What supports and infrastructure are absolutely necessary? Are there ways to economize and still enable a large percentage of the students to obtain degrees in 3 years? Do we need to face the reality that producing competitive and workforce-ready students from the target population requires a much higher-level investment in human and financial capital than anticipated? Are the partner institutions prepared to make the investment?

Participants and Process

Evaluator Julie Shattuck and Research Associate Gabriel Roybal interviewed 28 students from Cohort 1 in small groups for 45 minutes each at the Hartnell Alisal Campus in March and April 2014. One of the groups was exclusively female to enable the researchers to draw on their unique experiences. One student was interviewed individually. The study topics for each group were generated from input from project staff and faculty.

Additionally, 8 individuals representing the staff, faculty, and administrators from Hartnell and CSUMB were chosen by the PI and were individually interviewed including:

- Marsha Moroh, Dean, College of Science, Media Arts, and Technology, CSUMB
- Willard LeWallen, President, Hartnell College
- Sonia Arteaga, Instructor, Computer Information Systems, Hartnell College
- Pam Weise, Instructor, Computer Information Systems, Hartnell College
- Sathya Narayanan, Co-PI and Director/Associate Professor, Computer Science and Information Technology, CSUMB
- Joe Welch, Co-PI and Instructor, Computer Information Systems, Hartnell College
- Katie Cunningham, CSIT-In-3 staff
- Leslie Kern, CSIT-In-3 staff (brief phone conversation)

Limitations of the Study

This report is intended to provide a "snapshot" view of students' experiences and perceptions to date as well as some insights from a selected group of project staff, faculty, and administrators. As such, this is not a comprehensive report of the program or an analysis of all issues. For example, the focus groups did not address student academic achievement. The report is intended to be used as working document and reference for the upcoming core team meeting and ongoing documentation of Year 1 of the program.

Student Focus Groups and Individual Interview Findings

This section details the results from the 5 student focus groups and 1 student interview. Students were asked to comment on the following topics:

- Experience in CSIT-In-3
- Student Integration and Professional Growth
- Organization, Communication, and Support
- Elements in CSIT-In-3
- Summary Comments and Suggestions for Refinements

Exhibit 2: Excerpt from 2013-14 Annual Report to the National Science Foundation, including major goals (vi-viii), and specific goals for outreach/recruitment, including outcomes (page ix).

Preview of Award 1317649 - Annual Project Report

Cover |
Accomplishments |
Products |
Participants/Organizations |
Impacts |
Changes/Problems
| Special Requirements

Cover

Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Grant or Other Identifying Number Assigned by Agency:	1317649
Project Title:	Academic Integrity Management (AIM) of a collaborative three year computer science degree program
PD/PI Name:	Sathya Narayanan, Principal Investigator William J Welch, Co-Principal Investigator
Recipient Organization:	University Corporation at Monterey Bay
Project/Grant Period:	08/01/2013 - 07/31/2018
Reporting Period:	08/01/2013 - 07/31/2014
Submitting Official (if other than PD\PI):	N/A
Submission Date:	N/A
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	N/A

Accomplishments

*** What are the major goals of the project?**

CSUMB and partner Hartnell will improve enrollment, persistence, retention, and graduation of disadvantaged and underrepresented students in Computer Science and Information Technology (CSIT) by implementing an innovative three-year Bachelor of Science degree program called *CSIT-In-3*. The project will incorporate the following features:

- Implementing a three-year accredited Bachelor of Science degree option in which students will complete the first 1.5 years of their program primarily at Hartnell and the final 1.5 years primarily at CSUMB;
- Improving the college-readiness of students through a four week summer bridge program;
- Organizing students into cohorts that will be maintained from enrollment through transfer and graduation;
- Providing ongoing academic support through identification of academic needs and provision of support services;

- Delivering career development support through internship preparation workshops and internship placements;
- Providing scholarship support that will *eliminate the need for students to seek outside employment*.

Major Goals are to:

1. ***Curriculum/Organization*** – To finalize the reorganization of resources and curriculum at CSUMB and Hartnell Community College to implement a three-year accredited, Bachelor of Science degree option in Computer Science and Information Technology beginning in the fall 2013.
2. ***Outreach/Enrollment*** – To implement outreach and recruitment that results in enrollment of 25-30 new Computer Science and Information Technology majors committed to completing the three-year program each year for five years; representing a 40 percent increase in CSIT majors overall at CSUMB. This objective will educate students about the opportunities in computer science and attract new enrollment into STEM.
3. ***Support/Retention*** – To deliver academic, student services, and financial support to 100 percent of enrolled students resulting in an 80 percent retention rate in *CSIT-In-3*.
4. ***Transfer/Graduation*** – To deliver academic, student services, and financial support to 100 percent of enrolled students resulting in a 90 percent transfer rate in CSIT from Hartnell to CSUMB (five times the current rate) and an 80 percent graduation rate in *CSIT-In-3*; more than double the current four-year transfer students graduation rate of 30 percent at CSUMB.
5. ***Evaluation/Dissemination*** – To finalize and implement a comprehensive, evidence-based evaluation program to collect and analyze performance and outcome data on 100 percent of program participants and disseminate the results to stakeholders across the country. These results will inform the design and effectiveness of the *CSIT-In-3* program and guide the integration of support services into existing institutional support programs like ASAP (Academic Skills Achievement Programs) and Center for Student Success. The dissemination activities will educate the broader community on proven best practices for implementing accelerated pathways between community colleges and universities.

*** What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?**

Major Activities: Major activities broken down by major goals include:

1. ***Curriculum/Organization***
   The three-year course pathway starting at Hartnell College and leading to completion of a bachelor's degree in Computer Science and Information Technology at CSUMB is in place as of fall 2013. Administrators at both schools have committed to adhere to the pathway schedule by offering all courses during the designated semester so that students can graduate in three years.

2. ***Outreach/Enrollment***
   - 2013-2014 Recruitment Efforts - To recruit for the first CSIT-In-3 cohort for academic year 2013-2014, project staff executed a comprehensive recruitment effort within Monterey County high schools. Between October 2012 and March 2013 staff visited 14 high schools presenting to over 400 students in advanced math classes.
   - 2014-2015 Recruitment Efforts - To recruit for the second CSIT-In-3 cohort for academic year 2014-2015, project staff

- Delivering career development support through internship preparation workshops and internship placements;
- Providing scholarship support that will *eliminate the need for students to seek outside employment*.

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1. ***Curriculum/Organization*** – To finalize the reorganization of resources and curriculum at CSUMB and Hartnell Community College to implement a three-year accredited, Bachelor of Science degree option in Computer Science and Information Technology beginning in the fall 2013.
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Specific Objectives: ***2) Outreach/Enrollment***

2013-2014

Recruitment Results:

- 84 students started applications; 39 students interviewed based on completed applications and meeting qualifications
- 37 students started math intensive in March to meet calculus readiness requirement before fall 2013 courses
- 32 students successfully completed math intensive and calculus readiness requirement and started with cohort 1

Demographic Data:

Of the 32 students who started in cohort 1:

- 91% are underrepresented minorities (primarily Latino/a)
- 38% are female
- 84% are first generation college

2014-2015

Recruitment Results:

- 83 students started applications; 51 students interviewed based on completed applications and meeting qualifications
- 48 students started math intensive to meet calculus readiness requirement before fall 2014 courses
- As of June 2014, 34 students are on track to complete math intensive and calculus readiness requirement in order to start with cohort 2

Demographic Data:

Of the 34 students currently on track to start with cohort 2:

- 91% are primarily Latino/a
- 38% are female
- 82% are first generation college

3) Support/Retention

2013-2014

Retention Results:

Of the 32 students who started with cohort 1, twenty-nine students are still with cohort 1. One of the students no longer with the program was tragically lost in a traffic accident during first semester. This is a 94% retention rate through the first year of the program.

- One student was dropped due to failure of a core course. This student will begin with cohort 2 in fall 2014.
- One student decided to pursue a degree other than computer science.

5) Evaluation/Dissemination

Data collected from year 1 evaluation activities is informing adjustments to the program in year 2. However, no conclusive results are available at this time.