Section A. General Self Evaluation

The main degree programs under review in this self-study are a terminal professional master's degree and an undergraduate degree, both in Computing and Software Systems (CSS). This is the first review for these programs. The graduate MS program is entering its fifth year and the undergraduate BS program is entering its seventh year of existence. The undergraduate BA degree in CSS introduced in the AY 2005-06 and the newly approved Computer Engineering and Systems degrees will also be briefly reviewed.

The University of Washington, Tacoma, Computing and Software Systems program began in the fall of 1999 with an inaugural cohort of 30 juniors. The Tacoma CSS program was modeled after the CSS program that was designed by the UW Computer Science & Engineering faculty and implemented by the Bothell faculty three years earlier. Seven community colleges in the South Sound joined a collaboration committed to providing South Sound residents access to a computer science four-year degree. Larry Crum was the founding Director of the new program. The first laboratory of computing workstations was located temporarily in a conference room in the Library, while a permanent laboratory space in Dougan Hall was being prepared; additional laboratories in the new Science Building were constructed shortly thereafter.

In 2000 Moshe Rosenfeld and Josh Tenenberg were recruited to the faculty, making it possible to offer the senior year of the program. Students entering the CSS program were provided multiple articulated paths to the Institute through their community colleges. They could pursue an Associate of Science degree providing them with the best foundation in math and science, pursue an Associate of Arts (sometimes named an Associate of Arts and Science) degree which provided for a more diverse academic preparation, or complete an Associate of Applied Science - Transfer Option degree, created to allow students the opportunity to prepare immediately for technical employment while also appropriately preparing to continue their four-year education once this was completed.

Another senior faculty member, George Mobus, joined the program in 2001 along with Sam Chung who joined as an assistant professor. These hires helped expand the variety and scope of classes that could be offered. A number of visiting professors and full-time lecturers were also added to the program to help expand the course offerings.

In 2001 Governor Gary Locke, with encouragement and support from industry organizations such as the Washington Software Association's Workforce Study and the Technology Alliance, proposed the creation of a "polytechnic university" to address the increasing demand for nationally competitive bachelors and masters prepared technology professionals. The legislature approved the establishment, through a creative public-private partnership, of the Institute of Technology at the University of Washington, Tacoma, to address the growing demand for high-tech professionals and to spread the prosperity of the high-tech economy to more residents of

Washington State.

In 2002 the Institute saw its greatest faculty growth. Steve Hanks and Peter Horak were hired as senior faculty (Horak currently has a joint appointment with Interdisciplinary Arts and Sciences). At the same time, Isabelle Bichindaritz, Donald Chinn, and Edwin Hong were hired as assistant professors. The 2002 group, along with the existing faculty, enabled the Institute to offer a wide range of elective courses in addition to the required core classes. They also made it possible to introduce the new master's program.

As the faculty grew and the demand for more highly trained software developers expanded, the need for an advanced degree program in computer science was addressed. In 2003 the Institute began a Masters program in Computing and Software Systems to serve two important populations of professionals: those with a baccalaureate degree in computer science and those with a baccalaureate degree in a related field and with some education and experience in computing. Bridge classes were developed to help students in the latter group prepare themselves for graduate study in the computer science field.

In 2005 the Institute proposed a Bachelor of Arts Degree in CSS for those who were interested in the application of computing technology to fields other than computer science. This program was approved by the HEC Board in Spring of 2006. Students who choose this degree take fewer computer science classes but take a minor in another discipline. A Minor in Applied Computing was also developed in 2005. It is primarily for students whose main interest is outside computer science but who need computing skills to make them more productive in their chosen fields. Below is a listing of graduates for each program since their inception.

Table A. 1. Listing of Graduates for each program.

Term	BA	BS	MS	Total
2000-2001		4		4
2001-2002		35		35
2002-2003		54	1	55
2003-2004		55	11	66
2004-2005		55	11	66
2005-2006	1	56	20	77
2006-2007	3	47	22	72
Totals	**4**	**306**	**65**	**375**

Additionally, service courses have been added in order to create opportunities to support students outside of the CSS programs who are interested in the topics of technology, web infrastructure and introductions to software and software development. These TINST courses include Entrepreneurship in Technology, Living and Working in a Virtual World, and Computational Problem Solving to name a few. Students from Business, Nursing, Environment Studies and Interdisciplinary Arts and Sciences have taken these courses.

Orlando Baiocchi was hired in 2005 to take over for Larry Crum as Director of the Institute. In

anticipation of retirement and to facilitate the hiring of a new Director, Larry Crum chose to move from the Director's position into a half-time faculty position.

In the spring of 2006 Larry Wear was hired to help plan and implement the proposed computer engineering degree. Later in the year he applied for a full-time position and was hired permanently starting in the fall of 2006 as professor/Associate Director for Computer Engineering. Dan Zimmerman was also hired in 2006 as an assistant professor. Ankur Teredesai, initially hired as a visiting professor, also applied for a full-time position and was hired as an associate professor starting fall 2007.

Two events important to the Institute took place in the 2006-2007 academic year. The first was the transition of UW Tacoma from a two-year, upper division university to a traditional 4-year university. UWT admitted its first freshman class in the fall of 2006. Although freshmen do not declare majors, a good number of the entering freshmen have indicated that they intend to select a major in the computing field. Since there are now freshmen and sophomores on campus, the Institute has developed a new computer fluency course, TINST 100 that will be open to all students. The course is modeled after the CSE 100/FIT 100 courses currently taught at UW Seattle. This course goes beyond computer literacy and teaches students to begin making effective use of information technology. We look forward to offering a class that has the potential to impact students from all disciplines on campus, not just those in computer science and engineering.

The second event that impacted the Institute was the HEC Board approval in December 2006 of the Institute's proposal to offer a degree in computer engineering. With the addition of this traditional engineering degree, the Institute took an important step towards becoming the "polytechnic university" envisioned in Governor Locke's original concept for the Institute. To move even closer to being a polytechnic university, faculty are currently preparing additional degree proposals in the areas of systems engineering and information technology.

Having freshman and sophomore students also means we will be offering more sections of our introductory programming and engineering courses. In the past most of our entering students had completed these classes at community colleges. As a result some community colleges have expressed concern that the changes at UWT could impact their enrollment. Because of this we have taken steps to dispel their concerns. Last spring Tacoma Community College faculty were worried that offering the first electrical circuits class at UWT would mean that they would not have sufficient enrollment to justify teaching the class at their colleges. Our solution was to jointly teach the class collaboratively using faculty and facilities of both schools. The course was very successful, and faculty from both schools were very pleased with the results. We are currently working on a similar approach with faculty from other community colleges in the state,

including our formal partner community colleges and Clark Community College in Vancouver, WA.

Having students on campus, full time, for four years may also have a positive impact on our graduate program. Because most of these are full-time students, there is a belief that some of them will move directly from the BS program to the MS program. If this proves to be true, we can expect increased demand for the MS program in three to four years.

The Institute was created to serve Washington State and especially the South Puget Sound and surrounding region, with the broad goal to enhance the quality of life of every citizen, including those who never take a class at the Institute. A primary focus was to provide high quality bachelors and masters level programs centered in the field of computing science and engineering. The Institute was also entrusted with the mission to be a catalyst and center for collaborative basic and applied research, experimentation, and design in the South Sound region.

Many of the students served by the Institute are from either underrepresented populations or are nontraditional (older, working, with families, place bound, etc.), or are first-generation college students without strong role models and support structures. We are working to increase enrollment in these groups as noted elsewhere in this report.

The Institute's current constituent groups include:

- College-prepared high school students who seek a competitive, high-tech, university bachelor's degree, and want to enter a four-year university upon graduation from high school. The Institute offers a Dual Admission program in partnership with select community colleges providing consistent access to university advising, faculty, facilities, and student services through all four years.
- Community and technical college students who desire to transfer to a competitive university bachelor's degree program in a high-tech field. The Associate of Science degree programs and the Associate of Arts (alternatively named Associate of Arts and Sciences or Direct Transfer) degree programs are appropriate preparations for these students. Those programs encourage the building of a four-year university-oriented mathematics, science, and critical thinking general education foundation. The Destination UWT program provides an opportunity for students who are preparing to transfer to the Institute to make that intention known, thereby allowing them preferential admission consideration, university advising and student services.
- Working professionals seeking a degree program to prepare for a career change into high-tech or a career step within a high-tech field. The Institute offers both bachelors and masters level programs to serve these students. It also offers credit remediation courses and non-credit professional courses (through the UWT Professional Development Center), as well as a spectrum of others through its community college partners. Both the bachelors and masters programs are offered on schedules that allow working professionals to complete the program primarily with evening courses.
- Working professionals who desire to keep current with evolving and emerging technologies. The Institute allows and encourages non-degree seeking working professionals to take courses at the Institute on a regular or occasional basis. Their presence as peer students is beneficial to degree seeking students as well. The Institute occasionally also solicits working professionals with leading edge expertise to offer courses that complement those offered by

the regular faculty. Other valuable continuing education courses are available through the Professional Development Center at UWT.

- Middle school and high school students who are preparing for a professional career in high-tech. The Institute through many community organizations offers workshops, seminars, and lectures to inform, motivate, and support K-12 students in the pursuit of a career in high-tech. One of the Institute's most successful outreach programs is the Math, Science and Leadership program that has been offered each summer for the past five years. With help from industry sponsors, the Institute provides a three-week program aimed at underrepresented students in local junior high and high schools. The program accepts students starting as 7th graders and encourages them return each summer until they graduate from high school. The program focuses on building interest and improving abilities in math, science and leadership.
- Industries and community organizations that can benefit from partnering with a community of university faculty and students. The Institute is proactive in building partnerships with industry and the community to create quality internships for its students, to provide research collaboration opportunities with faculty and students, and to promote technology transfer of faculty research. An example of this effort work currently being executed by a faculty and two students who are working with the Port of Tacoma to develop improved navigation aids for pilots maneuvering cargo vessels into the port. The Institute also provides lectures and conferences in partnership with the community to encourage education and economic development.

In order for the University of Washington's Institute of Technology to succeed in producing an economic benefit to the South Sound region, engaging and educating a greater number of technically skilled graduates prepared to enter the work force, and becoming a major resource to the greater community and the state, it must be proactive in integrating itself into the community. To help facilitate this integration and to help students transition from the university to the community after graduation, the Institute created the position of Assistant Director of Industry Partners. Our industry partners must be motivated not only to recognize the Institute's benefits but also to actively invest in growth and development. The Assistant Director of Industry Partners promotes this participation. Critical functions of the position include locating internships, obtaining industry feedback and advice, determining career opportunities, networking with the business community, and helping to develop financial partnerships.

Computer Science programs across the nation have experienced enrollment downturns during the past few years and the CSS program at UWT is no exception, although the downturns at UWT have not been as extensive as those at other schools. To explain how UWT compares to national enrollment trends, the following two tables show the decline in the production of bachelor degrees. Table A.2 shows the production of degrees at UWT and Table A. 3 shows the production of degrees nationally as reported by the Computer Research Association (CRA).

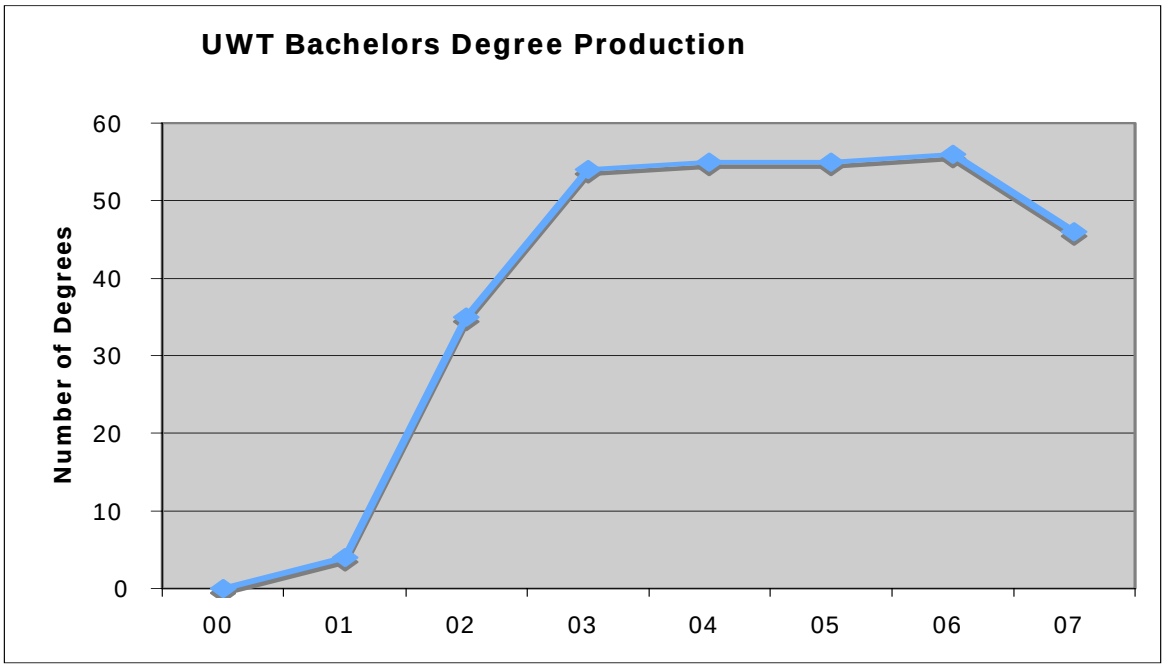

Table A.2 Production of Bachelors Degrees in CSS at UWT

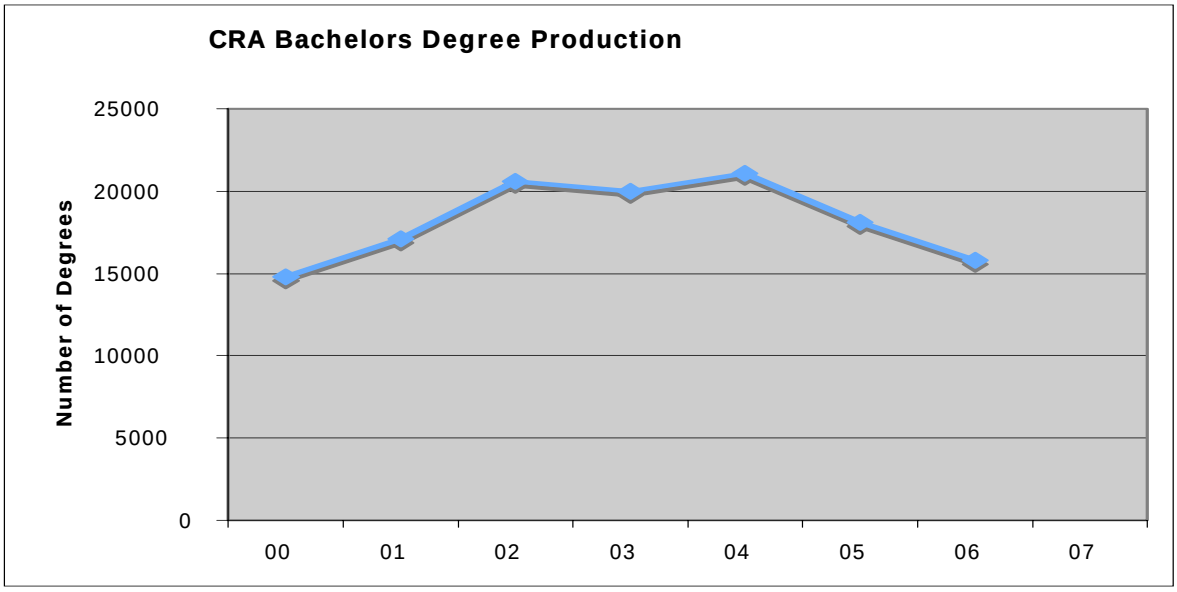

Table A. 3 Production of Bachelor Degrees Nationwide as Reported by CRA

As the figures indicate, there have been declines both at UWT and nationally. However, the national decline began earlier, and for the 2006 year was projected to be about 25% from the high. At UWT, there was actually a slight growth in degree production in 2006. The data for 2007 does show that UWT experienced a 15% drop from its maximum (the 2006-2007 academic year data is not yet available from CRA). With the drop in degree production at UWT for the last year included, UWT has experienced only two-thirds the drop in production compared to other schools.

Another interesting statistic is the number of newly declared undergraduate majors. Again, the UWT data is compared to that published by CRA.

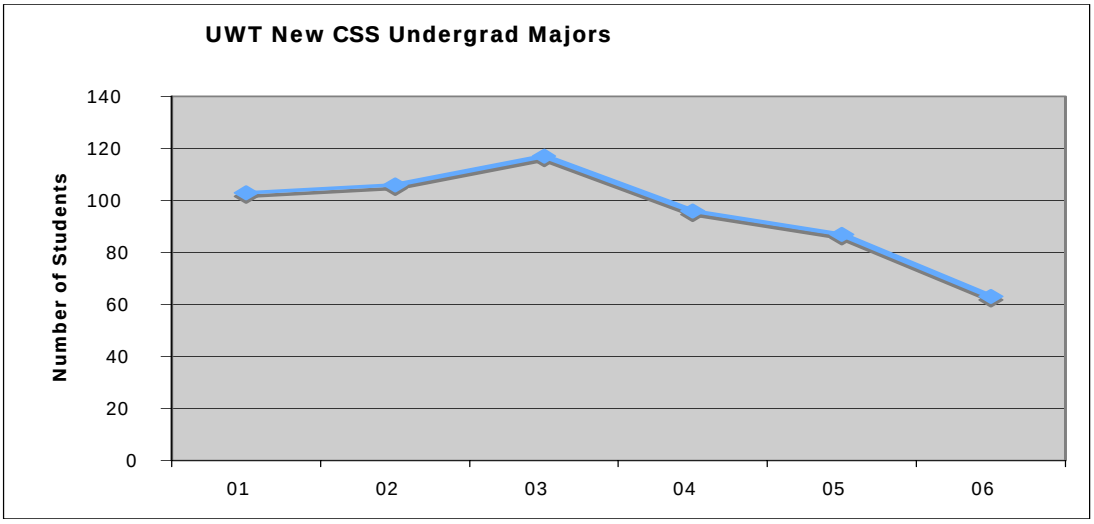

Table A. 4. Newly Declared CSS Majors at UWT

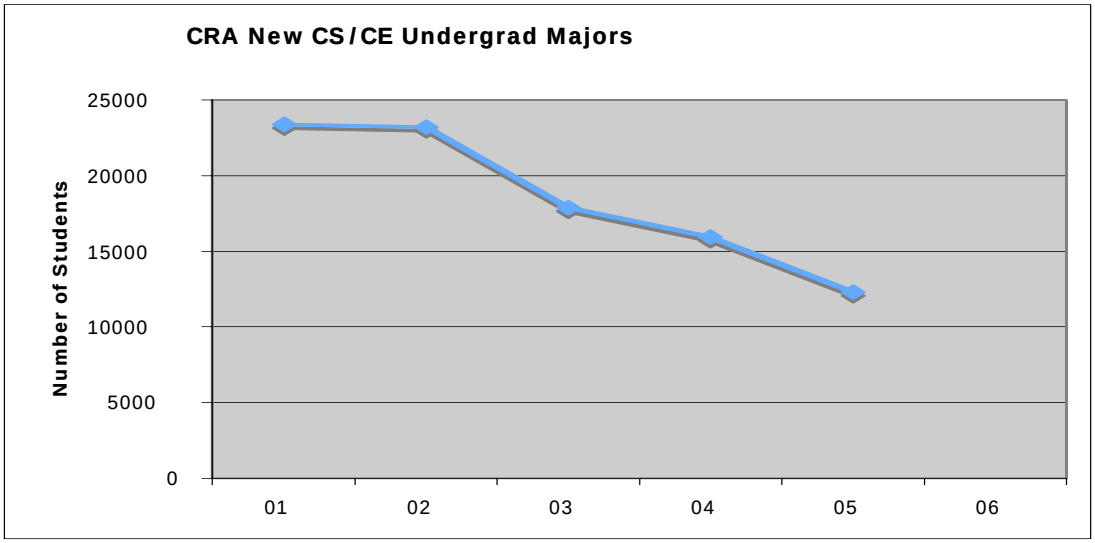

Table A. 5. Newly declared CS/CE Majors Nationwide

The drop in the number of declared new CS majors nationwide by 2005 was approximately 47% compared with a drop at UWT of only 18%. However, the drop experienced at UWT increased to 46% by 2006 (again, data from CRA for 2006-2007 academic year is not yet available).

1. Strengths and Assets

Conceptual focus of the curriculum

As an example, one of the first decisions made in designing the graduate program's curriculum was to structure the coursework around the general concept of distributed computing systems. This sets our program apart from other computer science programs and makes it unique in the field. Two of the core courses (one covering computing theory, and one covering the design,

architecture, and implementation topics) are specifically structured around distributed systems concepts and are designed to be complementary in subject matter. A seminar core course and several electives complete the program.

Although there are aspects of this structure that we have not realized as adequately as we would like, using distributed computing as a structuring device has worked very well; the structure provides a valuable focus for students in their coursework. Learning the concepts of distributed computing aids in subsequent learning and in the workplace; the framework stimulates faculty and student research, and conversely the research feeds back into the curriculum.

Excellent faculty / student interaction

Both students and faculty seem pleased with the amount and quality of interaction between themselves. We see two main factors assisting with this interaction:

- small class sizes foster positive pedagogical relationships
- the research seminar and capstone experience foster close research relationships. Many of our faculty are working with students in research projects. This year alone six students and four faculty attended conferences where they presented joint papers, which is unusual for a professionally oriented program.

Composition and attitude of the faculty

The faculty is dedicated to excellence in teaching, and in giving students whatever assistance is needed to facilitate their progress through a course or a project. Student comments are consistently positive when referencing the amount of contact, attention, and encouragement that they receive from the faculty.

Faculty technical interests are well balanced for a small program, representing both theoretical and applied disciplines and research methodologies that range from highly theoretical, to mainly applied, to fundamentally empirical.

Quantity and quality of advising

The program has a Lead Graduate Advisor dedicated to both recruiting students into the master's program and providing assistance as they progress through the program. This can present a challenge, as she needs expertise in the technical and administrative aspects of the program as well as the varied and changing needs of an extremely diverse student base in an equally dynamic field. We have introduced the concept of faculty advisors for the undergraduate program – although this is still in its initial phase, it has been very successful – and we look forward to extending faculty advising to the graduate program as well.

Diversity of the students

We have a diverse student base, in every sense of the word; the student population varies greatly both in terms of demographic attributes such as age, gender and ethnic background, and also in

academic and work experience, employment status, and life situations. For example, in classes the more mature, experienced students will often be seen taking a mentoring role with the younger students, and students with significant industrial experience are often able to contribute their perspective on how the concepts covered in a class relate to projects that they have experienced in the workplace.

Interaction with the community

The University of Washington, Tacoma in general and the Institute of Technology in particular enjoy a very supportive relationship with the City of Tacoma as well as business and governmental agencies in the South Sound region. It was the financial support from the State and the community that made the Institute viable in the first place. The interaction with the community benefits the program in providing a supply of eager students, and also benefits the students in terms of internship, research opportunities, and job opportunities upon graduation. We have been especially effective working with local employers on structuring the program enabling the students to progress through our program while maintaining full-time employment (a necessity for many of our students). The Institute of Technology Advisory Board (ITAB) composed of key South Sound professionals, provides timely and important community perspective, advice and feedback to the Institute. See appendix J for the Advisory Board list of members.

Connection to the UW system

Our program benefits greatly from our connection to the other UW campuses. We receive support and advice from the CSE department in Seattle; we maintain research collaborations and invite speakers from CSE and other departments; students enjoy access to the UW laboratory and library facilities; and are able to take electives at the Seattle and Bothell campuses. This broadens their educational experience. Faculty members from other campuses have also acted as advisors to assist students completing their capstone projects.

Laboratory facilities

In addition to its five general purpose computer laboratories, students in the program have access to an excellent set of specialized computing laboratories administered by the Institute of Technology. Our specialized research laboratories currently include Applied Distributed Computing, Embedded Computing Systems, Informatics and Artificial Intelligence, Information Assurance, and Networking. Please see appendix S for a complete listing of our lab resources.

2. Assessment of Success

In the shorter term, we measure the program's success mainly using feedback from the students, and from the Institute's Advisory Board. The board is apprised both of current enrollment and

graduation data, and also consulted on strategic planning for the program. A detailed, long term assessment of educational objectives and outcomes is outlined in Section F of this report.

The Lead Graduate Advisor is generally responsible for assessing student satisfaction – the advising staff periodically conducts email and phone surveys of current students and recent graduates. The UW Graduate School conducts exit interviews. These responses are reviewed by the advising staff. In last year's report the students rated the overall program at a 3.84 satisfaction rating out of 5. The exit questionnaire summary report is noted in appendix M.

Success of our graduate students can also be measured by their employment rates: 55.56% of our students have secured positions in the field and of those, 71.43% have secured their first choice of positions, with 92.86% of those positions being in Washington State.

Although all computer science programs can be characterized by a rigorous scientific approach and by their intense mathematical content, performance criteria for research, teaching and service vary widely across the country. UW Tacoma, and the CSS program in particular, are in a very peculiar situation. On one side, we are part of the University of Washington – a prime research institution by any international standards – and on the other side we are a predominantly an undergraduate institution with a mission to serve a variety of constituencies. To set the proper level of accepted scholarship is a contentious issue, as reflected in the different criteria for Tenure and Promotion that exist at UWT and the University of Washington. We believe that scholarship is still the main driver for the success of our programs. Yet, a balance between teaching, research and service is still expected. The involvement of faculty in student advising, and potentially in recruiting are examples of the level of commitment in achieving such a balance.

Institutions like the ones in the California State University System, where a few programs offer a doctorate, the State of New York University System (non-doctoral ones), the Rochester Institute of Technology and UW Bothell can be considered as appropriate peers for comparison. However, even among these there are differences and we tend to align with the ones that have stronger research activity.

3. Challenges and Areas Needing Improvement

Many of the current challenges facing the CSS program stem from the fact that the programs are new and small relative to what we would like to accomplish in providing a high-quality educational experience to a diverse student population with diverse backgrounds, and diverse educational goals and requirements.

Challenges specifically associated with the graduate program are:

- small numbers of students leads to high variance in enrollment from quarter to quarter, leading to difficulties scheduling classes
- number of electives is limited by necessity, leading to problems with the variety of selections we can offer to students

- difficulty in normalizing workload across faculty (night classes concentrated among a relatively small number of instructors)

We continue to struggle with the fact that we are trying to offer a varied educational experience to an extremely diverse student population:

- trying to offer both a "research-oriented" educational experience and a professional/practical program
- trying to provide a program that serves both students with an undergraduate degree in computer science and those without that degree, but with some computing-related coursework and work experience

The second issue is especially challenging. From the beginning, the program was intended to serve students with a traditional computer science baccalaureate degree ("Track II" students) and those without a computer science degree, but with some relevant coursework and work experience ("Track I" students). The program admits Track I students and offers a set of "bridge courses" intended to fill gaps in their previous coursework.

The latter category diversifies the student population and furthers the program's mission to serve the educational needs of the South Sound region. But it has proved challenging to adjust the proper admission requirements for Track I students, and also to choose the bridge courses to "level the playing field" for these students when they start taking the MS core courses. We have, and will continue to experiment with policies for admission and bridge curricula.

An additional complication associated with the bridge courses is that they are required only for a fraction of incoming students, thus enrollments tend to be quite low. Given the size of a typical incoming class, it is difficult to balance offering the bridge courses often enough to allow incoming Track I students to progress through the program, while at the same time using our teaching resources effectively (i.e., not teaching the courses to a handful of students at best).

A final challenge, attributable at least in part to the program's youth, is external awareness and perception of the program; the experience of the staff recruiters (later verified by an independent consultant's report) indicates that there is low awareness in the community of the existence and nature of the programs, both graduate and undergraduate. We have developed advertising campaigns in conjunction with the UWT Advancement office, promoting both our undergraduate and graduate programs, but the effects of these campaigns are slow to be realized.

The reader may have noted that our computer science program is referred to as the "CSS" program rather than just the traditional "CS" program, the reason being that there was a concern when the programs at Bothell and Tacoma were created that there might be confusion of these new programs with the CS program in UW Seattle. As a result, they referred to us as "Computing and Software Systems" rather than "Computer Science." This has been, and continues to be, a concern. Most high school and community college students and counselors know what Computer Science is, but very few realize that the term Computing and Software

Systems really means Computer Science. It would be beneficial in the future to rename the program to "Computer Science", clearly identifying that UWT is offering students the traditional computer science degree. The unusual name has also caused some problems for students seeking jobs since most employers do not understand what it means to have a degree in Computing and Software Systems, and the students need to take the additional step of defining it as Computer Science on their resumes and in interviews.

Additional evidence that the CSS program at UWT deserves recognition as a true Computer Science program came recently from Upsilon Pi Epsilon, the national computer science honor society. The Institute was informed that its application to host a chapter of UPE at UWT has been approved. Dr. Robert Roggio, a member of the executive board of the society, will visit UWT in November and help conduct the first initiation ceremony for qualified undergraduate and graduate students. It is expected that approximately 45 students will qualify for membership.

4. Changes in the Field

We begin by noting that this is our first program review, and this report item seems to address at least in part changes since the last review.

In the next ten years we see changes in our academic program driving our evolution, as much as changes in the field of computer science. UWT is expected to grow significantly, and it is our intention that all of our educational programs and faculty will grow with it. In the 2005-2006 exit questionnaires our students indicated confidence in our faculty regarding recent developments or trends, with a score of 4.05 out of 5. The UWT average was 4.14 and the UW as a whole was 4.13.

In addition to numbers, the Institute is committed to broadening its offerings significantly in the next few years. At the undergraduate level, we introduced a new BA degree and minor in Applied Computing and just initiated a new program in Computer Engineering and Systems. Proposals for new undergraduate degrees in Systems Engineering and Information Technology and Systems are currently under review at campus level. We expect new programs at the master's level to follow soon.

We are especially committed to developing cross-disciplinary programs. For example, our Minor in Applied Computing is a natural selection for Business students, and our BA students are required to take an academic minor in another program. The Institute was instrumental in establishing the University of Washington as an NSA National Center of Academic Excellence in Information Assurance Education, and maintains active collaborations in that area with UW Seattle and other institutions.

One of the main changes we are seeing in the field is a move to broaden the focus of computer science programs from "pure computer science" to more application-oriented disciplines. The

proposed Information Technology and Systems program is a response to this change. This and similar programs will also broaden the Institute's offerings, providing a technical degree to those who do not seek a traditional degree. We anticipate graduate offerings in this area in the next few years – in particular we are planning graduate certificates in Health Informatics and Information Assurance, both of which will supplement our graduate offerings. Eventually we will extend the offerings to full Masters Degree programs in Information Science, as potential enrollment justifies.

5. Role vs. Expectations

We enjoy generally good communication with the University administration as to our role, and external expectations are generally well aligned with our goals and achievements. Three points deserve mention, however:

- The Institute was established with expectations of very aggressive growth, especially in enrollment. Factors beyond our control (primarily the economic climate, the attractiveness of computer-science degrees nationwide, and overly optimistic estimates on the number of qualified local students) have prevented growth at the expected rate. And although the administration appreciates this, and the program has actually fared well compared to peer programs nationwide, we feel a continuing need to manage external expectations about a reasonable rate of growth. The enrollment yields for the Institute have remained steady. The rate of completed applications to admitted students is consistently in the 80% to 84% range, and the rate of completed applications to enrolled students consistently remains in the 60% to 65% range. Projections for both would remain at this rate.
- External stakeholders (most notably our colleagues in the Seattle Computer Science and Engineering department) have considered it prudent for us to offer "lighter-weight" academic programs, e.g., concentrations or certificates, rather than multiple "traditional" academic degrees. While we tend to agree with them in this regard, as a practical matter it is difficult to do so, given the program's current size, and current growth projection. Offering multiple concentrations requires diversity in course offerings, and that in turn requires greater number and diversity in teaching resources. We will continue to pursue development of these "lighter" programs at a prudent pace, and to manage expectations of when and how we should do so.
- Decreased enrollment at the community colleges continues to be a negative factor in establishing a "pipeline" between their two-year programs and the Institute.

6. Governance

As a small program, we govern and plan mainly as a full faculty. Faculty meetings are held once a month during the academic year for discussion and to vote on matters relating to admissions, curriculum, governance, staffing or other items within the purview of the faculty. There is a certain amount of delegation to committees (e.g., the graduate committee deals with the tactical aspects of administering the MS program), but any changes in policy are discussed and approved by the full faculty. There is essentially no unilateral planning or decision-making at the Director level. The staff is also consulted in the planning and decision-making processes, whenever their expertise is relevant to such processes.

7. Mentoring Junior Faculty and Students

Faculty

Mentoring junior faculty is an important responsibility – each junior faculty chooses a senior faculty mentor – but this has been mostly accomplished informally, and according to the style and needs of the faculty members involved. We expect to see significant growth in mentorship efforts and outcomes in the near term as we formalize the mentoring program. Consideration is being given to "cloning" the mentoring process in the UWT IAS program.

In the meantime we provide new faculty with release time to develop their research portfolio. We also have in place a peer review process that allows senior faculty to review not only teaching – as required by the UWT code – but also research and service. Senior faculty comments and suggestions are discussed with junior faculty. A similar process takes place at the Director level**.**

Students

A peer-mentoring program has been established for our program. Mentors are advanced CSS students who work one-on-one with other CSS students in computer labs to explain concepts and theory troubleshoot code, and assist in developing problem solving skills. Mentors also maintain the Institute of Technology's mentor web page; visit classrooms to inform of mentor purpose and availability; advise and motivate students; and serve as role models. They attend mentor meetings either weekly or biweekly to discuss challenges and ideas with staff and faculty supervisors. Their weekly time commitment is generally between four and ten hours. Qualifications and characteristics for this position include both the completion of TCSS 142, 143, 321, 342, 343, and 372 with a GPA of 3.2 or better and a recommendation letter from a faculty member.

Most graduate student mentoring occurs informally. Our students consult with the Lead Graduate Advisor and/or the Graduate Program Coordinator on academic and career matters along with the Assistant Director of Industry Partnerships. Advisors also work with students who have graduated from the program, inviting them to make themselves available to our current undergraduate and graduate students at information sessions and recruiting events. The Institute also sends any student job openings within the Institute to our student listserve. The student groups, Grey Hats and ACM also serve to informally assist students in all program areas.

Section B. Teaching

Faculty Courses

Tables B.1 and B.2 both show the number of courses taught, number of students taught, and student credit hours for each faculty member in our CSS program over the last three academic years. All part- and full-time faculty members are included. The asterisks denote graduate faculty members. Please note that there are two tables, which indicate two types of TCSS courses: classroom-style courses and independent-study courses. Regular courses, including core courses and electives, are taught at scheduled times in mediated classrooms. Independent-study courses are those that require one-on-one interaction between an instructor and a student:

- TCSS 497 Internship in CSS
- TCSS 498 Directed Reading in CSS
- TCSS 499 Undergraduate Research in CSS
- TCSS 600 Independent Study in CSS
- TCSS 700 Master's Thesis in CSS
- TCSS 702 Design Project in CSS

Table B. 1. Faculty Teaching—Regular Courses

	2004-2005			2005-2006			2006-2007		
Name	# of courses taught	# of students enrolled at 10th day	# of credits	# of courses taught	# of students enrolled at 10th day	# of credits	# of courses taught	# of students enrolled at 10th day	# of credits
Bichindaritz, I*	4	64	325	6	125	625	6	134	670
Burkett, J.	3	45	240						
Chinn, D.*	4	81	412	4.83	157	534	5	148	470
Chung, S.*	6	110	560	6	91	460	4	76	380
Conlen, W.	7	72	375	4	53	275	2	33	165
Crum, L.*	1	9	55	3	69	365	4	32	160
Endicott, B.				1	13	65			
Fry, A.	3	67	340	2	42	210	1	14	70
Hanks, S.*	4.91	109	312	3	54	285	4	55	275
Hong, E.*	4	72	395	5	71	405	6	88	440
Horak, P.	1	16	85	3	31	160	3	53	265
Lyon-Banks, L.	6	73	380	3	43	225			
McLane, D.	6	137	700	6	126	655	6	109	545
Mobus, G *.	6	53	269	4	54	300	7	57	285
Muppa, M.				1	15	80	6	73	365
Robinson, D.	2	42	215						
Rosenfeld, M.*	6	107	600	6	106	605	6	79	395
Sanders, A.	1	21	110						
Stepp, M.	7.17	134	624	6.16	89	439			
Tenenberg, J.*	4	645	350	2	43	245			
Teredesai, A.							4	58	290
Wear, L.*							2	8	40
Zimmerman, D. *							6	107	535

Table B.2. Faculty Teaching – Independent-Study Courses

	2004-2005			2005-2006			2006-2007		
Name	# of courses taught	# of students enrolled at 10th day	# of credits	# of courses taught	# of students enrolled at 10th day	# of credits	# of courses taught	# of students enrolled at 10th day	# of credits
Bichindaritz, I	5	8	50	11	13	53	12	10	45
Chinn, D.	3	3	7	1	1	5	6	6	26
Chung, S.	8	25	117	11	29	122	10	5	59
Conlen, W.				2	2	10			
Fry, A.	3	14	85	1	6	37	5	4	30
Hanks, S.	4	4	20	1	1	4	3	3	15
Hong, E.	1	1	5	6	6	30	4	4	11
Horak, P.	1	1	5						
McLane, D.	2	2	10	3	5	25			
Mobus, G.	7	9	45	8	8	28	8	7	36
Muppa, M.							3	2	15
Rosenfeld, M.	2	2	10	4	7	29	1	1	3
Stepp, M.				2	3	11			
Tenenberg, J.	2	2	10	4	5	25			
Zimmerman, D.							1	1	5

2. Teaching Responsibilities/Assignments

Teaching responsibilities and scheduling for the academic year are initially discussed by a small committee composed of the Director, the Graduate Coordinator, the Associate Director, the Program Administrator, and the Lead Graduate Advisor. Instructor constraints and preferences are solicited ahead of time, and instructors are given the opportunity to review the schedule before it is finalized. Input from the students comes from meetings with the Director and preference surveys. The Graduate Coordinator and the Associate Director advise the Director on the final teaching assignments. The Director is also responsible for allocating course releases for research and administrative purposes.

3 and 4. Other Student Contact Hours and Undergraduate Research

There is extensive faculty/student interaction (both undergraduate and graduate) in joint research (faculty publication lists are noted in the attached CV's) and in the advising of directed reading, independent study, and masters-level capstone projects. As noted in the 2005-2006 exit questionnaires, 31.58% of our graduate students are publishing based on thesis or dissertation, as compared to the UWT average of 24.63% and the UW average of 26.81%. As an example, we describe below one of our success stories.

> *Josh Tenenberg served as the advisor for Kristen Shinohara's graduate project throughout the 2005-2006 academic year. This design project took an explicitly human-centered approach, with a focus on using ethnographic methods to provide insights into the life world of a visually impaired student at a college within the region. This project involved an interview and observational study of the student interacting with various technologies within her home. Based on these observations, Kristen then proposed a series of conceptual designs for overcoming the task breakdowns experienced by this particular student. The implications of Kristen's work are both methodological and theoretical.*
>
> *Methodologically, Kristen used a research design with a single non-sighted individual involving a large range of interaction tasks with a number of different technological artifacts in context, in contrast to most user studies that involve a larger number of users on a more constrained set of tasks within the laboratory. Kristen's design does provide a richer and more coherent account that is better able to get at situated meanings, but at the expense of external validity on a narrow range of tasks.*
>
> *Theoretically, Kristen's work emphasized the importance to the socially-situated meaning that determines who will use technology and how they will use it in addition to functionality. What Kristen's study pointed out is the importance of sensitivity to the ways in which technologies can "mark" an individual as having a disability, especially in light of the well-documented stigmatization that people who are blind or have physical disabilities encounter. Kristen and Josh Tenenberg actively continued to collaborate on this project since her graduation from the Institute.*
>
> *Kristen presented this work in a Student Research session at the ACM SIGACCESS Conference on Computers and Accessibility in 2006 and a full paper was accepted to this same conference for presentation and publication in the ACM Digital Library in 2007. She has recently been hired as the first specialist in Human-Computer Interaction at Newtech, a software company in the South Puget Sound.*

Additional examples of recent graduate student publications are listed below:

- Akkineni, S, Bichindaritz, I. Concept Mining for Indexing Medical Literature. Engineering Applications of Artificial Intelligence. Special Issue on Recent Advances in Data Mining, Perner, P. (Edt.) Vol 19, Issue 4, 20056, 411-417
- Rajagopal R., Bichindaritz I., Knowledge discovery in the form of prototypical cases using advanced data mining techniques, Advances in Data Mining, Poster and Workshop Proceedings of the Industrial Conference on Data Mining, Workshop on Data Mining in the Life Sciences, Isabelle Bichindaritz and Petra Perner (Edts.), Leipzig, 2007, 30-39
- Dillard L., Annest A., Predicting Lung Cancer Prognosis from Gene Expression Levels, Advances in Data Mining, Poster and Workshop Proceedings of the Industrial Conference on Data Mining, Workshop on Data Mining in the Life Sciences, Isabelle Bichindaritz and Petra Perner (Edts.), Leipzig, 2007, 61-72
- Potter R., Comparison of Classification Algorithms Applied to a Breast Cancer Dataset, Advances in Data Mining, Poster and Workshop Proceedings of the Industrial Conference on Data Mining, Workshop on Data Mining in the Life Sciences, Isabelle Bichindaritz and Petra Perner (Edts.), Leipzig, 2007, 40-49
- Spiz Michael Szymon, Using Latent Semantic Indexing for Data Deduplication, Industrial Conference on Data Mining – Posters 2006, Leipzig, 2006, 37-48
- Allampalli-Nagaraj G., Bichindaritz I., Semantic Indexing Of Images Using A Web Ontology Language, Advances in Data Mining, Poster and Workshop Proceedings of the Industrial Conference on Data Mining, Workshop on Data Mining in the Life Sciences, Isabelle Bichindaritz and Petra Perner (Edts.), Leipzig, 2007, 50-60
- Christopher P. Baidoo-Essien (directed by Moshe Rosenfeld and Ed Hong), Knapsack Cryptosystems: Analysis of Trapdoor Construction and Cracking Schemes, Internal

Undergraduate research is strongly encouraged. Examples of recent publications include:

- Eric Smyth: Sudoku. His research project was presented at the regional meeting of the American Mathematical Association in Linnfield College, Oregon in April 2007.
- Tim Minalia: (ongoing research directed by Moshe Rosenfeld) Tim programmed the “Salmon Circle” problem, which we will continue to investigate.
- Chris Perryea, “Software IP Crisis,” prize-winning essay in Computing for Social Responsibility Essay Contest, 2003-04
- Mark Paul (directed by Josh Tenenberg), “Impact of Violent Video Games,” International Conference on Politics and Information System, Technologies and Applications, Orlando, FL 2004
- Ben Leibert (directed by Josh Tenenberg), “Ethical Issues in Robot Sentience,” (directed by Josh Tenenberg), TCSS 499 Undergraduate Research, Winter 2004
- Jason Brick, “Artificial Intelligence and Game-Playing,“ TCSS 499 Undergraduate Research, Spring 2002
- Bong Cho (with Sam Chung), “Reverse Engineering a Point of Service System Using JavaPOS with UML and RUP,” US-Korea Conference on Science, Technology, and Entrepreneurship, Seoul, Korea, 2002
- Christopher Lohrey, Laura Henry, and Brent Roberts (with George Mobus), “Experiments in Synthetic Psychology,” Consortium of Commuter Science in Colleges, Northwest Section, Seattle, WA, 2004

- John Shock (directed by George Mobus), Achieving Consensus in JXTA Peer-to-Peer Networks, TCSS Spring 2005 Colloquium
- Mathew Conrad (directed by Martin Stepp), The Role and Value of the Institute: Exploring the Core of Employer Expectations, Internal
- Dmitriy Dorenshenko (directed by Andrew Fry), Architects BCRA's Financial Management System, Internal

As stated, this is only a partial listing of the research accomplishments of our undergraduate students but it gives an indication of the type of work being presented by the students as well as the broad involvement of the Institute's faculty.

Students taking Internships, Directed Research and Directed Readings are generally required to present their projects at the end-of-quarter colloquium. Each quarter, the colloquium provides attendees a written program with titles and abstracts to accompany their presentations. These written programs have been cataloged and are provided on site in addition to a complete and detailed listing of projects and research examples.

5. Instructional Effectiveness Evaluation

Instructor evaluation is conducted in accordance with the faculty code and program by-laws: a committee is formed to evaluate each instructor; the instructor assembles course material and evaluations, along with a self-assessment that includes both an evaluation of the year's teaching and plans for improving effectiveness in the future. The committee reviews this material and visits the instructor's class for in-person observations. The committee writes a report that is shared with faculty senior in rank and the Director. The Director communicates the evaluation results to the instructor. Student evaluations of the faculty are conducted in accordance with UW criteria and are also analyzed by the Director and discussed with faculty. We rely most often on numeric student ratings and on the instructor's self-evaluation to assess teaching impact. Collegial classroom visits are not uncommon, but not mandated. It is not uncommon for an instructor to request an assessment from CIDR (Center for Instructional Development and Research), though that is decided at the instructor's initiative.

6. Data Summary

There are several ways that we assess our effectiveness: student evaluation of faculty (see table C. 1 below), including written comments, as well as input from the Advisory Board and alumni, Graduate School surveys, Director's meeting with students, verbal and written comments received by faculty and staff, etc. Below are some changes that we have introduced in response to this data collection:

- We have replaced one adjunct faculty member in order to better address the goals and objectives of the TCSS 142 and TCSS 143 courses.
- The TCSS 390 course has been updated. The faculty at large now has more direct input in the delivery of this class.

- New regular and adjunct faculty have been recruited and hired who can teach new courses in areas not served by the current faculty.

Table C.1 Course Evaluation Annual Averages for Instructor Effectiveness

Year	Annual Average	#of faculty receiving Higher than 4.6
2000-2001	3.76	n/a
2001-2002	3.5	n/a
2002-2003	3.7	3
2003-2004	3.8	7
2004-2005	3.8	7
2005-2006	3.8	7
Spring 2007	3.9	4

7. Methods to Assist Faculty Development in Teaching

As stated above, the evaluation committee will engage an instructor if the annual review suggests problems with teaching effectiveness. The nature of the evaluation can range from individual mentoring, to suggesting intervention by CIDR, to more directed remedies such as asking the instructor to prepare a more detailed teaching portfolio for further review.

8. Innovations and Best Practices Employed

The CSS program is small but growing. One of its primary missions is to provide a high-quality undergraduate education experience to its student population that consists primarily of non-traditional students. Nearly all of our students to date have transferred from other institutions, and most of them have transferred from local community and technical colleges; many students have family and/or jobs. Because of their varied backgrounds, their preparation is not always up to the standards we would like to see. As a result, our students face special challenges.

The CSS faculty addresses these challenges through their teaching practices, the environmental conditions that they create, and the resources that they make available to students. These efforts have primarily been carried out by individuals on an ad-hoc basis within their own classrooms. This is not to minimize the importance of such efforts: examples include the use of peer review in algorithms analysis courses, high-performance teams that exhibit both autonomy and mutual accountability in software engineering courses, and the utilization of special-purpose laboratories and creative processes for students to explore robotics in embedded systems courses. Although students present their creative project work in quarterly public displays and performances, there are few institutionalized forums for sharing best practices amongst faculty. Annual faculty reports, where faculty members articulate such things as classroom practice and teaching philosophy, are not shared as a matter of program policy except by the subset of faculty involved in annual reviews of the reporting faculty member. Nor are discussions of teaching practices a regular part of faculty meetings, unless there is an issue about resources.

However, much has been accomplished in dissemination of best pedagogical practices through the forums that do exist. One of the most important of these are the quarterly meetings between CSS faculty and faculty from partner community and technical colleges (CTC's). These have been well attended and have served to foster two-way communication of best practices across institutional boundaries. Discussions at these meetings have included a "show and tell" of the different textbooks used in the introductory programming courses, short classroom exercises that can be used to assess student understanding, and a tutorial on how to use graphics packages to support introductory programming. This has resulted in considerable knowledge among the participants about the teaching and learning at regional institutions. As importantly, it has improved the relationship between CSS and CTC faculty over the course of the last several years.

Another way innovations have been introduced into the curriculum is through deliberate transfer to practice of the research conducted by Josh Tenenberg and Donald Chinn, two CSS faculty members whose main research area is computer science education. They have hosted visits and talks by experts in computer science education from around the world, which has influenced how CSS faculty talk about and view their work as teachers. Josh Tenenberg's Disciplinary Commons project brought together computer science educators from both four-year and two-year institutions in the Puget Sound area to discuss pedagogical issues in the teaching of introductory programming. Donald Chinn's work to implement and evaluate problem solving workshops for several of the core CSS classes has influenced the way students study and has contributed to a culture of collaborative study among our commuter student population. Their research efforts, however, have largely improved their own teaching practice rather than that of the faculty in general.

The CSS program has recently started to define the educational outcomes for individual classes to devise ways to measure student achievement of these outcomes. This work shows great promise in improving the quality of the education provided to our students. Evaluating outcomes will also make it possible to move from ad hoc course improvements to a planned approach for course and program improvement. Details on program objectives and outcomes and the process being implemented to measure them can be found in section F.

Although we have made much progress, there are still opportunities to make deliberate structural changes that will increase the innovation that occurs in teaching in CSS. As mentioned above, providing regular ways to disseminate and evaluate best practices, such as devoting time in regular faculty meetings to discuss teaching, would help to create a culture of excellence in teaching where issues can be discussed before they turn into crises. In addition, faculty could engage in more deliberate individual and reflective practices with a focus on both evaluating existing efforts and feeding forward the insights obtained into structural changes in curriculum and teaching. In short, the CSS program needs to establish what teaching excellence means,

systematically engage in reflective and evaluative practices that are known to stimulate creativity and improve quality, and provide mechanisms to achieve excellence and maintain it.

Section C. Research and Productivity

1. Tenure, Promotion and Salary Considerations

The Institute uses standards consistent with the UW and UWT faculty codes, and with the common practices of other academic programs on campus, which require attention to research, teaching, and service. It is difficult to identify a particular policy addressing the balance between teaching, research and service required for successful promotion, simply because the unit is so new that we have had very few cases to consider. In general terms we reference the Computing Research Association's (CRA), "Best Practices Memo Evaluation Computer Scientists and Engineers for Promotion and Tenure," appendix I. Faculty retention, promotion and salary as stated are based on review of the individual's teaching, research, and service record in light of the Institutes mission and T & P criteria and in accordance with the procedures outlined in the UW Faculty Code. Salary decisions, which are made annually for each faculty member via the performance and merit review process, involve the Director and faculty senior in rank to the reviewee. A faculty review committee evaluates the merit of the reviewee for the current academic year based on the data contained in the reviewee's annual report. The committee submits its recommendation to the Director along with a document that contains feedback for the reviewee. The Director forwards his merit recommendation to the Vice Chancellor for Academic Affairs, and the Director may append additional feedback to the review document. The review document becomes part of the reviewee's annual performance review, and is discussed in the face-to-face meeting between Director and reviewee at the end of the academic year. Retention decisions are made before the end of an assistant professor's third year and involve the Director and faculty senior in rank to the reappointment candidate. The faculty review committee bases its evaluation on the data contained in a portfolio assembled by the candidate that contains evidence of the candidate's accomplishments to date and future potential in the areas of teaching, scholarship, and service. As with the merit review process, the faculty review committee forwards its recommendation to the Director along with a document that contains feedback for the candidate. The Director forwards his reappointment recommendation to the Vice Chancellor for Academic Affairs. The Director may also append additional feedback to the review document, which is sent to the candidate after the reappointment decision is made.

2. Mentoring

As noted in a previous section, the mentoring process is evolving since this is a new and relatively small program. To date only one faculty member has applied for tenure and promotion and was successful. Another faculty member applied for early tenure and it was recommended

that the application be resubmitted. Two junior faculty members will go through the same process this year and careful attention has been given, including one situation where a change of mentor was necessary. An additional junior faculty was hired this year and his progress has been fully monitored, although no formal mentor has been assigned at this time. We provide release time and have a peer review process that allows senior faculty to review teaching as well as research conducted. The senior faculty assists with feedback and assistance in any areas that would benefit the junior faculty member in developing their research plan. We also encourage junior faculty to apply for external grants. Several speakers have been scheduled to discuss different perspectives and trends; one such event was the recent visit by the Executive Director of CRA. The Institute's Director also monitors announcements of grants from different sources and circulates these opportunities to the entire faculty. It has also been a policy to encourage junior faculty to attend conferences and events, even when they are not presenting, to ensure they have good exposure and the opportunity for professional development.

3. and 4. Impact of Research and Advances in the Discipline

The Institute's faculty members have made numerous contributions to the computer science and engineering fields over the past several years. This has been accomplished while carrying a much heavier teaching load than at many universities, and with many needing to focus considerable energies on program building activities at the new campus. Some of these contributions are summarized below, and more can be found in the CVs located in appendix G.

- Orlando Baiocchi- recent contributions have been primarily in the field of engineering program design and assessment.
- Isabelle Bichindaritz- several fields within computer science have been positively impacted by her research. These areas include: case-based reasoning, data mining, health informatics, and artificial intelligence.
- Donald Chinn- computer science education has been the main focus of his research. Adaptation of the Treisman model to computer science courses has been one of his goals.
- Sam Chung- the emerging field of service-oriented computing has been his area of concentration. He has identified technology and strategies for realizing service-oriented architectures in Web applications.
- Larry Crum- embedded computing has been his main area of research and development. He has contributed to the establishment of CS&E programs throughout the country.
- Barbara Endicott-Popovsky- information assurance and security have been where she has made her most important contributions. She has developed technology and tools to help secure computer networks.
- Steven Hanks- artificial intelligence has been his primary research area. He developed a model for probabilistic temporal reasoning that shows great promise in addition to being on several editorial boards.
- Edwin Hong- he has made contributions to discrete mathematics and image compression.
- George Mobus- earlier contributions in the area of robotics and neural networks were significant. He is currently focusing on the development of systems science and energy systems engineering curricula.

- Moshe Rosenfeld- is a senior Fulbright research scholar and a Fulbright Senior Specialist. He made major contributions to graph theory. His most recent work was on Hamiltonian cycles in prisms, decompositions of the completer graph into cubic graphs and equi-partite graphs and polytopes.
- Josh Tenenberg- computer science education has been his major focus. In addition to editing the ACM journal in the field, he has done numerous studies on student learning.
- Ankur Teredesai- interests span areas of data mining, data management and evolutionary computing. Focus is on developing new solutions for problems including pattern-recognition, link-analysis, and clustering, with an emphasis on online social networks, and pervasive computing applications.
- Larry Wear- engineering education and engineering program development are the focus of his recent research. He has also developed peer review processes used in software development.
- Daniel Zimmerman- research work is concentrated in formal verification and testing. In particular, he is looking into automated testing techniques for object-oriented systems.

Twelve of our faculty, both part time and full time at all levels have produced or presented approximately ninety-two papers in 2006-2007. A complete list of publications for the last academic year is included in appendix R.

As a relatively new field, computer science is undergoing constant change. Some of these changes have had direct effects on faculty research; three examples are notable. Sam Chung has redirected his research efforts to the evolving area of service-oriented computing. Three years ago this branch of research was barely known, but it has recently attracted much attention and Chung's contributions in the area are significant. Ankur Teredesai's research has recently moved into the area of social networks and remote sensor networks. Both of these areas have seen significant growth in the past few years and his contributions have helped promote that growth. Isabelle Bichindaritz has broadened her area of expertise to include data mining and biomedical informatics where she has had numerous publications and has edited several journal special issues. The increasing importance of cyber-security and information assurance has motivated several faculty members to include those topics in their research areas, from the pure mathematical point of view to the application of new security techniques to network systems. Recent funding initiatives at the federal level have also generated additional interest in computer science education.

5. Heterogeneity within the Unit

We feel fortunate to have diversity in our faculty in terms of research areas and methodologies; the faculty range from mathematicians who use proof as the primary research tool, to pure implementers who build systems, to researchers in social and pedagogical issues who use empirical methods typical of social sciences to evaluate research.

The main obstacle to communication at this point is physical; the program is housed in two buildings that are situated at opposite ends of campus. This is a significant detriment to faculty

interaction. It is a definite goal of the program to situate the entire faculty and staff in the same building, as soon as it is practically possible.

6. Impediments to Faculty Productivity

As with most UWT programs, the main impediment to faculty productivity is the extreme time demand associated with developing new programs and continually evaluating the procedures and policies associated with existing programs. This burden is especially high given the relatively small size of the program (thus relatively few faculty members, thus high load per faculty). We expect this will get better over time, as the programs mature and the number of faculty grows.

Secondary impediments include limited human and financial resources. Without doctoral students, and with masters students who are fully-employed while attending school, graduate assistants are not readily available to reduce part of the teaching load or to assist with research. The opportunity to "buy out" teaching responsibilities (i.e., course releases via external funding) to generate more research time is constrained by the joint effects of our small faculty and broad curricula, which make it difficult to find acceptable replacement instructors.

7. Staff Productivity and Professional Development

Staff is composed of a Director, an Associate Director, an Assistant Director of Industry and Partnerships, a Program Administrator, two professional advisors, one professional outreach coordinator, two professional lab technicians and three classified staff. An organizational chart is provided in appendix O.

The present stability in staffing, after a period of transition, has created an opportunity to work with staff and their respective job assignments. Particular job duties and job descriptions have been reviewed with the help of an external consultant; redundancies have been eliminated which has served to create efficiencies in the various positions. A cross-training plan has been developed insuring a consistent workflow.

The departmental philosophy is to work with staff to accommodate work schedules, family commitments, attending school and caring for children. The Director, Associate Director and the Program Administrator have adopted open-door policies to foster communication among faculty and staff members. Staff evaluations are conducted annually.

Our program strongly encourages the professional development of the staff. Staff members are encouraged and supported financially in attending professional development and continuing education courses as well as professional conferences and workshops. They are also encouraged to pursue the eLearning program available to all University of Washington employees. Employees have the opportunity to take advantage of various courses offered by the Seattle Campus Office of Training and Development as well as various professional development workshops on a wide range of topics. We also have the Continuing Studies Office available to

staff. Lastly an opportunity exists via a campus-wide Professional Development Task Force that encourages staff to pursue professional development opportunities. A list of the development opportunities attended by Institute staff in 2005-2007 is included in appendix O.

Section D. Relationships with Other Units

The program maintains active research and educational collaborative relationships with various other programs campus-wide, and more broadly throughout the UW system.

One of our faculty members, Sam Chung, has produced several papers on the application of service-oriented and distributed computing to enterprise management with Sergio Davalas of the Milgard School of Business.

Another faculty member, George Mobus, has entered into several collaborations both on this campus and with people from various regional institutions regarding the development of a Master's of Energy Systems Engineering degree program for the Institute. Additionally, he is developing a collaborative project with IAS professor of philosophy, Michael Kalton to design a degree program in Systems Science, and has taught in the Global Honors program.

Josh Tenenberg and Donald Chinn have developed a broad collaboration with many of our partner community and technical college (CTC) faculty called the Teaching Commons. Their effort is increasing the communications between our program and the many community college campuses regarding teaching and learning objectives.

Several additional collaborations have been discussed and are in various stages of development. For example, Isabelle Bichindaritz, whose research in Medical Informatics is quite well developed, has been discussing projects of mutual benefit with members of the Nursing Program at UWT, the medical school, and the genome sciences department at UWS.

The faculty are also developing projects in interdisciplinary teaching. For example, Donald Chinn will be released this winter quarter to co-teach one of the Freshman Core courses with a philosophy professor in IAS. The contents of the course will draw upon computation theory and logic, but also cover ethical implications of information technology in society.

The NSA National Center of Academic Excellence in Information Assurance Education mentioned above was a joint venture involving the Institute of Technology at UWT, the Information School, Law School, CSE, EE, and Urban Studies departments at UW Seattle, as well as Olympic College, Bellevue Community College, Highline Community College, and Seattle University.

Members of the faculty are active participants in all aspects of campus- and university-wide governance, serving in leadership roles on the faculty assembly and curriculum committees, and participating in the Faculty Councils on Academic Affairs, and Promotion and Tenure. Faculty

members have served on the UW-wide Tri-Campus Council, on the UW Faculty Senate, on the UW Faculty Council on University Libraries, and on the UW Faculty Council on University Facilities and Services.

A new program in Environmental Engineering has been proposed at the campus level that will include collaboration with science, physics and mathematics faculty from the IAS program.

Larry Wear is collaborating with Dr. Izad Khormaee from Clarke Community College to develop a way to deliver the first circuits course. Lectures will be delivered over the Internet and we will be conducting the labs for the course on our campus for the Western Washington students beginning in the next academic year. Larry Crum developed a similar working collaboration with the various community colleges last spring, creating a twofold opportunity for students receiving instruction at the community college and lab instruction in the Institute's labs. The outcome was very positive for both the faculty and students.

Students also bring breadth to our courses as noted in a recent Cross Enrollment by FTE report. This report shows CSS students taking courses in various other programs and students from other programs, predominantly IAS and Business registered for CSS courses. The most recent report from Autumn 2005 indicates that 5.3 FTE students from Business took CSS courses while 11.5 FTE from IAS were registered for CSS courses.

Along with the campus community, our faculty and students, have had the privilege of collaborating with our visiting faculty and scholars listed below. Collaborative associations are being discussed with the Rochester Institute of Technology, the Federal University of Campina Grande, Brazil and the Ghent University, Belgium.

2006-07 Visiting Faculty/Scholars

Benedito Aguiar- Visiting Scholar, Professor, Department of Electrical Engineering, Federal Universidad Federal de Campina Grande, Brazil

Martin DeCock- Visiting Scholar, Professor, Department of Applied Mathematics and Computer Science, Ghent University, Belgium

Vu Dinh Hoa - Visiting Scholar, Associate Professor, Department of Computing, University of Education Hanoi, Vietnam

Ankur Teredesai- Visiting Faculty, Assistant Professor, Department of Computer Science, Center for Advancement of Cyber-Security Infrastructure, Rochester Institute of Technology, Rochester, NY

2007-08 Visiting Scholars

Guy Johnson- Visiting Scholar, Professor, Golisano College of Computing and Information Science, Center for Advancing the Study of Cyberinfrastructure, Rochester Institute of Technology, Rochester, NY

Tae Wan Kim- Visiting Scholar, Assistant Professor, School of Computer Engineering, Inje University, Obang-Dong, Kimhae, GyungNam, South Korea

Section E. Diversity

1. and 2. Inclusion of Underrepresented Groups and Data

A primary part of the Institute's mission is to attract historically under-represented groups to technology fields. As noted in the report below, Hispanic, Hawaiian/Pacific Islander, Amerindian, and Native American populations are in the low percentile. In the spring of 2005 the campus welcomed six hundred Latino high school students from the local schools to hear about the range of program opportunities and the programs at the Institute. Our Math, Science and Leadership summer program will have the first class returning who are now 11th graders. We continue to be in contact with these students throughout the year and one component of the course for this year focuses on their future, higher education and careers in the sciences.

Below is a breakdown of students in the CSS programs by ethnicity and gender since its inception:

Table E. 1 Ethnic Breakdown

Year	Afro Am.	Amerind	Asian	Caucasn	Haw/Pac	Hispanic	Not Ind.
1999			33.3%	46.7%		6.7%	13.3%
2000	2.2%	1.1%	31.2%	35.5%		2.2%	28.0%
2001	3.0%	.6%	30.8%	36.1%		2.4%	27.2%
2002	3.2%	.9%	26.3%	43.3%		1.4%	24.9%
2003	3.5%	.9%	24.2%	46.8%		2.6%	22.1%
2004	2.9%	.8%	24.6%	50.8%		2.9%	17.9%
2005	3.3%	.9%	23.7%	48.4%		2.3%	21.4%
2006	1.1%	.5%	20.7%	50.0%	.5%	5.4%	21.7
Total	2.8%	.8%	24.4%	45.5%	.1%	2.8%	22.6%

Table E. 2 Gender Breakdown since the inception of the program:

Year	Female	Male	Total
1999		100%	100.0%
2000	34.4%	65.6%	100.0%
2001	35.5%	64.5%	100.0%
2002	30.0%	70.0%	100.0%
2003	22.9%	77.1%	100.0%
2004	20.8%	79.2%	100.0%
2005	16.7%	83.3%	100.0%
2006	15.2%	84.8%	100.0%
Total	23.8%	76.2%	100.0%

The percentage of women is low, but consistent with national averages. Isabelle Bichindaritz, Maile Hadley, and Phuc Nguyen, one of our female students of Vietnamese origin, made a presentation at the South Puget Sound Higher Education Diversity Partnership in 2004. Menaka Muppa, a full time lecturer, attended the conference for Women in Science and Engineering in Seattle this past February to advertise our program to the participants and to bring back information that would assist our recruiters in attracting women into the program. The Institute's

recent marketing campaign has focused videos and posters that highlight the women in our program. The president of the student group, Grey Hats is a young woman who has also worked to assist in advertising our program to women. As we develop our new web site we will link to the various Women in Computing organizations to our main page. Martine DeCock, a visiting scholar from Belgium presented a paper in our speaker's series this past spring. She will be returning this next winter to continue to work with our students and our program.

Sam Chung, associate professor, along with the Advising Team, developed Korean American Night. UWT and all of the CSS programs were presented to 75 individuals representing the Korean community. Sam Chung will host another outreach open house for the Korean community; in 2007 the invitation will also extend to the Vietnamese community.

Along with Sam Chung, Moshe Rosenfeld sponsored Professor Vu Dinh Hoa from Vietnam for the autumn 2007 quarter. Several presentations were held to connect the UWT Vietnamese student population and the local Vietnamese Community with our program.

Former and current graduate advisors have participated in a number of events, such as the following:

- NSBE/UW Minority Career Fair – each January
- Evergreen State College Tribe Graduate Fair – quarterly
- Ministers' Alliance – a group of ministers representative of the Hilltop area in Tacoma, WA. Relationships have developed with local congregations and/or specific groups that allow presentation of the program information
- GO-MAP Yearly Diversity Dinner
- Relationships are being developed with foreign professionals at Microsoft to promote the MS CSS program to their spouses and with Native American Tribal councils to promote the program to their members.

Table E. 3 Retention Percentages of underrepresented populations

Class	Ethnicity	Retained in Program
Graduate	AFRO AM	100%
	Asian	85.2%
	Caucasn	69.2%
	Not Ind	74.4%
Total		**74.8%**
Undergraduate	AFRO-AM	52.2%
	Amer-Ind	75.0%
	Asian	66.2%
	Caucasn	67.2%
	HAWIPAC	100.00%
	Not Ind	67.2%
Total		**66.4%**

As noted in the table above, retention rates are good. A percentage of students who initially enrolled in our program have moved to other programs or other UW locations, as happens with

any program on campus. We continue to build our underrepresented student base with community college visits, hosting Korean/Vietnamese events, working with the Hispanic population and our marketing efforts. Also, with the students in MSL program approaching college age, we anticipate our numbers will increase.

Most recently, Chris Rials, Lead Graduate Advisor has assumed the responsibility of working with and admitting International students to the MS CSS program. This should broaden our multicultural pool of students.

Teaching loads are similar for all faculty and instructors, regardless of academic rank or membership in traditionally underrepresented minority groups. Junior faculty enjoy reduced administrative responsibilities (regardless of minority-group status), as is traditional for academic programs.

In the technology fields, gender diversity remains a concern as shown in the previous tables. This is also true in faculty recruiting. Advertisements for open faculty positions are sent to the leading computer science magazines and web sites. However, in recent job searches, female applicants were 8 out of 108 for the Information Sciences search and 3 out of 42 for the Computer Engineering search. The table below identifies the ethnicity and gender of the faculty and staff of the Institute.

Table E. 4. Institute Faculty and Staff Ethnicity and Gender

Ethnicity	**Faculty**	**Staff**
AFRO-AM	0	0
Amer-Ind	0	1
Asian	3	0
Caucasn	12	5
HAWIPAC	0	2
Hispanic	1	2
Gender		
Male	14	3
Female	2 Full time and 2 Part time	7

3. Outreach and Recruiting

Our recruiting and retention processes are especially focused on outreach to groups traditionally under-represented in the technology fields. The Institute sponsors two successful outreach programs, Math Science and Leadership Program (MSL) and the Expanding Your Horizons (EYH).

MSL Program

- The Institute of Technology has maintained this outreach program designed to help minorities, low-income students, and first generation college-bound students build an interest in math and science. The program started in 2003 and is now in its fifth year of existence.

- The lessons and projects during the summer introduce material that the students will learn next year in school, helping them to get a head start and make difficult classes like math and science less intimidating.
- The students we target are the ones who statistically, are less likely to enter four-year colleges or universities after graduating high school. For those who do, again statistics tell us they are less likely to pursue degrees in science and mathematics.
- Classes spend their summer working on themed lessons and through projects like Robotics, Design, Environmental Science and Service learning, we help students build skills, and confidence.
- The program is in its fifth year and continues to gain momentum. We are seeing very large numbers of students coming back year after year. Many in fact, have been with us since the program began in 2003.
- MSL Sponsors are Boeing, Intel, Wells Fargo and many community foundations.

EYH Program

The Math/Science Network created the first EYH conference at Mills College in 1976. Today, EYH conferences are held in over 89 locales. Over 600,000 young women have participated in these conferences so far. Many of these conferences conduct concurrent programs for parents and educators so they may more effectively support young women and their technical aspirations.

The South Puget Sound EYH conference began in 2003, hosting 150 girls. The conference has continued to be a successful event, now drawing over 350 students, teachers, volunteers and presenters each year. The Institute of Technology at UW Tacoma provides facilities, monetary and organizational support. This all-volunteer effort is funded by a grant from the Office of the Superintendent of Public Instruction, (OSPI) as well as the generous support of Pierce County Careers Consortium.

4. Collaboration on Diversity

Contact has been made and conversations have taken place regarding the Graduate Opportunity Minority Achievement Program (GO-MAP) and with the Office of Minority Affairs (OMA) on student recruitment and retention. Further conversations need to take place to assist the Institute in their recruiting efforts.

The Institute plans to work with the newly hired Vice Chancellor for Diversity on the UWT campus to establish a diversity plan in addition to the current MSL and EYH outreach programs.

Our advisors regularly recruit from the local community colleges and high schools, allowing us to advertise our program to a more diverse population. A recent job re-classification of advisors positions allows for a specific recruitment position. This person was hired in February of 2007 with the charge of recruiting from local community colleges, high schools and to visit universities and colleges that do not offer graduate programs in computer science.

The Institute's program administrator is a certified diversity trainer. The focus of the staff retreat was Multicultural Training and additional conversations have begun to consider some events to highlight diversity topics for both faculty and staff.

5. Impact of Diversity

Because of the technical nature of the program, diversity does not impact the program content design. However, diversity is emphasized in other aspects of the program. For example, the way some courses are structured drives undergraduates and graduates to be in the same classes, allowing the undergrads the benefits of the graduate perspective. There has also been the new component of the freshman experience introduced this last academic year. This has created an interesting and valuable experience of interaction between the predominately transfer population and the freshman population.

Section F. Degree Programs

1. Doctoral programs: N/A

2. Master's Degree: Computing and Software Systems

a. and b. Program goals, objectives, learning outcomes and assessment

The MS in Computing and Software Systems is a terminal masters degree, designed both for students with a baccalaureate degree in computer science and those with significant coursework and practical experience in computing, but lacking a formal degree. The program provides a broad overview of the technologies and theories supporting computing and software systems, with a focus on distributed and networked (for example, Internet-based) computing. The master's program differs from the bachelor's program in the degree of exposure to theoretical concepts and the requirement that students demonstrate their ability to synthesize and apply these concepts outside of the classroom through a capstone experience.

The goals of the MS degree are to

- provide a broad overview of the technologies and theories supporting computing and software systems, with a focus on distributed and networked (e.g., Internet-based) computing
- emphasize theoretical (conceptual knowledge), as well as practical (embodied knowledge), foundations of computing
- emphasize the ability to synthesize and apply concepts in a professional setting
- prepare students with competence in a specialization of the field that builds upon the program core.

The educational objectives of the MS degree are to prepare students to:

- be proficient in identifying appropriate technological solutions to commonly-encountered computing issues
- apply critical thinking skills and breadth of knowledge in computing and software systems

- demonstrate effective leadership ability, communication skills, and team membership skills.

These goals and objectives are comparable to those of peer programs that are granting terminal MS degrees in Computer Science with a primary focus on professional rather than research skills. A sample of peer programs is found in Section A. 2.

A detailed description of the entrance and graduation requirements and course options appears in appendix K.

To assess the achievement of objectives of the MS in CSS Program, the following benchmarks were initially proposed:

- Employers of graduates and graduates would be surveyed one, three, and five years after graduation to determine if students are:
  a. Proficient in identifying technological solutions to commonly encountered computing issues
  b. Successful in applying critical thinking skills and knowledge in working with computing and software systems.
  c. Able to demonstrate effective leadership, communication skills, and team membership skills
- Graduation rates of eight MS degrees per year by the third year, and fifteen MS degrees per year by the fifth year would be considered successful.

These benchmarks were conceived in terms of meeting the state's needs for programmers, so both were concerned with productivity issues. The first looks to determine whether employers are satisfied with our graduates. The second assumes that growth in output signifies a perception of quality among our prospective students, as well as success in retention.

From what can be seen along this narrative the first benchmark was mostly achieved, although no formal process was used. The Institute introduced formal assessment at the time the Computer Engineering and Systems proposal was submitted to the HEC Board (Fall 2006). From there we have extended the process to the undergraduate CSS program, as described in the following pages. The remaining step we are now taking is to have the formal process also at the graduate level.

The second benchmark was clearly achieved, as demonstrated by the numbers presented in Table A. 1. It remains to be seen whether the number of graduates will stay at the level of 20 students per year. The upsurge of the economy plays a negative role in graduate enrollment, but we intend to compensate for that by enhancing our recruitment efforts and by bringing international students to the program.

The following are the expected learning outcomes of the program:

- Graduates of this program will be able to design, develop, program, test, and document computer programs at the level of professional computer programmers. (Assessment: Students are required to demonstrate this competency in the program assignments and in the capstone project.)
- Graduates of the program will be able to work in a team environment to design, develop, test, and document a complex computer program. (Assessment: Students will be required to work in teams in the program demonstrating this competency.)
- Graduates of the program will have a competitive foundation in computing, mathematics, and computing practice that will support life-long learning and evolution with the field. (Assessment: Students will have to demonstrate their competency with these foundations in their core studies.)
- Graduates of the program will be capable of reading the profession's research and practice literature, and will be able to use it to extend their competencies. (Assessment: Students will be required to read current literature and to demonstrate their ability to comprehend and employ the relevant new theory and practice.)
- Graduates of the program will be capable of writing and orally presenting an article at a level expected of a professional in the field. (Assessment: Students will demonstrate this capability in the program and in their capstone project.)
- Graduates of this program will be able to research a current topic and evaluate the various arguments presented for and against positions and/or methods. (Assessment: Students will be required to demonstrate this skill in the program.)

The faculty are responsible for verifying that the students have met the learning outcomes described above. Based on student performances in the selected courses, we believe that our graduates have achieved all the outcomes for the program.

c. Career options and planning

The Institute retains a professional staff member, the Assistant Director of Industry Partnerships, whose responsibilities include assessing the career options for, placement of, and success of graduates and undergraduates. Some of the supporting programs include:

- Internship Process Presentation

  Twice a year an Internship Process Presentation is provided for interested students. Supported by accompanying PowerPoint slides, the general process, paperwork, academic expectations and faculty sponsor requirements are explained. Additionally, advice on how to navigate the process of finding an internship opportunity is discussed.

- Industry Brown Bags

  At least twice a year, companies and hiring organizations are invited to come to campus and speak to the students about upcoming hiring and internship opportunities through an informal brown bag lunch. Members of industry and hiring organizations give background information on their companies; discuss their company culture and the development environment as well as answering questions from the students. Usually the participating companies, which in the past have included Avanade, bSquare, NewTech, Avue Technologies, Intel, the Department of Ecology, Inforsource and others, are also interested in seeking out students who might want to work for them in the future.

- Career Fair

  Each year the Career Development Center of the University of Washington, Tacoma, headed by Judy Colburn, along with numerous employer partners, sponsors a Career Fair. In April of 2006 over 100 employers registered for the 10th Annual Career Fair. This event is open to students and alumni from all majors and degree levels and in the last few years, additional companies have participated and have been recruiting from the Computing and Software Systems program. The event is marketed by the Career Center toward students and alumni who are looking for full or part-time employment, internships, or who just want to gain information about companies.

  Curriculum changes and updates are made every year. They are strongly influenced by the feedback from industry and alumni regarding the marketplace needs. Elective courses in the areas of Networking, Information Security, Social Networks, Graphics and Multimedia are examples of how we address those needs.

- Student Coaching

  Often students are unfamiliar with the steps needed to secure an internship or a job. That means making contacts through networking, putting together a solid resume and understanding interviews and how to prepare for them.

3. Bachelor's Degrees:

In addition to the Master of Science in Computing and Software Systems, the Institute offers three bachelor's degrees, the Bachelor of Science, Computing and Software Systems, the Bachelor of Arts, Computing and Software Systems, and the Bachelor of Science, Computer Engineering and Systems. The BA in CSS started in 2005 and has only produced 4 graduates to this point; the BS in CES, introduced in 2007, will not have any graduates for two years. These two degrees will be only briefly analyzed in this report but the curriculum descriptions for both programs are included in appendix C.

3.1 B.S. in Computing and Software Systems

a. Objectives and Outcomes

Since two of the goals in creating the Institute was to provide a well-trained work force for the South Sound industry and high-quality educational opportunities for residents, setting the correct objectives for the degree was important. The Institute has worked in collaboration with local industry and community colleges to define a set of objectives for the program's graduates (see below).

Program Objectives

Objectives, as defined by accreditation agencies, are the abilities, skills, and accomplishments expected of graduates within a few years of graduation. Programs are expected to assess their graduates' accomplishments to determine if the objectives have been achieved. Since the objectives are typically fairly broad, it is not expected that every graduate will achieve every objective.

The Computing and Software Systems Program has set six objectives for its graduates. The career path a graduate takes will affect the accomplishments they achieve but within the first few years after graduation they should have accomplished some of the following:

- defined a product or process by applying their knowledge of computing, systems, and application domains;
- participated effectively as a member of a multi-disciplinary project team and undertaken leadership roles when appropriate;
- taken graduate courses or continuing education classes to improve their skills and abilities;
- made positive contributions to their community and society by applying skills and abilities learned during their undergraduate program in computing;
- made work-related decisions that demonstrate their understanding of the importance of being an ethical computing professional;
- applied their communication skills to effectively promote their ideas, goals, or products;

The faculty in the Institute has shown interest in seeking accreditation for the CSS degree at some point in the future. They have therefore chosen to adopt the set of outcomes required by the Computing Accreditation Council, CAC. These outcomes are listed below.

Program Learning Outcomes

Outcomes, as defined by accreditation agencies, are "Statements that describe what students are expected to know and be able to do by the time of graduation." CAC has defined a set of educational outcomes that all graduates of computer science programs must meet. Computer science students must demonstrate the following attributes by the time of graduation:

a) an ability to apply knowledge of computing and mathematics appropriate to the discipline;
b) an ability to analyze a problem, identify and define the computing requirements appropriate to its solution;
c) an ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;
d) an ability to function effectively on teams to accomplish a common goal;
e) an understanding of professional, ethical and social responsibilities;
f) an ability to communicate effectively with a range of audiences;
g) an ability to analyze the impact of computing on individuals, organizations and society, including ethical, legal, security and global policy issues;
h) recognition of the need for, and an ability to engage in, continuing professional development;
i) an ability to use current techniques, skills, and tools necessary for computing practice.

Program objectives and outcomes are not static; they need to be reevaluated from time to time to insure they are in line with expectations by industry and the accrediting agencies. The Institute

makes use of its Industrial Advisory Board, ITAB, and community college contacts to review the objectives and outcomes on a regular basis, typically once every two or three years. The ITAB is currently reviewing the objectives for both BS and BA programs.

b. Standards and Assessment

This section describes new assessment processes that are currently being implemented within the Institute of Technology. At the time of the review team's visit in November, there will be some assessment data available but the process is still in its initial stage.

To verify that a program's graduates meet its objective, it is necessary to constantly evaluate and, if necessary, improve the program. To that end, CSS is developing a Program Improvement Process that is repeatable and manageable. The process will be executed once each year with a different set of inputs each year. The CSS Program Improvement Process depicted in the Table F. 1, will be used as a model.

The process in Table F. 1 begins each year with a review of the assessment tool(s) that will be used to gather that year's data. Based on past results, the faculty may choose to update or replace a given assessment tool. When the assessment tool has been chosen, data is gathered from one or more of the sources (employers, ITAB, alumni, students, and faculty). The data are then reviewed by the faculty to determine what, if any, changes should be considered. If needed, a Change Improvement Plan is developed. Based on the plan, changes are implemented.

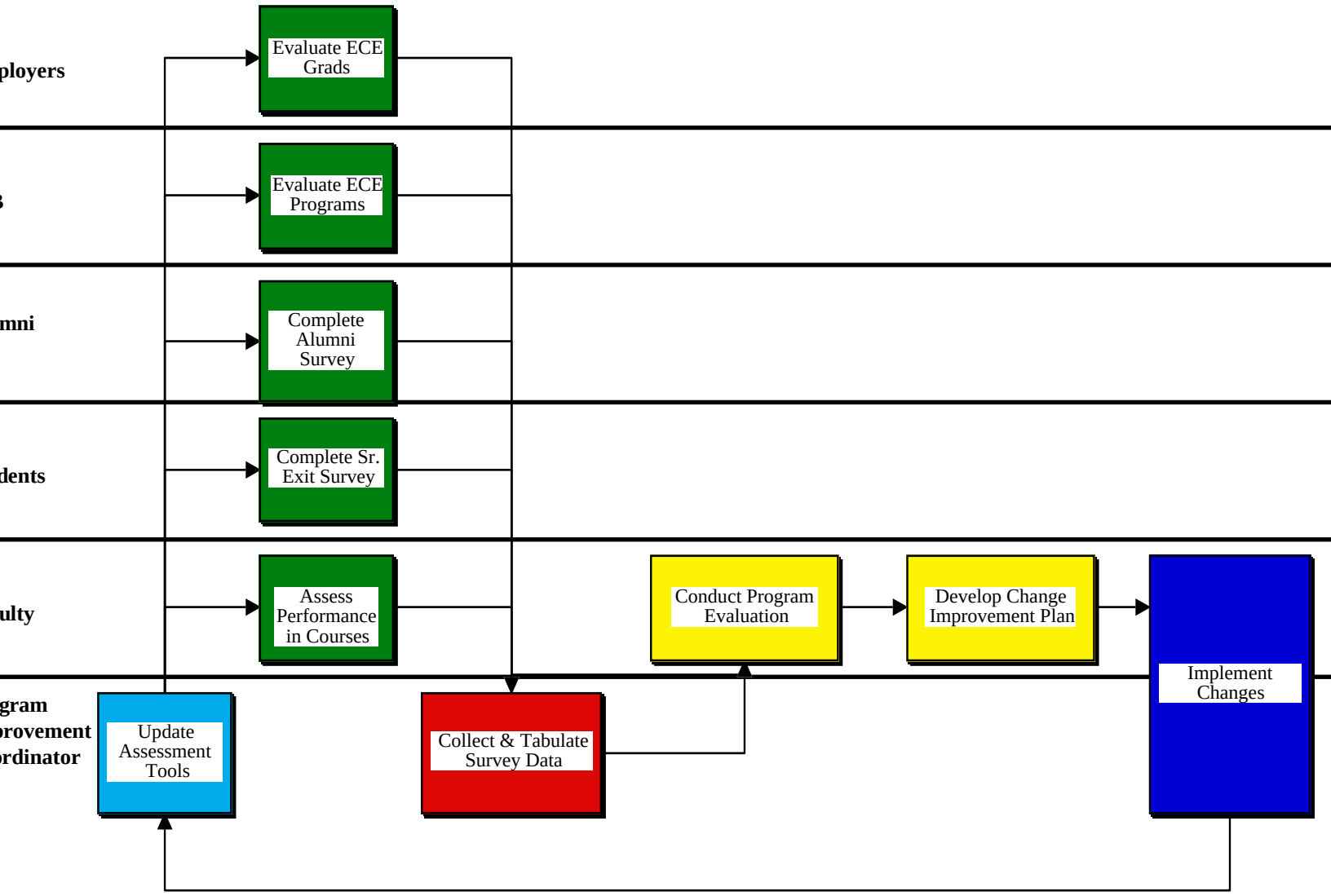

Table F.1 CSS Program Improvement Process

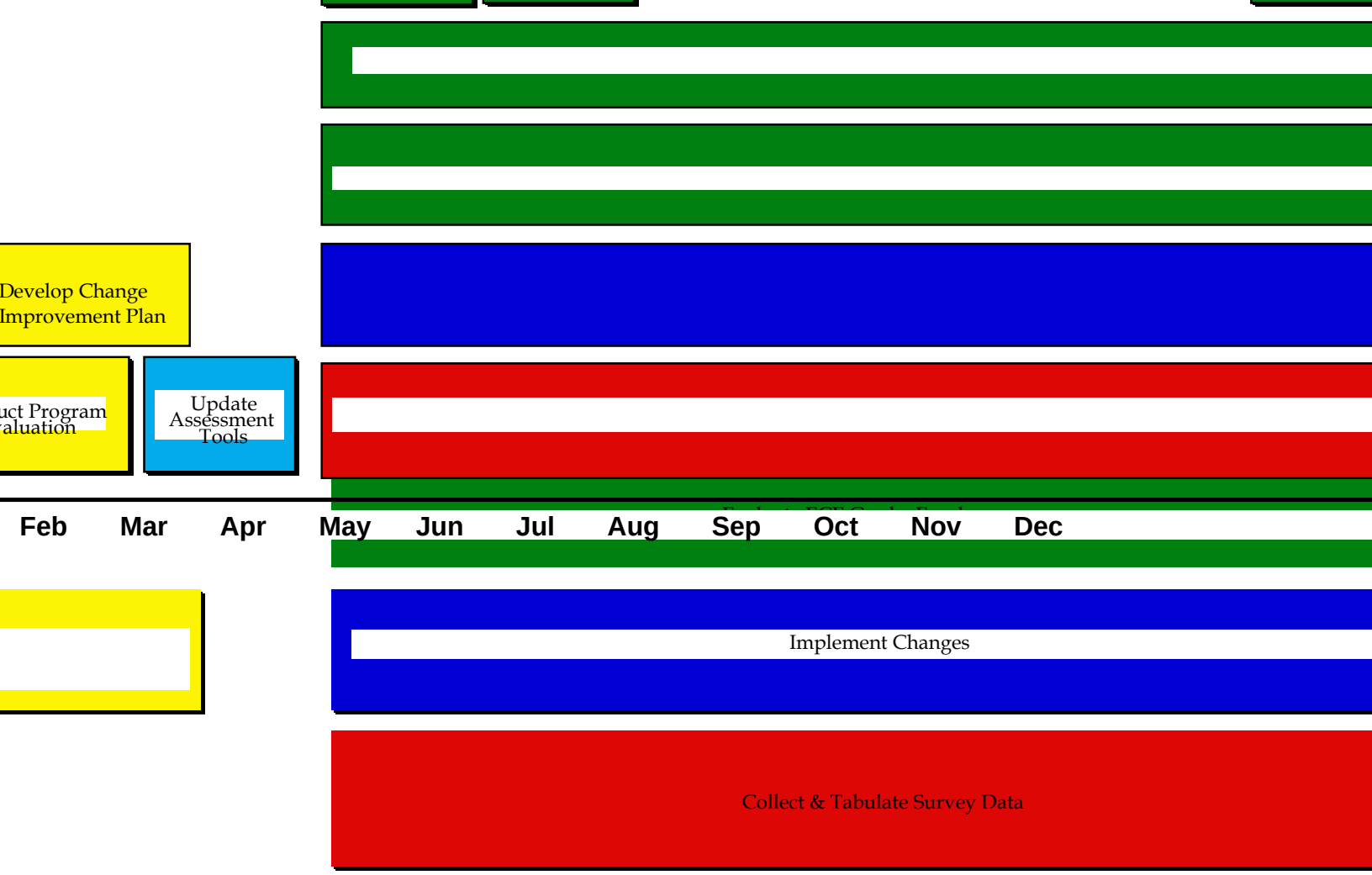

Table F. 2 Timeline for CSS Program Improvement Process Activities

The timeline for the program improvement activities is shown in Table F. 2 on the previous page. As can be seen, each January and February change plans are developed, if needed; changes are implemented during the following year. Alumni data collection via the web page survey actually takes place continuously throughout the year. Other data collection activities, such as employer surveys and senior exit surveys, take place at specific times.

The six-year cycle of assessment activities is shown below in Table F. 3. As shown, senior exit surveys are the only form of assessment that takes place each year. The other assessment methods are distributed throughout the six-year cycle so that assessment activities are not excessive in any one year. The faculty feel that this distribution makes the assessment activities manageable over a period of years.

Table F. 3: Six Year Assessment Cycle

	Alumni Surveys	**Senior Exit Surveys**	**Faculty Course Assessment**	**ITAB Recommendations**	**Employer Surveys**
1	1-2 yr grads	X		X	
2		X	X		
3	3-7 yr grads	X			X
4		X		X	
5	8+ yr grads	X	X		
6		X			

The process described will be used after it has been executed three times. For the first few years a modified version will be used. During the startup phase, Senior Exit surveys and Faculty Course Assessments will be conducted each year. The ITAB will also be consulted on any proposed changes to the program during this time. After graduates have been in the field for two years, Alumni and Employer Surveys will be added to the process.

Determining that each student has met all of the elements of the Program Educational Objective cannot be fully determined until after graduation and the graduates' ability to function as an engineer can be evaluated. Student educational outcomes, on the other hand, can and should be measured by the time the student graduates. The following section describes how that will be accomplished for CSS students.

Student Educational Outcomes Assessment Plan

The assessment plan for student educational outcomes uses both direct and indirect forms of assessment. Indirect assessment relies on a student exit survey that enables us to collect data on how well students feel they have met the educational outcomes. Students are asked a series of questions related to each outcome, a)-i). Responses are on a scale of 1 to 5 where a response of 1 indicates the student feels poorly prepared to meet the objective and a response of 5 indicates the

student feels very well prepared to meet the objective. The average response has not been determined but other schools have used 3.75 to decide whether further examination will be necessary.

Although indirect assessment can provide useful data, the Computing Accreditation Commission, CAC, has stated that outcome assessment must not rely solely on indirect assessment. Because of this, we have developed a direct form of assessment that is embedded in individual classes. This form of direct assessment requires that students demonstrate an ability to perform specific tasks in required courses. Table F. 4 below shows the classes in which the a)-i) outcomes will be measured.

Table F 4. Assessment of Educational Outcomes by Course

Courses		a) apply knowledge of computing and mathematics.	b) analyze problems	c) design implement, and evaluate	d) function effectively on teams	e) understand ethics and responsibilities	f) communicate effectively	g) analyze impact of computing	h) recognize need for continuing education.	i) use current techniques, skills, and tools.
TCSS 325	Computers, Ethics and Society					X	X	X		
TCSS 343	Algorithms	X								
TCSS 360	Software Dev. and Quality Assurance				X				X	
TCSS 371	Machine Organization		X							
TCSS 372	Computer Architecture			X						
TCSS 422	Computer Operating Systems			X						X

To ensure consistency among instructors, the syllabi for all core courses in the CSS program have been standardized. The syllabus for a course is divided into two parts; the first describes the course objectives, the course outcomes, and how the course relates to the program educational outcomes and objectives. The second part of the syllabus shows the order that topics will be

covered for the current quarter, the instructor's grading policies, and other information about the course. The syllabi for the CSS core courses are shown in appendix L. The relationship between program outcomes and program objectives is shown in Table F.5.

Table F. 5. Mapping of Learning Outcomes to Objectives for BSCSS graduates

Objectives graduates should have achieved within a few years of graduation:	a) apply knowledge of computing and mathematics	b) analyze problems	c) design implement, and evaluate	d) function effectively on teams	e) understand ethics and responsibilities	f) communicate effectively	g) analyze impact of computing	h) recognize need for continuing education.	i) use current techniques, skills, and tools
developed a product or process by applying your knowledge of mathematics, computing, systems and development tools	X	X	X						X
participated effectively as a member of a development team and undertaken leadership roles when appropriate				X		X			X
taken graduate courses or continuing education classes to improve skills and abilities	X	X	X					X	X
made positive contributions to your community and society by applying skills and abilities learned during your undergraduate program in computing	X	X	X				X		X
made decisions related to your work that demonstrate your understanding of the importance of being an ethical computing professional		X	X		X		X		
applied your communication skills to effectively promote your ideas, goals, or products				X	X	X			

c. Undergraduate Research

Undergraduate students in the CSS program who have performed well in class are often given the opportunity to work with the faculty on research projects. The results of some of these research projects have been presented as conference papers, essay contest submissions, and Institute

Colloquium presentations. A partial list of undergraduate research projects was presented in Section B.

d. State Mandated Measures

The table below describes the performance along two accountability measures, the retention measures are shown in appendix Q. The growth of the program is clearly identified in the numbers below. The DEI (Degree Efficiency Index) shows a steady average of 75%, mean time to degree that is appropriate based on the rigor of the programs and the deficiencies of many applicants to the program in the areas of physics and calculus. Many of our students are adults with families and jobs and as such have often taken leaves during their course work to accommodate life events, which does lengthen their course completion time. The average GPA score for non-transfer bachelor students is 3.24, and for non-transfer masters' students it is 3.68. For transfer students working towards bachelor's degrees, the average is 3.30.

Table F. 6 State Mandated Measures

Academic Year	U/G DEI	U/G Mean time to Degree		
		BA	MA	Tsfr. BA
2005-06	75.4	5.8	2.4	2.6
2004-05	76.9	5.9	2.0	2.6
2003-04	80.3	3.9	1.4	2.4
2002-03	74.9	4.5		
2001-02	74.6	5.5		4.2
2000-01	88.2			2.0

2006-2007 data was unavailable at the time this report was written.

The Institute was created to provide high-quality technical education for a community that had limited access to such opportunities in the past. Since many of the Institute's students come from underrepresented groups and are often the first in the family to attend a university, graduation rates and student retention have been concerns and the faculty has developed several programs to help students survive and excel in the university environment. These programs include:

Orientation Programs:

As stated above, many of our students come from families where there are few if any role models for university success. Because of this, we have developed a strong orientation program aimed at helping the new student acclimate to university life. Each quarter the advising staff coordinates orientation activities where students are introduced to the faculty and administrators at the Institute. This year the faculty will be taking an active part in the new student orientation. Each faculty member will be meeting their respective advisees. There are also tours of the facilities and new students will be shown how to get access to laboratory facilities.

Laboratory Access:

Many, if not most, of the current students in the CSS bachelor's program work part or full time and only attend class as part-time students. Because of this, they often need access to laboratories at unusual times. To accommodate these students, the Institute has an open access policy for its labs. Students taking course within the Institute are given access cards that allow them 24/7 access to the labs. Anecdotal evidence shows this has helped some students remain in the program even when they experience work schedule changes. Please see appendix S for lab information.

Early intervention:

Two to three weeks into each quarter, the advising staff contacts each faculty member in the Institute and asks them to identify any students who may be experiencing problems in a class. An advisor then contacts each student and schedules a meeting to discuss any problems the student may be experiencing. The advisor then tries to find resources to help the student succeed in the class. If it appears that the student will not be able to succeed in the class, the advisor helps the student drop the class so that he or she will not receive a failing grade in the class. For some marginal students this has meant the difference between placed on probation or remaining in good academic standing in the program.

Internships:

The internship program provides students with the opportunity to apply theoretical and conceptual classroom knowledge to practical work experiences, and to gain broad experience in a professional work environment. It provides employers with the opportunity to involve students, eager to employ new skills and methodology, in select professional design, implementation, and/or research projects. These students could potentially be future employees. Students can receive up to ten academic credits toward their degree for documented degree-related experience. Each five academic credits awarded must be deemed educationally equivalent to five hours of CSS elective coursework. Ten hours of credit typically requires one quarter of full-time commitment or two quarters of part-time commitment. A CSS faculty advisor, a sponsoring organization senior professional mentor, and a CSS student form the internship team, and together they develop the detailed project plan. The plan must clearly identify the learning objectives and the program competencies that are further developed through participation in the internship. The CSS student writes a formal report detailing his project and his individual accomplishments. The report and an evaluation by the faculty advisor and senior professional mentor determine the grade for the internship. This report is a public document. For a more complete overview and description of the internship program please see the document "Internship Report for the Graduate Review" in appendix T.

Director Meetings:

Another way to increase student interest in the program is to give them the opportunity to propose improvements to the program. To facilitate this, the Director of the Institute schedules meeting with students every quarter to solicit their opinions and suggestions for improvement. These meetings have been well attended by students, some of whom have made suggestions that have led to changes in the program. Based on student suggestions, changes have been made to scheduling, lab access, and instructor assignments.

Exit Interviews:

Whenever possible, students leaving the program before graduation are interviewed by an advisor to try to determine the reason the student is leaving the program. In most cases, there has been nothing that the Institute could do to retain the student in the program, but in some cases we have learned that changing course timeslots could have been helpful. As already stated, many of our students are adult or non-traditional students with families and job responsibilities; as a result, some may have to leave the program due to situations outside the Institute's control. In principle, these interviews should be helpful in preventing future problems for those students.

Skills Building Classes:

The Institute provides two different types of skill building classes for its students. The preparatory ones tend to be informal; they are offered each quarter on student demand. Students take these classes to learn the fundamentals of Linux, how to troubleshoot computer problems and more.

The Preparatory Skills Workshops started Winter 2007, and are tied to the TCSS445/545/558 courses. They were repeated in the Spring of 2007.

Preparatory Skills Workshops:
http://css.tacoma.washington.edu/~lab/PrepSkills/
ITW201 -- Installing and Testing a Local IDE for Web Development
ITW202 -- Remotely Debugging and Deploying a Web Application
ITW203 -- Installing and Testing a Remote Application and DB Servers

The Basic Skills Workshops started in the Autumn of 2006; three or four are offered each quarter.

Basic Skills Workshops:
http://css.tacoma.washington.edu/~lab/BasicSkills/
ITW106 -- How to Secure Linux
ITW105 -- How to Automate System Administration: The Basics
ITW104 -- How to Administer Linux: The Basics
ITW103 -- How to Create a Wireless Network
ITW102 -- How to Administer XP: The Basics
ITW101 -- How to Assemble a Computer

TCSS 390 courses:

Under the direction of Donald Chinn a series of courses has been developed to help students in specific core courses. Students are required to sign up for a two-unit class to avail themselves of this service. In a paper, “Treisman Workshops and Student Performance in CS,” Chinn, Martin, and Spencer have described the success of these courses in improving student grades in specific core classes. The evidence presented in the paper shows that for algorithms classes, students who take the workshop score over half a grade point higher (on a 4 point scale) than students who do not take the workshop. For programming classes the grade improvement is not as high, but the courses continue to be helpful. The TCSS 390 course enhances problem-solving skills. Topics and approaches vary, as it is designed to work in collaboration with other courses and the needs of the program. It also includes lectures and problem sessions in mathematics, programming, problem solving, and CSS applications.

Creative Scheduling:

As mentioned above, many of our students are working and not able to attend daytime classes. Because of this, the faculty and staff have worked to schedule classes so that students can continue to work while pursuing their degrees. For the faculty this means that they have late afternoon and evening classes most quarters; however, this has enabled more of our students to stay in the program and make progress towards their degree.

Prerequisite Chain Reduction:

A problem common in many technical programs, including the Computing and Software Systems program, is that many of the upper division courses have a long chain of prerequisites that must be taken before the student can enroll. The faculty recognized this as a problem for our students and decided to review the prerequisites for all the course and elective classes in the program with the intent of eliminating prerequisites that were not critical to student success in a class. As a result of this, several prerequisites were eliminated. This has had the effect of giving students more flexibility in the order in which they take their classes. In some cases the faculty has allowed students to take three courses in a quarter rather than just two and this has, for some students, shortened the time to graduation.

Faculty Advising:

Until Fall 2006 the Institute had relied on a professional advising staff to provide academic guidance to students. In many cases this was adequate and students received the help they needed selecting courses to meet their degree requirements. In some cases, however, the advising staff did not have the background in computer science to give students the best advice when selecting a program of studies. To address this issue, the faculty decided to become part of academic advising for the courses. They work in conjunction with the professional advisors, giving the students a well-rounded success plan. At this point the entire full-time faculty has been trained on

the FERPA requirements associated with advising and on the use of the online advising system, DARS. Beginning February 19, 2007 the faculty started advising students. Each faculty member has between ten and thirty advisees. The students have been told of the change and nearly all have been very supportive of the plan. We hope that this too will assist students in completing all the requirements for their degrees in a shorter time and reduce their time to graduation.

Additionally, our advising plan consists of various systems that assist our students. We provide students with a grid of both the CSS and CES programs, which serves to facilitate their goal planning and scheduling (see appendix C for the degree grids).

The advisors are consistently in communication with both the undergraduate and graduate students. They provide them with critical information such as registration dates, withdrawal dates, etc. In addition they also contact each student with a GPA between 2.0 and 2.5 to provide assistance and to discuss any issues contributing to their low performance. The faculty are also contacted each mid-term requesting the names of students they feel are in need of additional assistance or additional support services.

e. Undergraduate Career Options

The Institute of Technology at the UWT was created in part with funding from businesses and public agencies in the local area. Because of strong community involvement, the Institute has made it a priority to extend and expand its ties to the community. To make sure the Institute maintains close ties to the community, the position of Assistant Director for Industry Partnerships was created. Andrew Fry has been in this position since its creation. One of Mr. Fry's important activities has been to develop an internship program for our CSS students. This program has grown steadily since its inception and in the last 4 years placed over two hundred students in internship programs throughout the region. Anecdotal evidence indicates that about 85% of the students who accept internships with local companies and public entities are offered permanent positions with these companies. This indicates a very strong acceptance of our graduates by the community.

To augment the internship opportunities for our students, starting in winter quarter 2006 we instituted the Industry Partners Internship program, described in appendix T. This program encourages companies and public agencies to commit a steady stream of internship positions to the Institute for its students. The Assistant Director continues to work to extend this program.

The Assistant Director has also created a course and lecture series, both of which bring industry and public agency representatives to campus to speak directly to students and faculty. These interactions help keep faculty and students informed of the latest trends in the local community and the types of employees that are being recruited.

To be sure that we are producing the kind of graduates needed by local industry, the Institute has also formed its Industrial Advisory Board (ITAB) to help guide the development of new programs and the evolution of existing programs. The ITAB currently has about twenty-four members who meet each quarter. Among other tasks, the ITAB has been asked to review the program objectives and educational outcomes for all of the Institute's programs, review the mission of the Institute, and give input on new programs the Institute is considering. The ITAB was instrumental in guiding the development of the recently approved Bachelor of Science in Computer Engineering and Systems.

UWT Career Services sponsors Career Connections, a career networking service that offers students and Alumni Association members the opportunity to gain career information from UWT graduates.

Additionally, the Institute offers a brown bag workshop focusing on the question of what to do after graduation. In the workshop, offered twice a year, Andrew Fry and Donald Chinn discuss advancing from undergraduate studies to industry opportunities and graduate school, respectively. Attendance varies from a handful of students to the mid-teens.

In summary, the graduates of the CSS program are in high demand by companies and government organizations throughout the region. In 2005-2006, 55.55% of the graduates had acquired positions and 92.86% of those had secured positions in Washington State. This attests to the quality of the education provided to our students and to the direction the Institute has undertaken.

3.2 The BA Degree in Computing and Software Systems

a. Program Objectives

Since the beginning of the CSS program (in particular the BS degree), we have been aware that it was extremely difficult for students outside the traditional core computing discipline to take computing courses. This has led to an insulated or compartmented situation where we were serving the educational needs only of traditional computer science students. We felt that this was in general not a good situation for the campus (since it deprived students of educational opportunities in computing and application areas) nor for us (since it limits the size of the student base we can serve, and makes our enrollment more subject to external cyclic influences). We thus saw two opportunities to broaden our educational offerings

- by offering a bachelors degree in the computing area that would be appropriate for students whose primary academic interest was in computing, but who wanted to pursue additional academic focus
- by offering a minor that would be appropriate for students who wanted some exposure to computing concepts and technologies, but whose primary academic interest lay elsewhere.

The first led to the BA in Computing and Software Systems, the second led to a Minor in Applied Computing. We mention the Minor in Applied Computing only in passing – it is not the primary focus of this section, but it was launched simultaneously with the BA degree, and addresses a similar educational need.

While the BS curriculum provides a strong and widely accepted course of study for those who want to enter a traditional computer science career path as a software developer, there are other career paths our graduates commonly pursue, and thus we wanted to explore the possibility of offering alternative educational experiences. The BA degree program is an attempt to offer students both a solid grounding in computing fundamentals and an opportunity to explore a second academic area.

In defining both of these new programs, we felt that we were exploring mainly uncharted territory. In the case of the BA degree, we did not know how positively or how quickly the student community would respond to this new degree option, and we were aware of the dependency on academic minors in other programs (discussed below). In the case of the Applied Computing Minor we were unsure as to how receptive students in other programs would be to taking an academic minor, or how well our initial course offering would meet their education needs.

These considerations led us to structure our initial program offerings so they could be launched quickly, and would initially use a minimum of incremental resources (or, more to the point, would overlap with the existing BS program to the greatest extent possible). Since these programs required the cooperation and support of other programs, our goal was to launch initial versions of the programs that could then be promoted, tested, and modified as needed.

Both the BA degree option and the Minor in Applied Computing were approved by the CSS faculty in February 2005, submitted to and approved by the Tri-Campus review process in Spring 2005, and launched in Autumn 2005. The BA degree was formally approved by the HEC Board in Spring 2006.

The education premise behind the BA degree was to subtract some of the "depth" courses from the BS degree requirements without leaving a "conceptual hole" in the student's experience. The table on the following page lists the CSS core courses for the BS and BA degrees. The number of core courses was reduced from 10 to 6, but still included material from the fundamental areas of computer science (programming, software, and system building; hardware and architecture; and mathematical foundations). In addition we reduced the required number of in-program electives from 5 to 4. We felt that this distribution of courses was appropriate for a student who wanted to be a competent engineer, but wanted to explore the application of technology in other areas, rather than focusing on computer science as a stand-alone discipline.

Number	Name	Required for BA?
305	Programming Practicum	Yes
342	Data Structures	Yes
371	Machine Organization	Yes
372	Architecture	No
422	Operating Systems	No
321	Discrete Math I	Yes
322	Discrete Math II	No
343	Algorithms	No
360	Software Engineering	Yes
325	Ethics	Yes

To promote this attitude of applying computing to a separate discipline, the BA degree requires the student to complete an academic minor in a different program at UWT. Academic minors typically require between 4 and 6 courses, which means the BA and BS degrees can be completed with the same number of required credits. As of Autumn 2007, UWT offers the following academic minors:

- Asian Studies
- Education
- Environmental Studies
- Health and Society
- Hispanic Studies
- Human Rights
- Museum Studies
- Nonprofit Management
- Public History
- Urban Studies

We should note that the in-program curriculum for the BA degree is a subset of the curriculum for the BS degree – as such, the BA program can be offered without additional resources.

b. Standards for Measuring Success
c. Involving Undergraduates in Research Programs
d. Complying with State-Mandated Accountability Measures

Since the BA program is so tightly coupled with the BS program (e.g., students need not commit to a particular path on admission, and often do not until the second year of the program; courses, independent studies, and research opportunities are offered uniformly to BS and BA students, advising services treat the two groups identically) we refer the reader to the corresponding sections describing the BS program.

e. Career Options

The BA program is still new, and small. So far we have graduated four BA students – three with Environmental Science minors, and one with a minor in Nonprofit Management. There is one currently enrolled student, with a minor in Health and Society. While the low enrollment is not particularly troubling to us (since the program does not require incremental resources to offer), we believe that the main reason more students have not availed themselves of this option is because a minor in Business is not available. We are actively working with the Business School administration and faculty to try to facilitate such a minor in any way we can.

At this point we are not tracking the BA students separately, though we intend to do so in the future, in particular to ascertain whether their career paths really do look different from the paths taken by BS students. That should help our recruiting efforts for both degrees; we would like to emphasize the BA more as a distinct alternative to the BS, but without empirical evidence to the effect that it enables different career paths, this pitch tends to be anecdotal. It will also help us to develop and improve the curriculum, for example by providing in-program electives that enhance the students' career opportunities, and will allow us to encourage other minors that we feel are complementary to the BA degree program and the career paths it enables.

3.3 BS in Computer Engineering and Systems

The BS in Computer Engineering & Systems was approved by the HECB at their December 2006 meeting. The program was developed to follow ABET norms for accreditation. A cadre of 10 to 20 students is expected to enroll in classes in Autumn 2007. We were able to start the CES program in Spring 2007 with a very limited number of faculty and lab resources because the program draws heavily on those resources available in the CSS program. The retirement of Dr. Larry Crum has accelerated the need to hire new faculty for the CES program. A search for a new tenure-track faculty member is expected to start Autumn 2007 and an adjunct professor will be hired while the search is conducted. The budget approved by the HECB included funding for two full-time faculty in addition to ¾ of an administrative position.

As the program grows it will be essential that faculty be hired and lab facilities be expanded. A new digital systems design laboratory will be needed for the 2007-2008 academic year. At that time students admitted this fall will be ready for senior level classes in this area. The Institute can probably reorganize existing laboratories to make room for the new laboratory but equipment will need to be purchased at an expected cost of $60,000 to $75,000. The initial budget approved by the HECB called for spending $75,000 in the first two years to fund laboratory development and this money will be needed to equip the design lab.

a. Objectives and Outcomes

The Institute has worked in collaboration with local industry and community colleges to define a set of objectives for the program's graduates as shown below.

Program Objectives

Objectives are the abilities, skills, and accomplishments expected of graduates within a few years of graduation. Programs are expected to assess their graduates' accomplishments to determine if the objectives have been achieved. Since the objectives are typically fairly broad, it is not expected that every graduate will achieve every objective.

The Computer Engineering & Systems Program has set six objectives for its graduates. The career path a graduate takes will affect the accomplishments they achieve but within the first few years after graduation they should have accomplished some of the following:

- developed a product or process by applying your knowledge of mathematics, computing, systems and development tools;
- participated effectively as a member of a multi-disciplinary development team and undertaken leadership roles when appropriate;
- taken graduate courses or continuing education classes to improve your skills and abilities;
- made positive contributions to your community and society by applying skills and abilities learned during your undergraduate program in computing;
- made decisions related to your work that demonstrate your understanding of the importance of being an ethical computing professional;
- applied your communication skills to effectively promote you ideas, goals, or products.

Program Learning Outcomes

Outcomes as defined by the Accreditation Board for Engineering and Technology, ABET, are "Statements that describe what students are expected to know and be able to do by the time of graduation." ABET has defined a set of educational outcomes that all graduates of engineering programs must meet:

a) an ability to apply knowledge of math, science and engineering
b) an ability to design and conduct experiments as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs
d) an ability to function on multi-disciplinary teams
e) an ability to identify, formulate and solve engineering problems
f) an understanding of professional and ethical responsibilities
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
i) a recognition of the need for, and an ability to engage in, life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program objectives and outcomes are not static; they need to be reevaluated from time to time to insure they are in line with expectations by industry and the accrediting agencies.

b. Standards and Assessment

The assessment process for the CES degree is the same at the one described for the CSS degree in section 3.1, except that different courses are used to evaluate the outcomes.

c. Undergraduate Research

CE&S students are expected to have similar undergraduate research opportunities as those in the CSS program

d. State Mandated Measures

Since only one class with three students has been held to this point, there is no data to present here. The same support programs for undergraduate CSS students (described in section 3.1) are available to CES students. The Institute is actively pursuing ways to keep students in the program and to graduate them as quickly as possible (see section 3.1 for details). We will apply the same techniques to attract, retain and graduate CES students.

e. Undergraduate Career Options

Members of the Institute's advisory board have expressed strong support for the CES program, and we assume the companies and organizations they represent will provide numerous opportunities for students entering the work force after receiving their bachelors degrees. The Institute currently provides career counseling to CSS majors and CES majors will have access to these same resources.

Section G. Graduate Students

1. Recruitment and Retention

a. Recruitment

The Lead Graduate Advisor for the MS CSS program is in charge of recruiting new students. This is accomplished through various mechanisms described in appendix P. These efforts include approximately fifty school visits and thirty-two information sessions and events, to name a few.

The enrollment yield report identifies the success of our recruitment efforts. The 10th day FTE report for Winter 2007 showed that, while the undergraduate percent of target was at 89.7%, the graduate percent of target was at 99.0%. Current enrollment projections for Fall 2007 are at 67.2%. Our enrollment numbers will increase as new applications are processed.

b. Retention

The retention rate for the MS CSS program is 76%. Many students in the program are "non-traditional" with families and work responsibilities. As a result, many students go "on leave" and

sometimes withdraw from the program. Thus, the variance in enrollment levels is high. The FTE for Autumn 2006 for the MS CSS program was low due to a large number of graduates in 2005 and an unusual number of students who took leave for various reasons, including to prepare for their Capstone projects. The FTE levels for Winter and Spring 2007 were at target or slightly above. Projections for Fall 2007 are unclear at this time. We feel this is understandable, given the current economic climate. Computer Science degree enrollments in general are down; paradoxically, the demand for software development engineers is very high, meaning that students are tending to take jobs rather than continue their education. The Lead Graduate Advisor is in constant communication with all graduate students and available to address their concerns.

The UWT Graduate Adviser's council (GAC) meets monthly to discuss advising and recruiting issues of common concern across the UWT campus, including those pertaining to the diversity of our student population. The GAC discusses the types of events that might be well attended by underrepresented groups, and promotes the events using media that can reach those groups.

2. Advising, Mentoring, and Professional Development

a. Communication and Student Information

Students communicate frequently with the Graduate Program Coordinator in conjunction with the Lead Graduate Advisor. Students are given a copy of the Graduate Handbook (see appendix K), which includes timelines, procedures, academic standards, and other requirements for successful completion of the degree. Beginning in February 2007 the faculty were trained on FERPA and EARS to work in collaboration with the advisors in advising students in our program. Each faculty member has currently been assigned several undergraduate students. The process will extend to graduate students in the near future.

c. Advising Plan

The advising plan is similar to the undergraduate plan. The Lead Graduate Advisor and the Graduate Coordinator are in constant communication with the graduate students. The capstone faculty committee and chair assist students with the development of their capstone projects.

d. Professional Development Plan

Students are also encouraged to work with faculty as well as our assistant director of industry partnerships to procure internships for practical hands on experience in the community.

The Institute provides support for our graduate students to attend conferences. They are encouraged to pursue doctorates. However, a large majority of our students are fully employed while they pursue their degree, so we focus our efforts on career development as well as job placement. For most of our current students this is a terminal master's degree. Based on the 2005-2006 Graduate Exit Questionnaires Summary Report, only 15.38% of our students plan on further graduate studies. In the long range, the addition of freshmen might change this situation

because there will be a higher number of full-time students in the program who may be more likely to pursue advanced degrees rather than seeking immediate employment after the BS or MS completion.

We have held presentations such as career development seminars, speakers from Tacoma computer companies, and informal career counseling with our students. However, in researching for this report it became clear that, although the necessary elements of a formal professional development plan exists, a formalized structure, calendar and narrative articulation of the available plan is needed.

3. Inclusion in Governance and Decisions

a. Inclusion in Governance

Students are invited to participate in all facets of program governance. Most often this is done informally, through comments directed to the Lead Graduate Advisor, the Graduate Program Coordinator, and/or the Director. A graduate student is a member of the Institute of Technology Advisory Board (ITAB). The Institute is presently exploring the idea of having a Student Advisory Board.

b. Grievance Process

The Institute follows the procedures for grievance process as stipulated in the Volume 4, Part 3, Chapter 11, Section 2 of the University of Washington handbook. (see below).

> 1. The student shall first discuss the matter with the instructor before the end of the following academic quarter (not including summer quarter).
>
> 2. A student who is not satisfied with the instructor's response may submit, no later than ten class days after his or her discussion with the instructor, a written appeal to the chairperson of the department (or the dean in a non-departmentalized school or college), with a copy of the appeal to the instructor. Within ten calendar days of receipt of the appeal, the chairperson shall consult with the instructor to determine whether the evaluation of the student's performance was fair and reasonable or whether the instructor's conduct in assigning the grade was arbitrary or capricious and should the instructor decline to revise the grade, the chairperson (or the dean in a non-departmentalized school or college), with the approval of the voting members of his or her faculty, shall appoint an appropriate member, or members, of the faculty of that department to evaluate the student's or students', performance and assign a grade. The dean and provost shall be informed of this action.

In the case of the Institute the designated "chairperson of the department" is the Director.

4. Graduate Student Service Appointees

The Institute employs MS students on an ad hoc, hourly basis only. We employ students as graders, mentors/tutors and facilitators. Appointments are made on a quarterly basis, based on faculty needs and student skills. In the 2005-2006 Exit Questionnaire 5.26% of our students served as graders and or tutors and 10.53% taught lab or quiz sections.

a. and b. Appointment Process and Duration

Students apply and are interviewed by staff and faculty before hiring. Also, special efforts will be implemented this coming academic year to hire graduate students to supplement the advising and technician staff. Generally, student employees are reappointed each quarter.

c. Funding

Several faculty members have submitted research proposals to NSF that include participation of graduate students. It is also intended that the proceeds of the two endowed chairs will be used to pay stipends to graduate students involved in future faculty research work. These endowed professorships were established in 2007 with the purpose of enhancing the University's ability to attract, retain and foster professional development for distinguished faculty in the Institute of Technology. One endowed chair is for Information Systems and Information Security and one is for Engineering Systems. The endowment income will be credited to an operating account at the end of each calendar quarter beginning June 30, 2007.

The faculty have been working to increase the opportunities so that both graduate and undergraduate students can become involved in other externally funded projects. An example of this can be found in the research contract between the Institute and the Port of Tacoma that was initiated last Spring. The contract provided money to support one graduate student half-time for the Spring quarter, plus some additional funds to continue the work over the summer. An extension to this contract will allow us to support another student in the Winter and Spring quarters this coming academic year.

d. Promotions and Salary

Appointments are granted only to graduate students who have carefully defined educational goals and who exhibit the highest intellectual competence and attainment. Succeeding appointments may be made if the student maintains high scholarship and continues to make satisfactory progress toward the degree. The salary guidelines are outlined in annual Graduate Student Salary Appointment (GSSA) document from the Graduate School.

e and f. Supervision and Training

Faculty and or administrators supervise our student appointees. Training is conducted by both the administration and faculty in relation to their specific position. The student employees are evaluated and mentored during their employment with the Institute.