WASHINGTON HIGHER EDUCATION COORDINATING BOARD

BOARD MEETING AGENDA

WSU Tri-Cities
CIC 120 (Consolidated Information Center Bldg.)
2710 University Drive, Richland 99354
September 27, 2007

8:00 Board breakfast meeting with CTC presidents
CIC 120A

9:00 Welcome and Introductions – Board and Advisory Council
Bill Grinstein, HECB chair / Advisory Council Co-chair
Charlie Earl, SBCTC executive director / Advisory Council Co-chair
Vicky Carwein, Chancellor, WSU Tri-Cities

9:15 **2008 Strategic Master Plan for Higher Education** **1**

- Review of outline for public discussion
- Review of public outreach plan
- Master plan discussion

12:00 Working Lunch (CIC 120A)
Continue master plan discussion

1:00 **Approval of the July 26, 2007 Meeting Minutes** **2**

Executive Director's Report

1:15 **The Role of Washington's Independent Colleges in the 2008 Strategic Master Plan**
Sister Kathleen Ross, president, Heritage University

The private independent colleges of Washington contribute significantly to Washington's higher education capacity, conferring a quarter of the state's baccalaureate degrees each year. Heritage University President Kathleen Ross will describe the role of the private colleges in helping our state prepare for the challenges of the 21st century.

2:00 Education Committee
Sam Smith, chair

Information/Discussion/Action: Revised Performance Targets for Higher Education Institutions — 3

- *Resolution 07-15*

In 2006 the Higher Education Coordinating Board, in collaboration with the Office of Financial Management, public baccalaureate institutions, and the State Board for Community and Technical Colleges, developed an accountability monitoring and reporting system. The system includes performance measures and performance targets for higher education institutions. The state budget adopted in 2007 requires review and revision of those performance targets based on new levels of per-student funding. Target revisions proposed by institutions and the SBCTC will be presented. Board action on proposed targets is requested at this meeting in order to meet the October 1 deadline for submitting revised targets to the Governor and the Legislature.

2:30

Information/Discussion/Action: Gender Equity Report — 4

- *Resolution 07-16*

The Board will review the findings and recommendations of a new policy brief on gender equity in high demand fields. The policy brief explores why these fields exhibit disproportionate degree conferment rates and identifies possible policy/program options. A resolution has been drafted for Board action, supporting the release of the policy brief and directing staff to implement its recommendations.

3:00

Student Panel

Public Comment

4:00

Adjournment

Public Comment: A sign-in sheet is provided for public comment on any of the items presented above.

Meeting Accommodation: Persons who require special accommodation for attendance must call the HECB at 360.753.7800 as soon as possible before the meeting.

2007 MEETING CALENDAR

Board Meeting	Location
January 25 8:00 – 12:00	**The Evergreen State College** Longhouse 2700 Evergreen Parkway N.W., Olympia
February 22 8:00 – 12:00	**State Investment Board** Board Room 2100 Evergreen Park Drive S.W., Olympia
March 22 9:00 – 4:00	**State Investment Board** Board Room 2100 Evergreen Park Drive S.W., Olympia
April 26 9:00 – 4:00 **Advisory Council**	**Tacoma Community College** Senate Room, Opgaard Bldg. (#11) 6501 S. 19th, Tacoma 98466
May 24 9:00 – 4:00	**Bellevue Community College** Library, D126 3000 Landerholm Circle SE, Bellevue 98007
June 28 9:00 – 4:00 **Advisory Council**	**UW Bothell** North Creek Events Center 18115 Campus Way NE, Bothell 98011
July 26 9:00 – 4:00	**Eastern Washington University** Tawanka 215 B & C Cheney
August 14-15 **Board Retreat**	**Talaris Conference Center** Seattle
September 27 9:00 – 4:00 **Advisory Council**	**WSU Tri-Cities** CIC 120 2710 University Drive, Richland 99354
October 25 9:00 – 4:00	**WSU Vancouver** ADM 110 14204 NE Salmon Creek Avenue, Vancouver
November 15 9:00 – 4:00 **Advisory Council**	**Highline Community College** Mt. Constance, Student Union Bldg. 2400 S 240th, Des Moines
December 13 9:00 – 4:00	**State Investment Board** Board Room 2100 Evergreen Park Drive S.W., Olympia

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

An Invitation to Help Us Formulate the 2008 Strategic Master Plan for Higher Education

Join the Discussion

The Higher Education Coordinating Board will hold a series of public forums, public hearings and small group meetings in October and early November. We are seeking broad public discussion to help the Board formulate the 2008 Strategic Master Plan for the state's postsecondary education system.

The purpose of this paper is to share the Board's early thinking about the major issues and challenges we face. Two overarching goals and some potential strategies have been identified to begin the discussion. We invite you to share your thoughts and ideas.

Please participate by sharing your thoughts and comments at one of the discussion events or at the Board's regularly scheduled October 25 meeting and public hearing at WSU-Vancouver. You can also submit your comments by email to masterplan@hecb.wa.gov. Or you can attend one of our public forums being held statewide noted below.

Public Forum Dates

October 18, 2007 **4:30 – 6:30 pm**	**Vancouver**	**Hamilton Hall - The Historic Reserve** **605 Barnes Road**
October 23, 2007 **4:30 – 6:30 pm**	**Bellingham**	**Quality Inn Baron Suites** **Atlantis Room**
October 29, 2007 **11:30 am – 1:30 pm**	**Spokane**	**NW Museum of Arts and Culture** **Gilkey Room** **2316 W. 1st Avenue**
October 30, 2007 **11:30 am – 1:30 pm**	**Tacoma**	**Tacoma Art Museum** **The Event Space** **1701 Pacific Avenue**

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INTRODUCTION

Our education system – still the envy of the world – is designed to serve the past. In the past, a high school diploma was enough to prepare most people to attain employment and participate fully in the American dream. A relatively small percentage of our population continued to higher learning and then to managerial, technical and professional careers.

This is no longer the case. The global economy drives a new imperative for education – to educate *everyone to achieve at higher levels*. This was the essential recommendation of **Washington Learns**, which called for a world-class, learner-focused and seamless system of education. We must simultaneously "raise the bar" and "close the gap" on educational achievement.

Our challenge is to reconstruct our education system so that it better serves Washingtonians and adequately prepares everyone to participate fully in our state's economic and civic life. We now know that:

- High-quality early learning is of critical importance to future educational success.
- While a high school diploma is necessary, it is no longer sufficient to ensure family-wage jobs and life success.
- Everyone's future is tied to education and ***everyone deserves the opportunity to get more education***.

As a state aspiring to be a global economic leader, we must ask ourselves some hard questions. Are we satisfied that one in four 18 to 24-year-olds lacks a high school diploma or GED? Are we satisfied that only 16 of every 100 ninth graders complete high school on time and earn a bachelor's degree within six years? Are we satisfied with a workforce built on imported talent while we fail to educate more of our own residents to higher levels?

A 'Perfect Storm'

As one national report puts it, America is in the midst of a "perfect storm" in which three powerful forces are converging.

1. Large numbers of better-educated, older workers are retiring and need to be replaced.
2. Our economy is growing and with this growth there is increasing demand for educated workers.
3. An increasing number of those in our education system come from groups with low family incomes who are most at risk for dropping out of high school and who are significantly under-represented in higher education.

The rigor of our education system may be insufficient to meet the challenges we face in this 'perfect storm.' Consistently, comparative tests of skill levels between our school children and their counterparts in other nations demonstrate our deficiencies, especially in science and math. Washington is not immune from these forces and may be even more exposed to them given our globally based economy.

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Education is a sound investment

Investments in education pay back significant personal and societal economic returns. Individuals benefit from higher lifetime earnings. The economy benefits from their greater productivity. There is also significant evidence of a public return on investment in education. Educated people contribute more and require less from taxpayers. They are more likely to be healthy, to vote, to participate in civic affairs and far less likely to engage in criminal activity or be dependent on the social safety net.

Our challenge

Tom Brokaw has written movingly of what he calls the "greatest generation" – men and women who came of age during the Great Depression, fought bravely in World War II and then came home to build the foundation for modern America. Among the many achievements for which we owe them our gratitude is the GI Bill – the greatest investment in higher education in our country's history.

The GI Bill, which enabled hundreds of thousands of returning servicemen and women to attain a college education, is widely praised as the most important social legislation of the 20th century. It helped forestall a postwar economic recession, expanded the home-owning middle class, and forever transformed individual lives and public institutions.

Our challenge today is no less critical for our future survival than the one faced by those of the greatest generation. We must take the bold steps necessary to extend educational opportunity, not only to our children and grandchildren, but also to our adult neighbors and fellow citizens. *We must reinvest in the economic engine of higher education.*

At the end of the day when we look in the mirror will we be able to say that we did the best we could? Will we have prepared our children and grandchildren to live and work in the world of tomorrow? Or, will we be the first generation in the history of the United States where parents are better educated than their children?

Will we have raised levels of education among our growing population of at-risk students, or will we continue with a system that serves only some of the population? Will we be running our industries and our governments with people we attract from other countries and other states, or will we have educated our own residents to the same level? These are the hard questions that must guide our thinking as we undertake the task of creating a 10-year strategic master plan for postsecondary education in Washington.

Context for the 2008 Strategic Master Plan

Since its creation in 1985, the Higher Education Coordinating Board has been charged by law to develop and update a statewide strategic master plan for Washington's postsecondary education system. The plan must encompass **all** sectors of higher education, including the two-year system, workforce training, the four year institutions, and financial aid. It must include strategies for expanding access, affordability, quality, efficiency, and accountability among the various institutions of higher education.

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The Higher Education Coordinating Board has met this mandate by producing strategic master plans in 1987, 1990, 1992, 1996, 2000, and 2004.

In 2007, the Legislature amended the HECB statute to require the 2008 strategic master plan to "propose a vision" for a **10-year** time period. It directs us to address the goals of: 1) expanding access; and 2) using efficient, cost-effective, and productive methods of educational delivery. It requires us to use performance measures to gauge our progress.

The 2007 Legislature also added fresh language exhorting us to "encourage partnerships" and to "embrace innovation." Our analysis is to be based on demographic, social, economic, and technological trends for a 20-year horizon and to address the needs of nontraditional populations, including adult learners. We take these legislative directives to heart. Our 2008 Strategic Master Plan will endeavor to answer two key questions:

- What should the state's higher education system look like in 2018?
- What will it take in terms of investment, policy initiatives and implementation steps to achieve that vision?

A Framework for shared responsibility: a call to action

The education sectors and the state's economy are fully interdependent, and higher education has a major role to play across all sectors.

- Investments in high-quality early learning are an effective strategy for reducing the achievement gap and increasing the graduation rate in K-12. Higher education prepares the early childhood teachers, child care providers, school leaders and classroom teachers.
- More students succeed in higher education when our schools produce students who have mastered an increasingly rigorous curriculum and are fully prepared to do college-level work. Higher education prepares the teachers and administrators who run the schools, conducts research to improve teaching and learning and helps establish common standards of preparation.
- Employers are dependent on a productive education system that allows students to access and complete degree and certificate programs that are in high demand by our economy. Higher education responds to employer needs by expanding access, developing new programs, and advancing research and public service.

Recognizing this interdependence, we seek to develop the 2008 strategic master plan within a framework of shared responsibility. Students, parents, families, communities, civic and business leaders, and educators at all levels need to mount a collaborative effort to raise the level of educational attainment in our state. A strong commitment to rapid and measurable progress is needed.

With a highly educated population and a significant employment base in technology, health care, aerospace, manufacturing, agribusiness and international trade, Washington is well-positioned to meet the challenge. Our state's higher education institutions – with outstanding faculty, world-class research capacity and a deep tradition of public service – are uniquely qualified to help lead this effort. But the future will not wait. We must act now.

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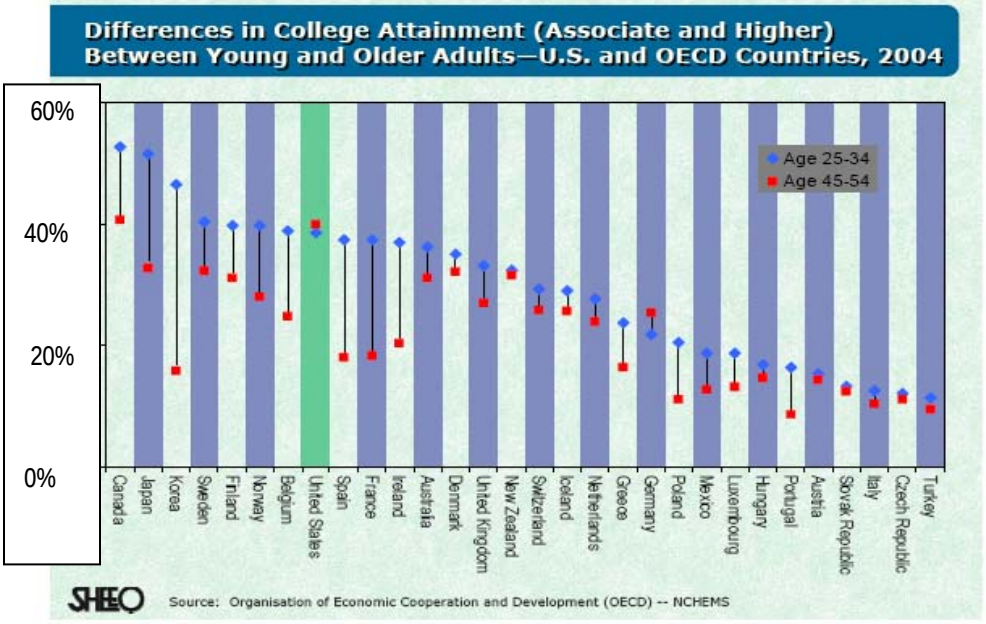
Other countries investing in educating younger adults

Green bar shows U.S. standing still while other countries improve



Key challenges for Washington postsecondary education

Washington must begin to develop a ***college-bound culture*** in our schools – one in which every student aspires to and achieves higher levels of skill, knowledge and empowerment. Our citizens deserve their share of the best jobs in the 21st century. Too few are being prepared to obtain them. Higher education has a significant role to play in this challenge.

We need to become better at:

- Engaging students early.
- Motivating them to prepare for college by taking challenging courses.
- Identifying the specific skills and courses needed to succeed in college.
- Supporting them financially and academically.
- Ensuring they can move through the system seamlessly.
- Focusing on helping them attain certificates, associate, bachelor's and advanced degrees.
- Reaching out to adult workers who need basic education and job-specific training.

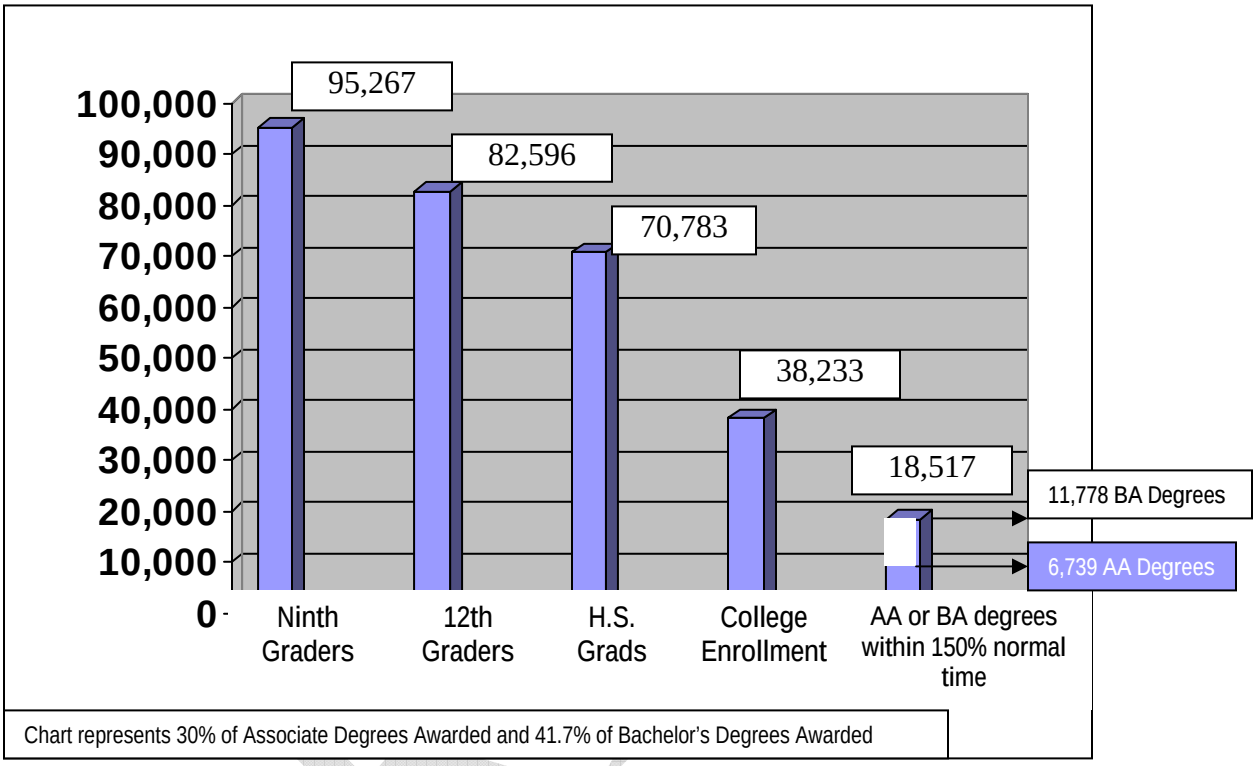
Gaps in educational achievement among low-income students

There are significant gaps in educational achievement among Washington students from families with incomes at the lower end of the economic spectrum – the most rapidly growing segment of our school-age population. Far too few of these students are continuing to college or other postsecondary training. And of those who do participate in postsecondary education, too many drop out – often after only a semester.

Building pathways for student success

Washington's current education system is not preparing enough of its citizens to meet the challenges of the 21st century. We must make improvements throughout our education system – early learning through graduate school – by building stronger educational pathways that emphasize early engagement, rigorous preparation, financial support and degree attainment.

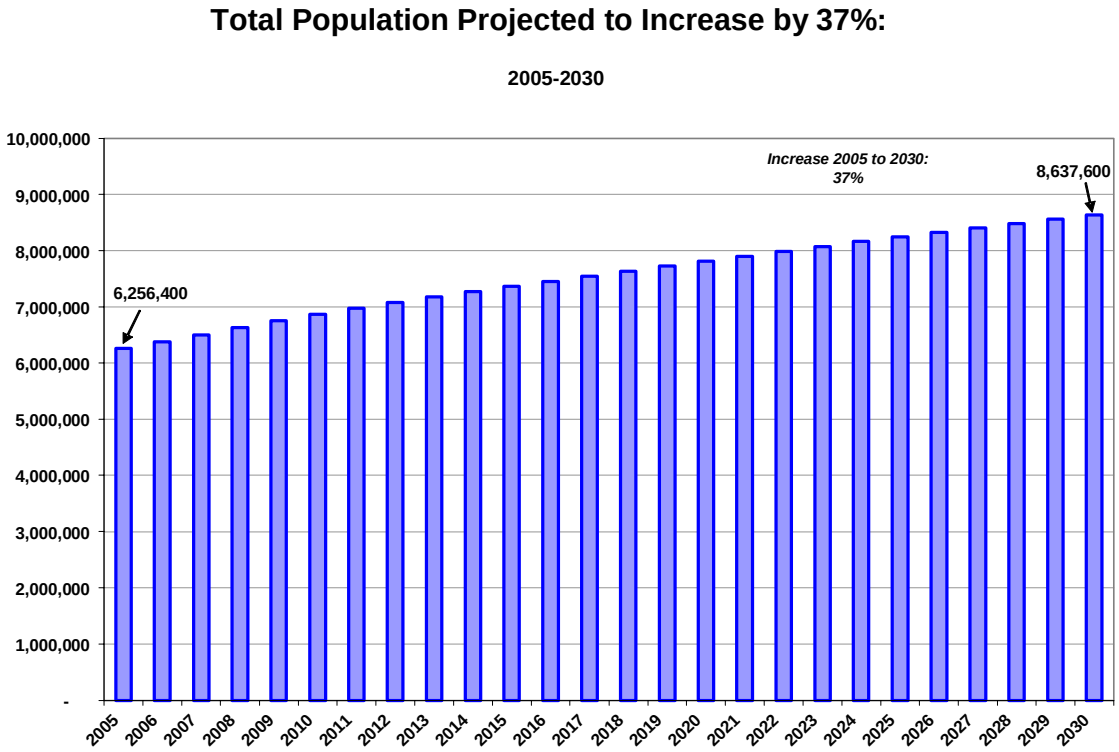
Too many students leave the educational pathway



- For every 100 students who enter ninth grade, only 74 have graduated from high school four years later and just 12 have graduated with a bachelor's degree six years after that.
- Washington ranks 7th among the 8 Global Challenge States (GCS) in the percentage of students enrolling in college directly from high school.
- Washington ties for 6th among the GCS in the percentage of ninth graders who complete an associate degree or higher.
- Washington ranks 6th among the GCS in terms of bachelor's degrees awarded per 1,000 college-age residents.

Population growth and increased demand for educated workers

A record number of students will arrive at the doors of our state's colleges and universities in the next 20 years. By 2030, our public colleges and universities will need to make room for thousands of additional students – 38,000 FTE students over today's level. While this is occurring our economy will be growing and the demand for even more highly educated workers will increase.



Source: OFM, November 2006, Forecast of Population by Age and Sex

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Exodus of highly educated older workers

Washington has a highly educated workforce, but many of these workers are older and will retire in the next decade. They will need to be replaced at a time when demand for highly educated workers is growing rapidly throughout the world.

Increased global competition for highly educated workers

Washington meets its need for highly educated workers, in part, by attracting them from other states and countries. As more baby boomers retire and competition for educated workers increases, importing workers will not be a viable strategy.

Lack of well-coordinated statewide economic planning

Baccalaureate and graduate education have lacked a presence in the state's workforce development plan. Baccalaureate and research institutions not figured prominently in creating better state workforce planning and assessment models and developing strategic responses. Basic and applied research is not sufficient to meet local and regional economic needs. A greater emphasis is needed on providing adult education and lifelong learning.

Suggestions for carrying out change

The Board has identified two suggested goals for the 2008 strategic master plan that will enable our state to initiate rapid and measurable change in our postsecondary system.

Goal 1: Increase educational access and success for our students

All students, regardless of income, race, ethnicity, or family history, deserve the right to participate and succeed in postsecondary education.

Potential Strategies:

- Develop *world-class teachers*, especially in the areas of math and science. Assess more accurately how many teachers will be needed in the future. Expand research-based teacher training and research-based classroom instruction.
- *Build a college-bound culture* in our state's schools through early engagement, motivation, increased preparation and support, stepped-up community outreach and mentoring, and proactive parent education.
- *Increase financial support for low-income students* through the State Need Grant, the College Bound Scholarship, and regional scholarship taxing districts.
- Develop *additional capacity* – faculty, programs technology, facilities and delivery methods – to educate more students as cost-effectively as possible.
- *Help more transfer students earn bachelor's degrees* through better transfer counseling, more seamless course transfer, a statewide online advising system, and a point incentive system rewarding progress.
- Expand access to degree programs *for place-bound adult students.*
- *Develop technology* to support teaching and learning and provide access for place-bound students, expanded off-site degree programs and other innovations.

Goal 2: Secure our state's future economic development

Higher education is a major driver of our state's economy. We need to ensure our institutions are producing the number and types of degrees needed to meet economic challenges and that our nationally recognized research universities are fully capable and engaged in driving innovation throughout our economy.

Potential Strategies:

- *Meet demand for* students with degrees and training in *high-demand, high-skill fields* through continued need and capacity analysis, consistent and focused investment in expanding enrollments, and targeted efforts to improve and expand the pipeline of interested and prepared students.
- Continue to encourage our higher education institutions to engage in local and industry-specific economic development planning forums and develop career pathways that support our state's key industries.
- Continue to make *strategic investments in the state's research facilities and programs*.
- Boost support for *research commercialization and technology transfer* activities, including continued funding for innovation partnership zones and research teams. Monitor and report on the results of research commercialization efforts at our public research institutions.
- Develop lifelong learning systems that help adult workers upgrade their skills and develop their careers through strong support *of adult basic education*, development of "worker-friendly" degree and certificate programs, and the creation of new finance and training delivery systems.

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WASHINGTON HIGHER EDUCATION COORDINATING BOARD

July 2007

Draft Minutes of July 2007 Meeting

HECB Members Present
Mr. Bill Grinstein, chair
Mr. Charley Bingham
Ms. Roberta Greene
Mr. Earl Hale
Sen. Betti Sheldon
Ms. Sasha Sleiman
Dr. Sam Smith

Welcome and Introductions
HECB Chair Bill Grinstein welcomed the audience and asked everyone to introduce themselves. He then invited Dr. Rodolfo Arévalo, President of Eastern Washington University (EWU), to say a few words. Arévalo said that EWU is growing fast and has been developing a number of branch campuses throughout the state; to call EWU a regional institution is a misnomer now, since it has a presence in the Tri-Cities, Yakima, Vancouver, Bellevue, and Spokane.

Action: June 2007 Minutes Approved

Sheldon moved to approve the minutes of the June 2007 meeting. **Greene** seconded the motion. The minutes were unanimously approved.

Action: New Degree Program Proposals Approved

Smith moved to approve the M.S. and Ph.D. in Earth and Space Science at the University of Washington (Res. 07-12); the B.A. in American Indian Studies at the University of Washington (Res. 07-13); and the B.A. in Applied Computed at the University of Washington Bothell (Res. 07-14). **Sheldon** seconded the motion, which passed unanimously.

Update on Institutional Performance Targets and GMAP

Chris Thompson, HECB Director for Institutional and Governmental Relations, presented an update on the accountability framework that was designed in concert with other agencies and institutions. The framework was presented to the Legislature during the last session and was included into the 2007-09 budget. The institutions are required to submit their revised targets to OFM and the Legislature by October 1. In addition, the Legislature has asked the HECB to gather data from institutions in the Global Challenge States. One of the proposed targets is to base appropriations on per-student funding.

The GMAP initiative calls for more rigorous accountability in state agencies. The newly created P-20 Council will play an important role in the process, overseeing most education-related measures. Possible topics include transfer and articulation, as well as financial aid.

Daley added that the inclusion of education into the GMAP is related to Washington Learns. Education is tied to the economic vitality of the state.

2008 Strategic Master Plan: Workforce Development

- Randy Spaulding, HECB Director of Academic Affairs
- Madeleine Thompson, Policy Analyst, Workforce Training and Education Coordinating Board (WTECB)
- Loretta Seppanen, Assistant Director for Education Services, State Board for Community and Technical Colleges (SBCTC)
- Paul Sommers, Center for Metropolitan Studies, Seattle University

Spaulding talked about the three primary approaches to understanding enrollment trends and needs: growth required to maintain the current level of participation; growth required to meet a benchmark participation rate or degree goal; and growth required to meet growing student demand for degrees.

Thompson presented on the workforce development needs of employers and students. A recent WTECB survey shows that 51 percent of employers claim to have difficulty finding qualified applicants for open positions. Skills shortages affect the economy, sales, and productivity. Employers report having most difficulty finding workers who have occupation-specific skills, can problem solve, and have positive attitudes and work habits. Furthermore, there has been a decrease in employer demand for workers with no postsecondary training, and an increase in demand for workers with four or more years of postsecondary training. Regarding the needs of students, the greatest barriers to education are financial need, lack of information about opportunities, childcare, time involved, and academic preparation. To help address these issues, the HECB should increase financial assistance for part-time adults; improve articulation and transfer; and expand the availability of applied baccalaureate degrees.

Seppanen said the largest number of students who attend community and technical colleges to prepare for a new or a different job are in nursing programs, information technology, or support positions. The degrees and certificates that these students obtain don't contain the extensive liberal arts background that four-year students receive. Workforce students are older, with a median age of 30. Currently the HECB's demographic analyses focus on students 18 to 29. Seppanen suggested that in its strategic master plan update, the Board should look at students 30 and older. Younger adults enroll in community and technical colleges with transfer goals; older adults enroll mostly with workforce goals.

Sommers examined growth of middle-wage jobs (jobs that pay at least $17 and hour but don't require any postsecondary training) in industry clusters. He said the demand for middle-wage jobs is decreasing and the demand for degreed individuals is increasing.

Greene said that since the low-wage sector is growing at the same time, lack of education is increasing economic disparities.

Washington Financial Aid Programs

John Klacik, HECB Director for Financial Assistance, stated that student aid is a means to implement higher education policies and priorities as outlined in the strategic master plan. State financial assistance has breadth and depth, and responds to student need. Some programs reach into middle schools. The Guaranteed Education Tuition program helps middle-income families save for college and traditional financial assistance serves students when they need assistance. Changes in the 2007-09 biennium include an $82 million increase in state financial assistance. State Need Grant (SNG) eligibility expanded to 70 percent of the median family income and three new programs have been established: the College Bound Scholarship, GET Ready for Math and Science, and Passport to College (for foster youth). Since 1993, SNG awards have increased at the same rate as tuition. The models that the HECB and the Legislature use take into account the needs of low-income students. This model is vital and should be incorporated into the strategic master plan.

Next steps include developing performance measures and conducting a student financial aid awareness study.

Demographics Update

Randy Spaulding, HECB director for Academic Affairs, and Andi Smith, associate director, reviewed Washington demographic in context with other global challenge states. The increase in the number of high school graduates in Washington is less than that in other global challenge states. Washington is seeing a more diverse, and increasingly Hispanic and Asian/Pacific Islander population. Compared with the global challenge states, Washington does poorly at retaining students in the K12-to-postsecondary education pipeline. Participation in public higher

education varies by county, with rates most affected by proximity to an institution. However, Washington does well at attracting degreed individuals.

Diversity in Higher Education

- Ricardo Sanchez, HECB Associate Director for Academic Affairs
- Sheila Edwards Lange, UW Vice Provost for Diversity and Vice President for Minority Affairs
- Rodolfo Arévalo, EWU President
- Jan Yoshiwara, SBCTC Director of Education Services

Sanchez provided introductory comments and asked members of the panel to address diversity issues in their institutions.

Lange presented on diversity programs at UW. She said that the college has a long history of diversity, dating back to the 1960s. She suggested that the updated strategic master plan address and support partnerships with K-12 to impact teacher training, parental engagement, and college readiness.

Arévalo stated that EWU has a long history of commitment to diversity. The absence of an office is intentional, since address diversity is the responsibility of every individual at the university. EWU has several-decades-old Native American Studies and Chicano Studies programs. Its Upward Bound and GEAR UP programs focus on local reservations.

Yoshiwara said that due to the changing demographics in Washington, it's a challenge to maintain educational attainment levels, let alone to increase them. If the state continues doing what it is currently doing, educational attainment levels will decline over time. Community and technical colleges provide high levels of access to higher education for people of color. Communities of color are over-represented in Adult Basic Education (ABE) courses, but also well represented in college-level course at community and technical colleges. However, there is a huge potential pipeline issue. Two thirds of students who transfer out of community and technical colleges and earn a bachelor's degree are the first in their family to do so. A smooth articulation and transfer system is critical to raise educational attainment levels for people of color.

Yoshiwara made three recommendations to the board:

1. The strategic master plan should pay attention to where people of color are geographically. Design ways to take institutions to communities of color (rather than expecting people of color to come to institutions); the issue is geographic as well as cultural.
2. Institutions should tailor their curricula to meet the needs of people of color.
3. Convene a diversity summit; strategic initiatives are necessary.

Prosperity Partnership

Bob Drewel, Executive Director of the Puget Sound Regional Council (PSRC), presented on the Prosperity Partnership, an conglomeration of over 243 corporations, labor groups, and community organizations. The partnership's goal is to improve the economy of the Puget Sound region and to create 100,000 new jobs that would not otherwise come to the region.

The Prosperity Partnership has three goals for education:

1. Increase the number of bachelor's and advanced degreed, focusing on science and engineering;
2. Increase the percentage of the region's students who graduate from high school within four years;
3. Strengthen the workforce training system and improve the integration of education in the workplace.

Prosperity Partnership's higher education group has offered potential solutions to the gap between demand for degreed workers and the number of degrees being produced. They included:

1. Funding the current capacity in high-demand field immediately;
2. Studying capital needs beyond the current capacity;
3. Developing and implementing a public-awareness pilot project
4. Providing more financial assistance to encourage students to pursue degrees in high-demand fields;
5. Funding FTE at their actual cost;
6. Adopting accountability standards and an outcome-based management of higher education;
7. Committing a percentage of the general budget for higher-education investment.

The meeting adjourned at 3 p.m.

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

September 2007

DRAFT: Revised Performance Targets for Higher Education Institutions

Introduction

In 2006 the Higher Education Coordinating Board (HECB), in collaboration with the Office of Financial Management, public baccalaureate institutions, and the State Board for Community and Technical Colleges (SBCTC), developed an accountability monitoring and reporting system. The system includes performance measures and performance targets for higher education institutions.

The state budget adopted in 2007 requires review and revision of these performance targets based on new levels of per-student funding. HECB staff have collaborated with stakeholders, including the institutions and SBCTC, to review and revise the targets. At its July meeting in Cheney, HECB was briefed on the process. Most proposed targets were presented to the Education Committee at its August meeting. All proposed targets were presented to the Education Committee at its September meeting.

Action on the proposed targets is requested at this meeting in order to meet an October 1 deadline for submitting revised targets to the Governor and Legislature.

Statewide Community and Technical College System

	Indicator	Actual Results		Target	Proposed Targets	
		2004-05	2005-06	2006-07	2008-09	2010-11
1	**Associate Degrees Awarded**	21,632	21,450	21,957	23,100	24,200
2	**Basic Skills**[1]	20,950	21,602	21,809	22,850	23,800
3	**Workforce Preparation**[2]	23,394	22,085	23,500	23,100	25,500
4	**Transfer Ready**[3]	17,436	17,218	17,800	18,700	19,400
5	**Transfer Rate**[4]	50.3%	51.0%[5]	52.0%[6]	55.6%	55.6%

Notes

[1] Number of students in Adult Basic Education and English-as-a-Second-Language programs who gain at least one competency level on a standardized test in reading, writing, mathematics or English proficiency that is administered before and after participating in the program.

[2] SBCTC defines as "prepared for work" students for whom there are "professional/technical degrees and related certificates awarded, including achievement of industry skill standards." Quotation from *Performance Reporting Plan: 2005-07 Biennium Targets,* by Washington Community and Technical Colleges, report approved by SBCTC December, 2005

[3] Number of students completing 45 credits of core coursework with at least 2.0 GPA.

[4] Percentage of students who transfer to a four-year institution within three years of initial enrollment among students declaring intention to transfer and completing at least 15 credits.

[5] The result recorded here is a projection -- not an actual result.

[6] This value is not a currently adopted target. All targets for this measure are proposed, since no targets have previously been established for this measure.

Three-Year Transfer Outcomes

	Actual Result	Projected Result	Proposed Targets		
	2004-05	2005-06	2006-07	2008-09	2010-11
Number of entering students[1]	18,073	17,900	17,900	18,000	19,500
Number who tranfer to four-year institutions within 3 years of initial enrollment	9,087	9,130	9,300	10,000	10,850
Number not transferred but still enrolled at 2-year institution	1,677	2,000	2,000	3,000	4,000
Number who left school	7,309	6,770	6,600	5,000	4,650
Transfer Rate	50.3%	51.0%	52.0%	55.6%	55.6%
Enrolled 4th Year	9.3%	11.2%	11.2%	16.7%	20.5%
Left School	40.4%	37.8%	36.9%	27.8%	23.8%

Notes

[1] Students who declare their intention to transfer to a four-year institution are included except that students who earn fewer than 15 credits during the three years are excluded from this analysis.

Washington Public Baccalaureate Institutions

	Indicator	Baseline 1998-02	Most Recent Year Actual Result	Checkpoints		Current Target	Proposed New Target
		5-year average	2005-06	2006-07	2008-09	2010-11	2010-11
1	**Bachelor's Degrees**						
	University of Washington Seattle	**6,349**	6,987	7,300	7,400	7,500	**7,625**
	University of Washington Bothell	**409**	573	575	650	800	**875**
	University of Washington Tacoma	**404**	680	700	800	1,000	**1,110**
	Washington State University	**3,720**	4,508	4,170	4,170	4,300	**4,700**
	Central Washington University	**1,950**	2,139	2,200	2,300	2,300	**2,400**
	Eastern Washington University	**1,615**	1,964	2,035	2,035	2,300	**2,350**
	The Evergreen State College	**1,158**	1,211	1,174	1,182	1,190	**1,201**
	Western Washington University	**2,610**	3,067	2,913	2,968	3,038	**3,129**
	Total Public 4-Year Institutions	**18,216**	21,129	21,067	21,505	22,428	**23,390**
2	**High-Demand Bachelor's Degrees**						
	University of Washington Seattle	**1,226**	1,237	1,300	1,350	1,460	**1,550**
	University of Washington Bothell	**128**	154	180	195	200	**215**
	University of Washington Tacoma	**64**	100	115	130	165	**185**
	Washington State University	**522**	681	630	630	700	**900**
	Central Washington University	**48**	54	48	49	50	**50**
	Eastern Washington University	**221**	328	405	405	440	**449**
	Western Washington University	**189**	374	365	371	380	**399**
	Total Public 4-Year Institutions	**2,397**	2,928	3,043	3,130	3,395	**3,748**
3	**Advanced Degrees**						
	University of Washington Seattle	**3,068**	3,703	3,500	3,550	3,550	**3,600**
	University of Washington Bothell	**34**	102	110	110	125	**130**
	University of Washington Tacoma	**73**	134	150	150	175	**185**
	Washington State University	**1,003**	1,080	1,090	1,090	1,200	**1,242**
	Central Washington University	**181**	201	190	200	210	**210**
	Eastern Washington University	**453**	524	550	550	555	**575**
	The Evergreen State College	**101**	92	92	92	93	**108**
	Western Washington University	**341**	349	372	375	377	**377**
	Total Public 4-Year Institutions	**5,255**	6,185	6,054	6,117	6,285	**6,427**
4	**6-Year Graduation Rate (first-time full-time freshmen)**						
	University of Washington	**70.3%**	74.8%	74.5%	74.7%	75.0%	**75.0%**
	Washington State University	**59.5%**	60.2%	62.0%	63.2%	65.0%	**68.0%**
	Central Washington University	**48.0%**	49.1%	49.1%	51.1%	53.0%	**53.0%**
	Eastern Washington University	**47.4%**	48.2%	50.0%	50.0%	53.0%	**53.0%**
	The Evergreen State College	**52.1%**	55.6%	54.5%	57.0%	54.0%	**54.0%**
	Western Washington University	**61.7%**	61.3%	62.4%	62.8%	63.2%	**65.0%**
	Total Public 4-Year Institutions	**61.3%**	63.9%				

Washington Public Baccalaureate Institutions

	Indicator	Baseline 1998-02	Most Recent Year Actual Result	Checkpoints		Current Target	Proposed New Target
		5-year average	2005-06	2006-07	2008-09	2010-11	2010-11
5	**3-Year Graduation Rate (transfers with associate degree from Washington community college)**						
	University of Washington Seattle	**64.7%**	79.2%	76.0%	76.0%	76.0%	**76.0%**
	Washington State University	**59.3%**	64.2%	63.5%	65.4%	66.0%	**68.0%**
	Central Washington University	**70.0%**	72.1%	72.0%	74.0%	74.0%	**76.0%**
	Eastern Washington University	**57.6%**	55.8%	61.0%	61.0%	64.0%	**64.0%**
	The Evergreen State College	NA	72.8%	72.3%	72.8%	73.3%	**73.5%**
	Western Washington University	**57.0%**	63.5%	61.0%	61.4%	61.8%	**66.0%**
	Total Public 4-Year Institutions	**62.9%**	70.2%				
6	**Freshman Retention**						
	University of Washington	**89.8%**	92.8%	92.9%	93.0%	93.3%	**93.3%**
	Washington State University	**83.9%**	84.8%	84.8%	84.8%	87.0%	**87.0%**
	Central Washington University	**74.6%**	78.7%	78.0%	80.0%	80.0%	**81.0%**
	Eastern Washington University	**74.5%**	77.2%	76.0%	76.0%	81.0%	**83.0%**
	The Evergreen State College	**70.2%**	67.6%	72.9%	73.9%	75.0%	**75.0%**
	Western Washington University	**79.3%**	84.5%	84.8%	85.0%	85.0%	**85.0%**
	Total Public 4-Year Institutions	**83.2%**	85.4%				
7	**Bachelor's Degrees within 125% of Required Number of Credits (single major, single degree)**						
	University of Washington Seattle	**91.4%**	92.0%	92.0%	92.0%	92.1%	**92.1%**
	University of Washington Bothell	**91.3%**	93.0%	92.5%	92.5%	92.5%	**92.5%**
	University of Washington Tacoma	**92.4%**	94.8%	92.5%	92.5%	92.5%	**92.5%**
	Washington State University	**92.4%**	91.7%	92.0%	92.0%	95.0%	**95.0%**
	Central Washington University	**84.4%**	87.6%	86.1%	86.6%	87.0%	**87.0%**
	Eastern Washington University	**76.3%**	91.1%	81.0%	81.0%	85.0%	**92.0%**
	The Evergreen State College	NA	97.9%	97.0%	97.0%	97.0%	**97.0%**
	Western Washington University	**94.8%**	95.1%	95.2%	95.6%	96.0%	**96.0%**
	Total Public 4-Year Institutions	**90.3%**	92.4%				

RESOLUTION NO. 07-15

WHEREAS, State law directs the Higher Education Coordinating Board to "establish an accountability monitoring and reporting system" for the purpose of making "progress towards the achievement of long-term performance goals in higher education"; and

WHEREAS, The Higher Education Coordinating Board adopted an accountability framework in early April 2005, and revised that framework in May 2006 in order to consolidate and streamline performance measures and better align timeframes for performance targets with both the state operating budget and the missions of the institutions; and

WHEREAS, The accountability framework suggests that when funding levels change targets should be reviewed revisions considered; and

WHEREAS, The 2007-09 budget requires the Higher Education Coordinating Board, the State Board for Community and Technical Colleges and the public baccalaureate institutions to review current performance targets and revise targets based on new levels of per-student funding; and

WHEREAS, Through the collaborative efforts of state agencies and higher education institutions, performance targets have been reviewed and proposed revisions have been developed;

THEREFORE, BE IT RESOLVED, That the Higher Education Coordinating Board adopts the proposed performance target revisions.

Adopted:

September 27, 2007

Attest:

_____

Bill Grinstein, Chair

_____

Betti Sheldon, Secretary

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

Review & Revision of Performance Targets

HECB Meeting

September 27, 2007

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

HECB charged with responsibility for

- Developing accountability monitoring and reporting system
- Adopting performance targets
- Annually reviewing actual performance
- Biennially reporting on results

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

Accountability Framework

2007-09 Budget

- Recognizes performance measures negotiated by HECB, OFM, institutions
- Provides increased funding to higher education
- Requires revision of performance targets

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

Target Revision Project Outline

- Stakeholder consultations (June 6, 8, 11)
- Project outline distribution (June 22)
- Stakeholder consultations (July 24)
- HECB briefed on process (July 27)
- Institutions submit proposed targets (Mid-August)

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

Target Revision Project Outline

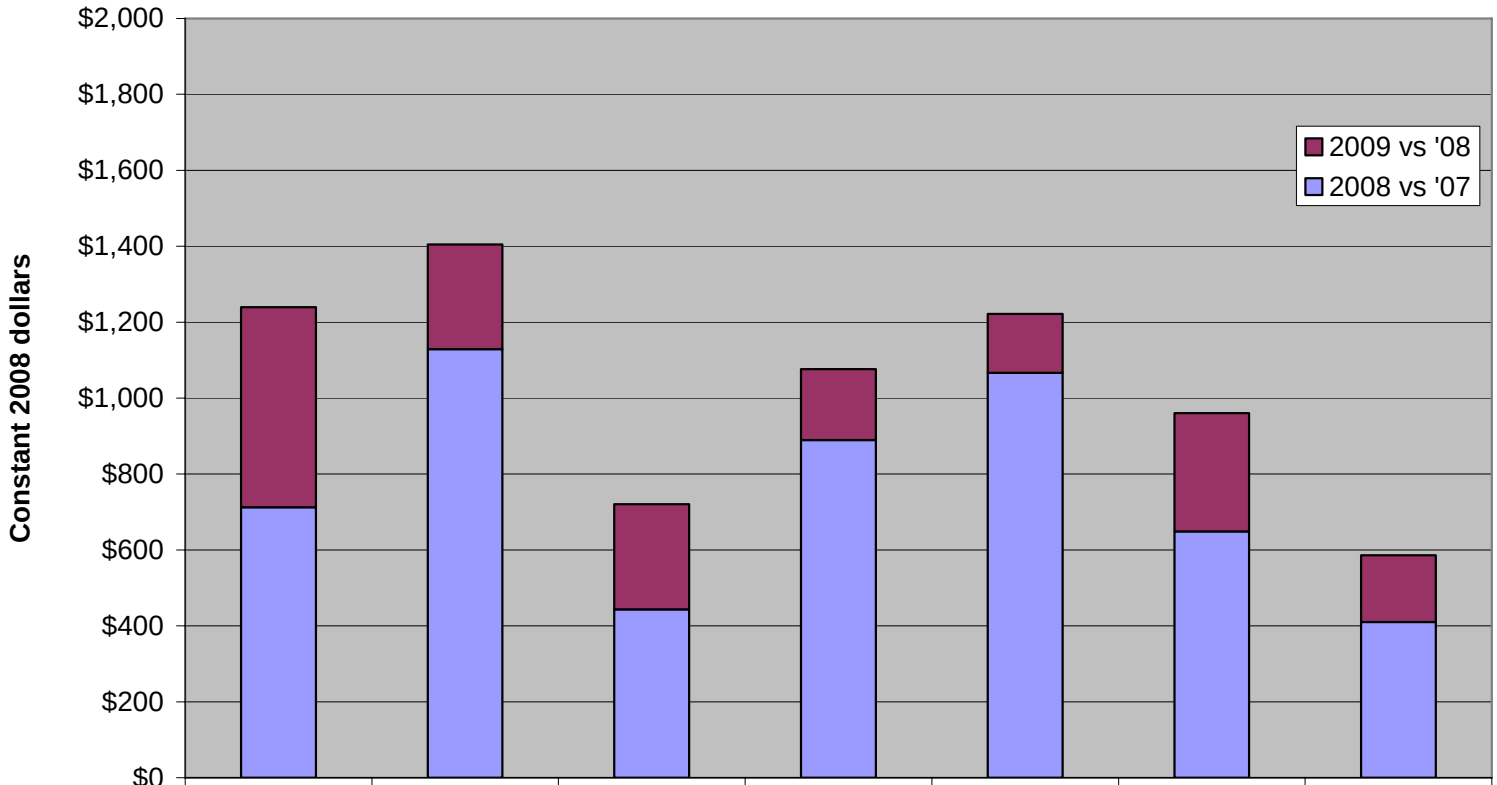
- HECB Education Committee (August 13)
- Stakeholder consultations (August 22)
- Proposed targets presented to HECB Education Committee (September 10)
- HECB action requested (September 27)
- Transmit revised targets to OFM, Legislature (October 1)

Charge in the Budget

- Institutions and HECB "shall review and revise these [performance] targets based on per-student funding in the 2007-09 appropriations act."
- HECB also directed to "compile comparable data from peer institutions" in global challenge states.

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

Per-Student Funding Increase in 2007-09 Budget

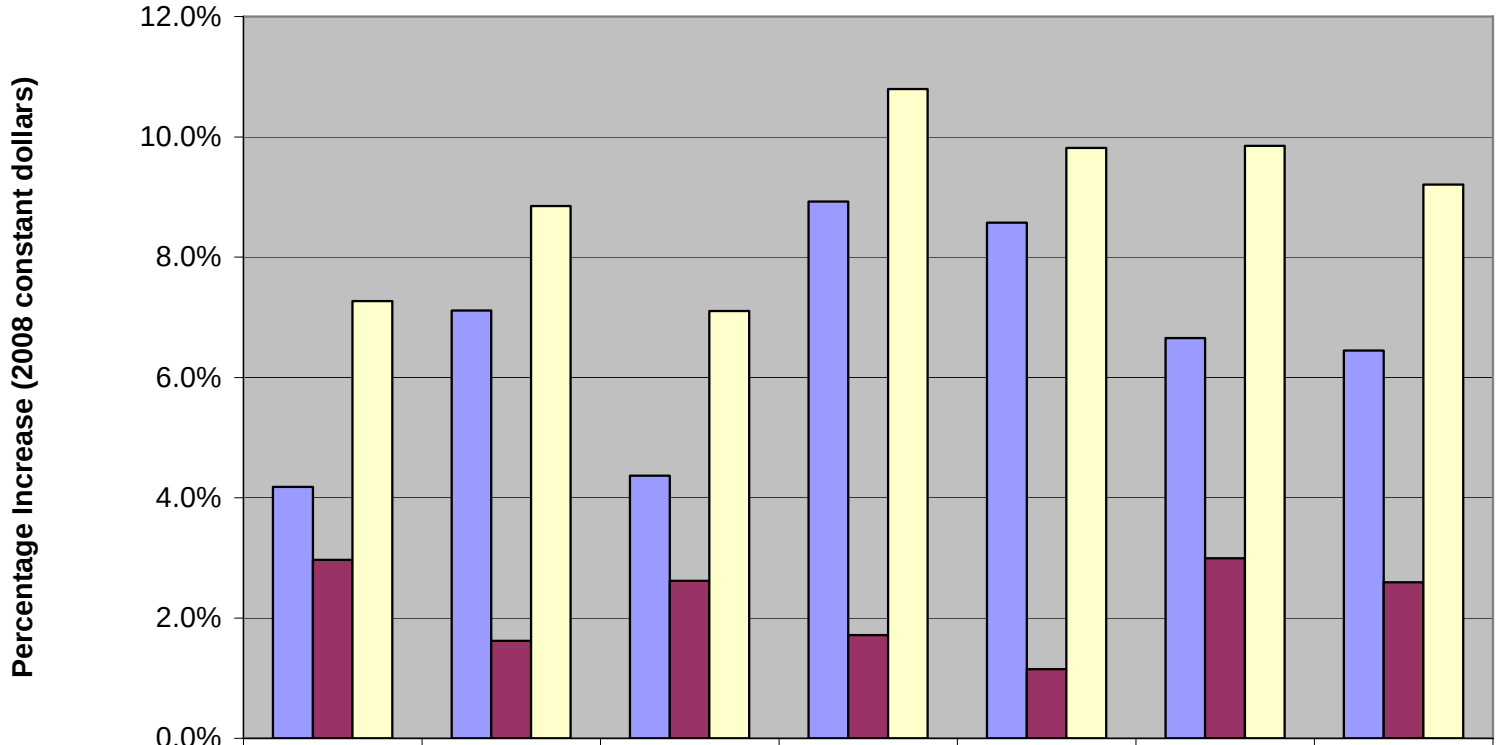


	UW	WSU	EWU	CWU	TESC	WWU	CTC
2009 vs '08	527	275	277	186	155	311	176
2008 vs '07	713	1,129	443	890	1,067	649	410

Source: Legislative Evaluation and Accountability Program Committee

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

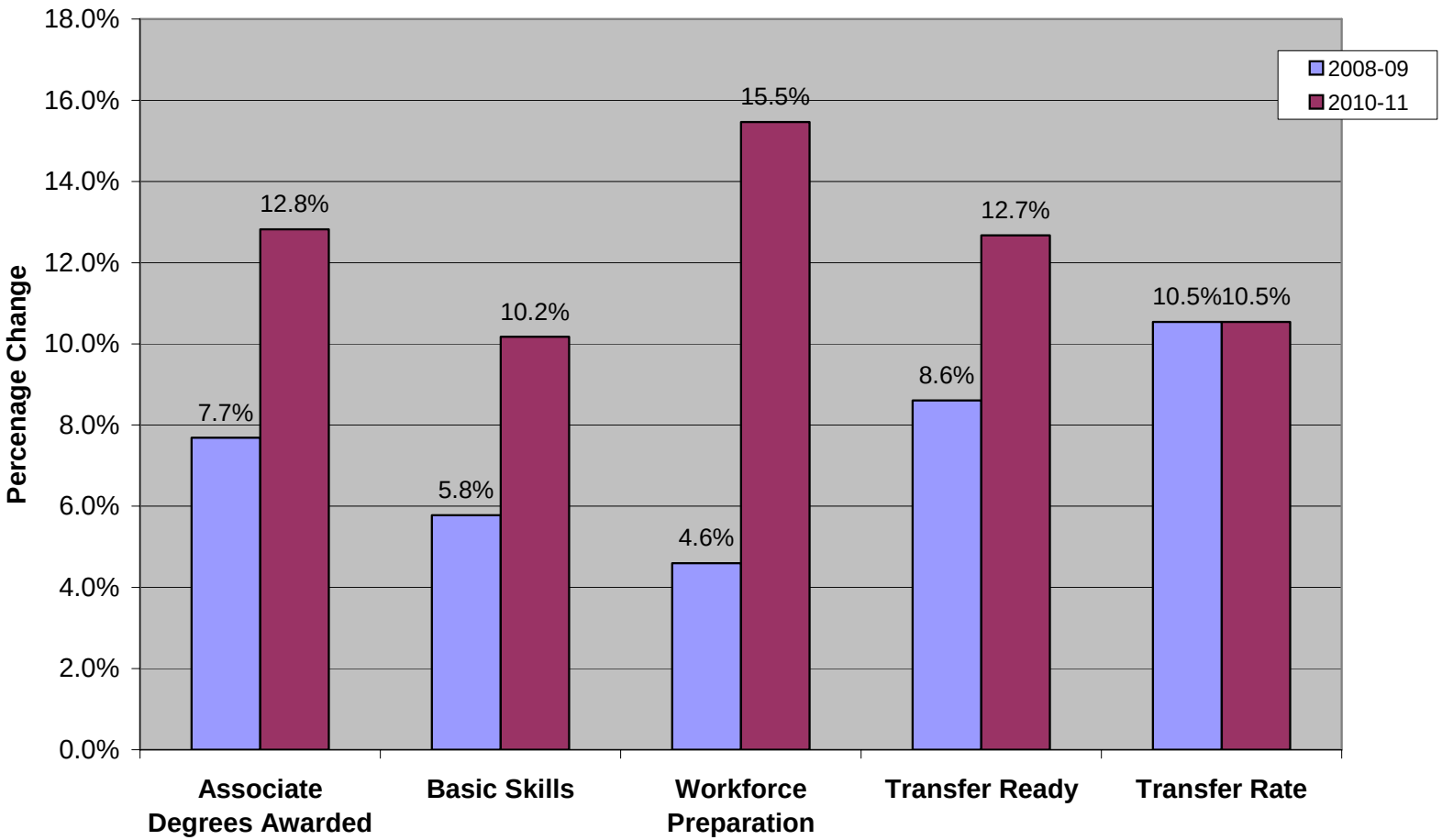
Per-Student Funding Increase in 2007-09 Budget



	UW	WSU	EWU	CWU	TESC	WWU	CTC
2008 vs '07	4.2%	7.1%	4.4%	8.9%	8.6%	6.7%	6.4%
2009 vs '08	3.0%	1.6%	2.6%	1.7%	1.1%	3.0%	2.6%
2009 vs '07	7.3%	8.8%	7.1%	10.8%	9.8%	9.8%	9.2%

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

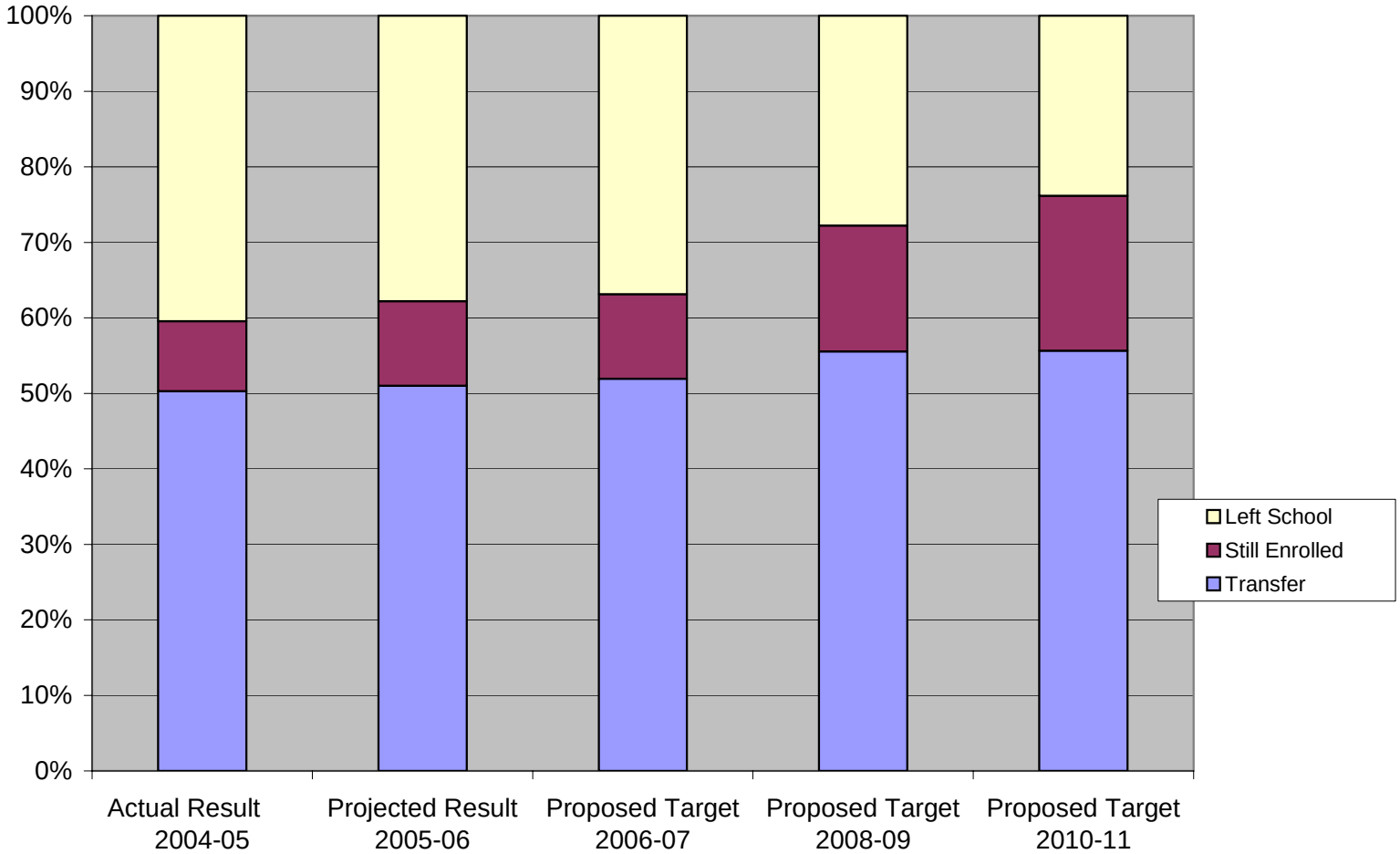
Targets Proposed by SBCTC:
Increase from most recent actual result



WASHINGTON HIGHER EDUCATION COORDINATING BOARD

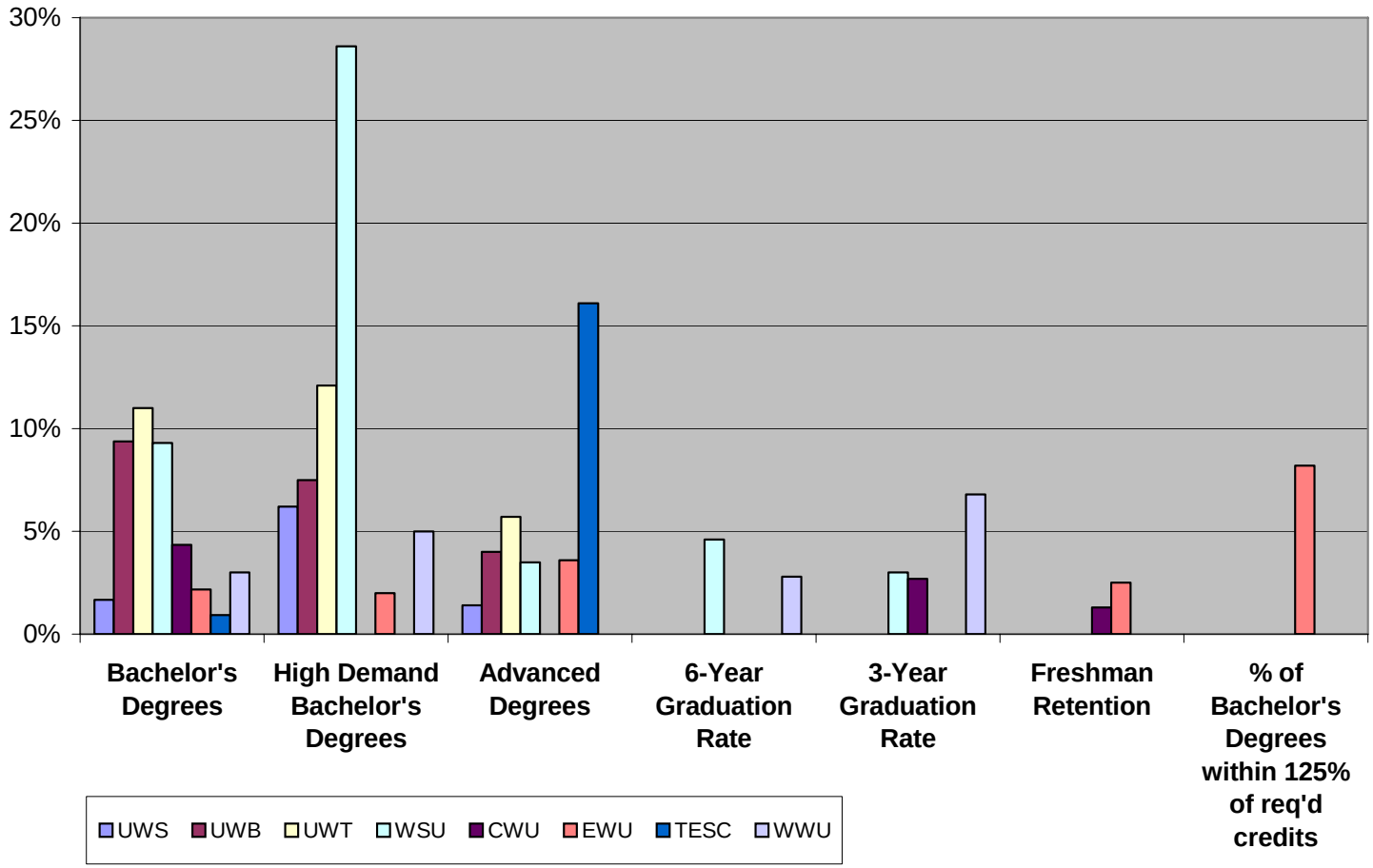
Proposed Target Focus:

3-Year Transfer Rate



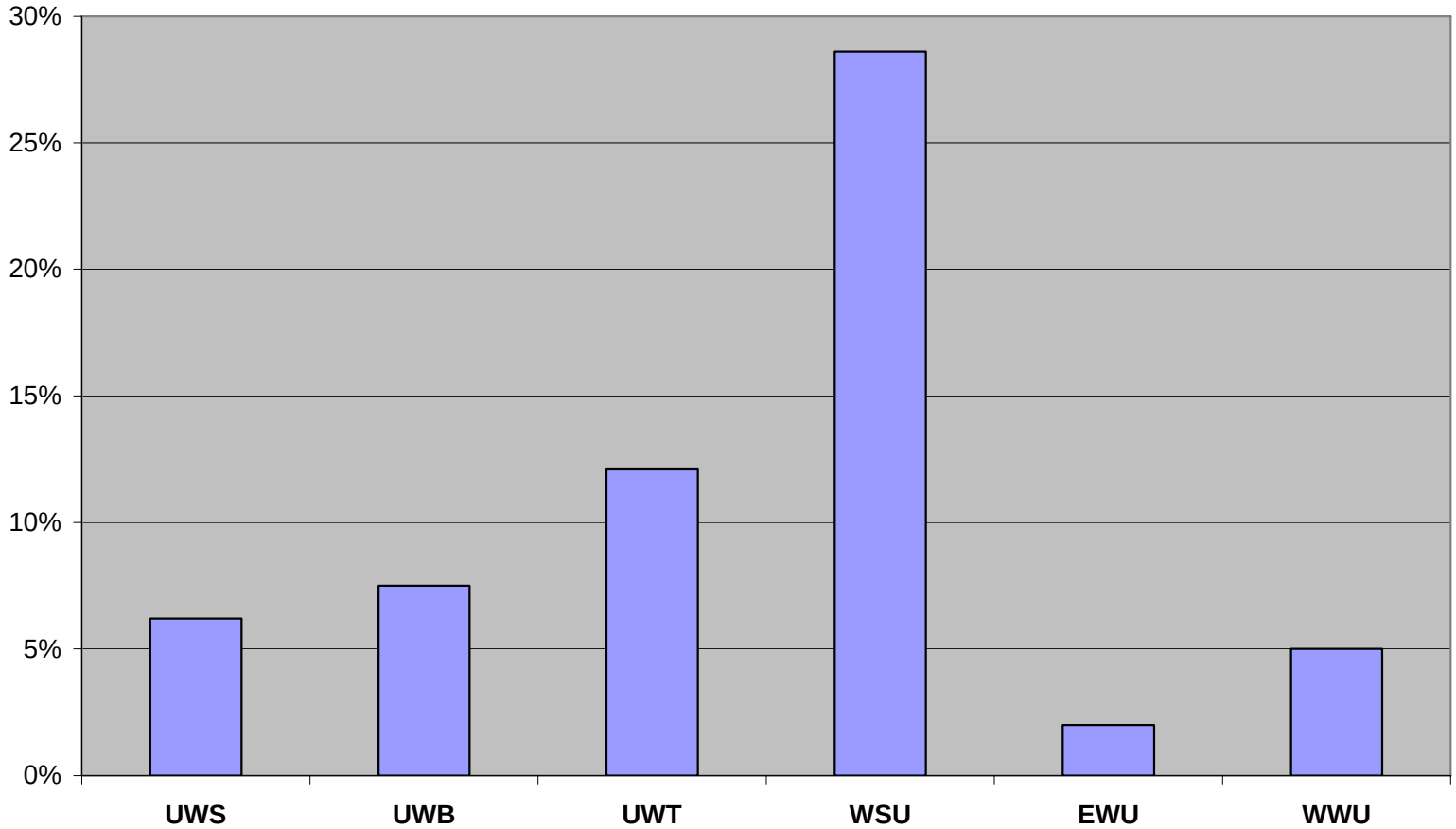
WASHINGTON HIGHER EDUCATION COORDINATING BOARD

Magnitude of change from Current to Proposed Targets, 2010-11



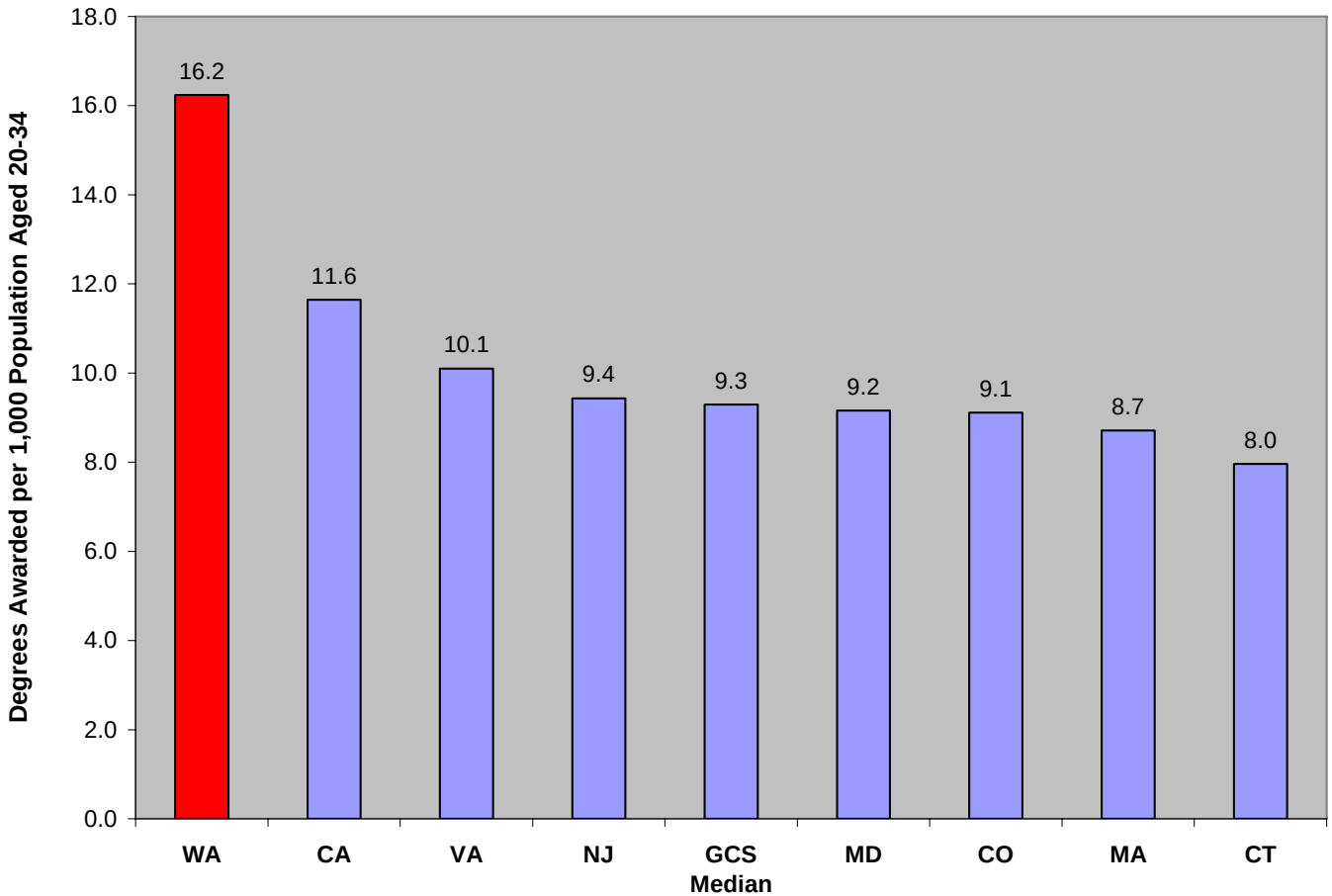
WASHINGTON HIGHER EDUCATION COORDINATING BOARD

Proposed Target Focus:
High-Demand Bachelor's Degrees Increase from Current Target



WASHINGTON HIGHER EDUCATION COORDINATING BOARD

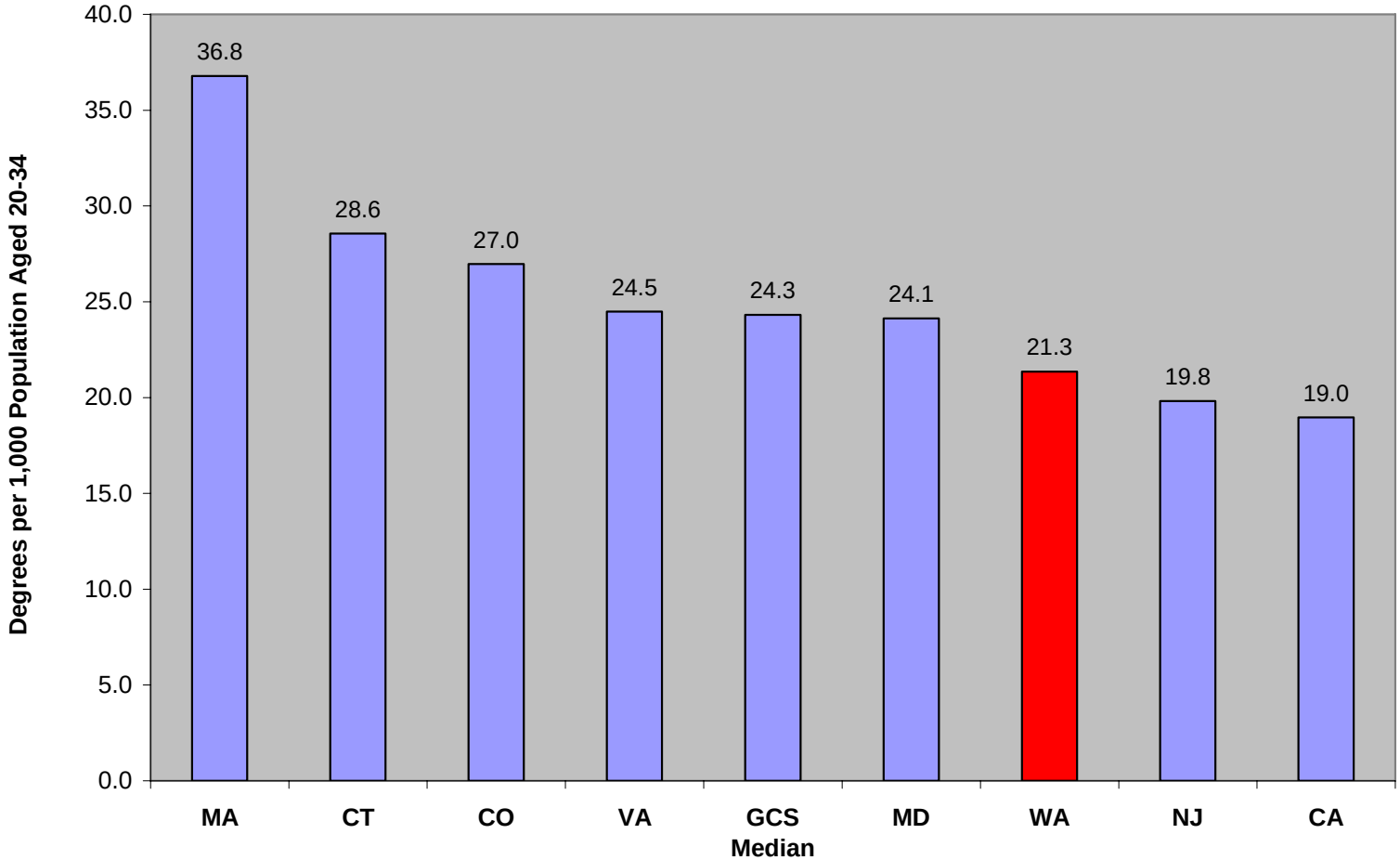
Benchmarking Global Challenge States: Associate Degree Production, 2005-06



Source: IPEDS

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

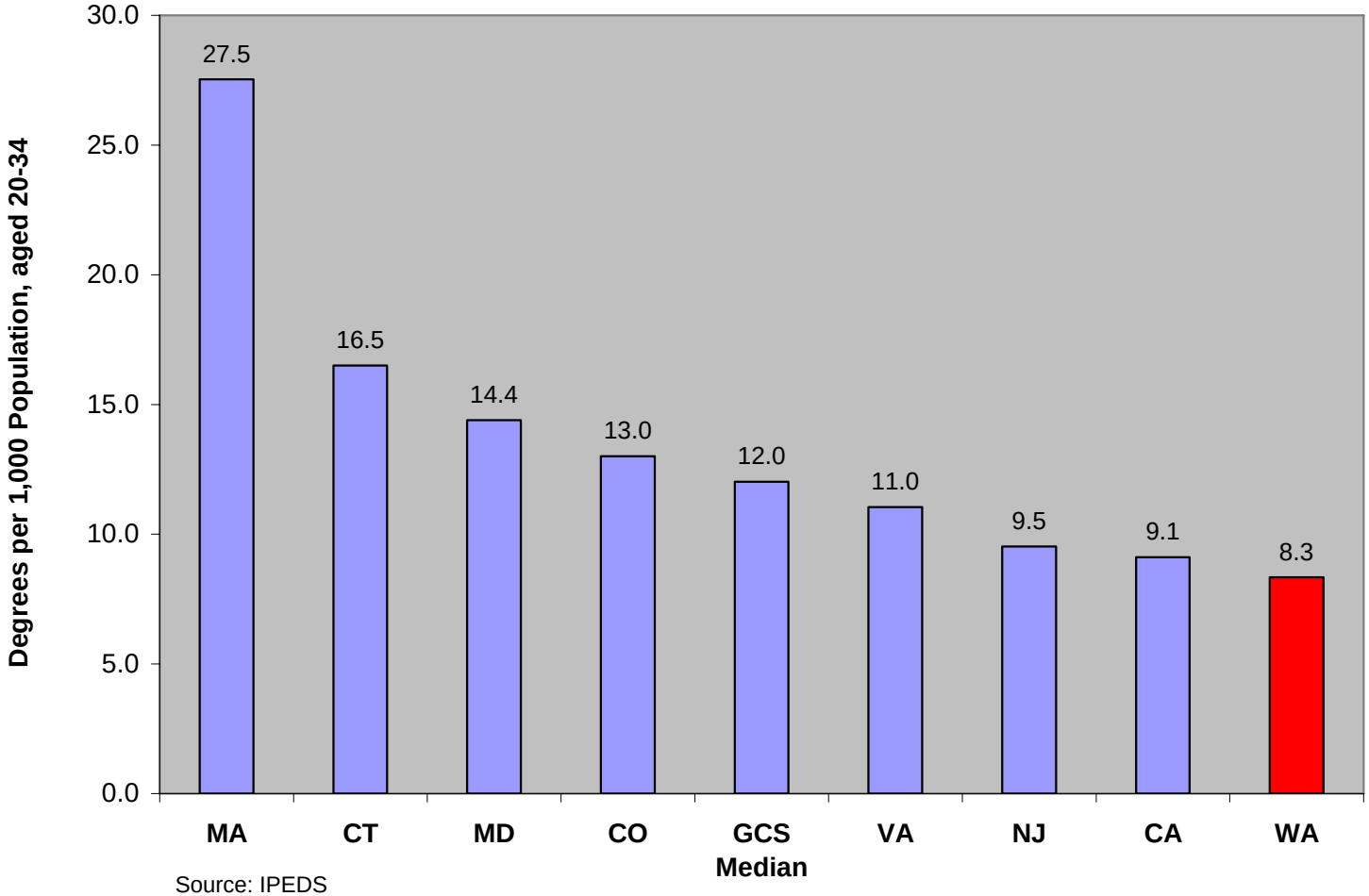
Benchmarking Global Challenge States: Bachelor's Degree Production, 2005-06



Source: IPEDS

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

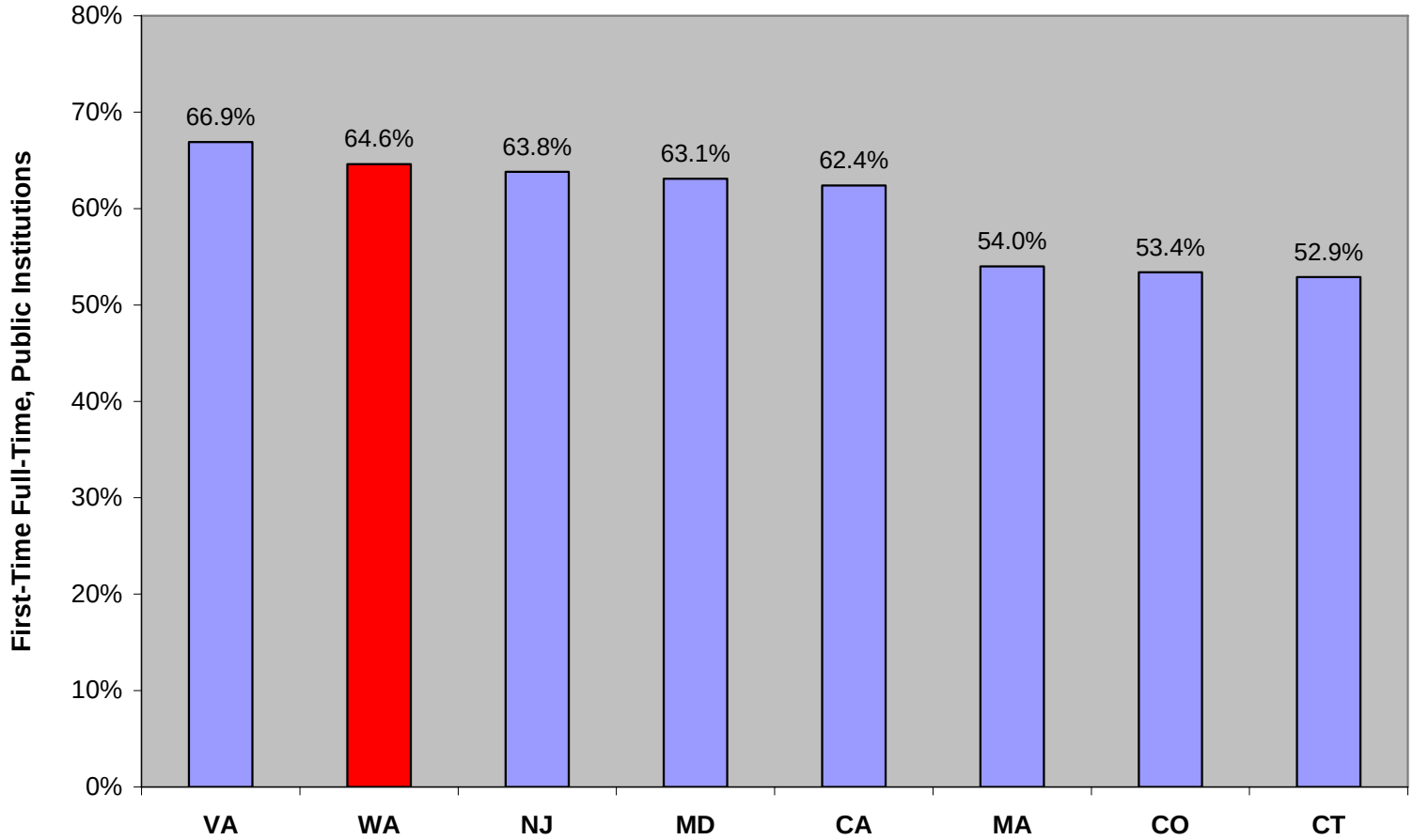
Benchmarking Global Challenge States: Advanced Degree Production, 2005-06



Source: IPEDS

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

Benchmarking Global Challenge States: Freshman Graduation Rates, 2005-06



Source: IPEDS

WASHINGTON
HIGHER EDUCATION
COORDINATING BOARD

WE HELP STUDENTS SUCCEED

WASHINGTON HIGHER EDUCATION COORDINATING BOARD

September 2007

DRAFT: Policy Brief

Gender Equity in Academic Programs at Washington's Public Four-Year Colleges and Universities

Summary

This policy brief explores gender equity in science and technology, engineering, mathematics, (STEM) and health sciences programs. It explores why relatively few female students earn degrees in STEM fields and few men earn degrees in health sciences fields. The report also identifies policy options that would help achieve a more equitable gender distribution in degree conferment rates.

Findings include the following:

- Male and female students are equally prepared to pursue postsecondary education in STEM and health science fields.
- High school students exhibit a high degree of vocational self-segregation by gender when asked to identify probable major fields; patterns that persist through their college experience.
- Women who take STEM courses as college freshmen are less likely to major in those fields than their male counterparts. Similarly, men who take courses in the pre-med/health sciences cluster are less likely to major in those subjects than are female students.
- Despite the recent growth of female doctoral graduates in STEM fields, the percentage of female faculty in these departments remains low.
- Women working in STEM fields earn a higher percentage of what men earn than women do in non-STEM fields, but wage parity has not yet been achieved in STEM fields or in health services.

Policy initiatives with the greatest potential for effectiveness are those that (1) raise student awareness of STEM and health sciences career opportunities, and (2) increase faculty diversity in STEM and health science departments.

Background

In December 2006, the Higher Education Coordinating Board (HECB) released a report on gender equity in higher education.[1] The report looked at gender equity in student services, athletics, and academic programs. At a subsequent HECB meeting, Board members took particular interest in the report's academic programs analysis and directed staff to conduct further analysis. This policy brief summarizes the results of that research.

Table 1

Program areas in which one or Washington public four-year institutions disproportionately awarded degrees to:

Female Students	Male Students
Family and consumer sciences/human sciences	Computer and information sciences
Health professions and related clinical sciences	Engineering technologies/technicians
Education	Engineering
Public administration and social service professions	Mathematics and statistics
Psychology	Business, management, and marketing
Visual and performing arts	Architecture and related services
Foreign languages, literatures, and linguistics	Physical sciences
Area, ethnic, cultural, and gender studies	Parks, recreation, leisure, and fitness studies
Communication, journalism, and related programs	History
	Security and protective services
	Philosophy and religious studies
	Social sciences

Note: Programs in italics are highly disproportionate (variance of 20 percentage points or more from institutional mean). Other programs are substantial disproportionate (10-20 percentage point variance).

Source: HECB, *Gender Equity in Higher Education*, http://www.hecb.wa.gov/research/issues/gender.asp.

The 2006 report found that among Washington's five public baccalaureate universities (University of Washington, Washington State University, Eastern Washington University, Central Washington University, and Western Washington University), 81 program areas confer 50 or more bachelor's degrees[2]. Of those 81 major program areas, 45 (56 percent) are highly or substantially disproportionate in the awarding of degrees to male and female students, with 23 programs dominated by male students, and 22 dominated by female students. (Table 1 lists the program areas that exhibit disproportionate degree conferment rates.)

[1] Washington Higher Education Coordinating Board (2006), *Gender Equity in Higher Education*, Olympia, Washington. See http://www.hecb.wa.gov/research/issues/gender.asp.

[2] The Evergreen State College was not included in the analysis because the institution reports all degrees in the same major subject area, Liberal Arts/Interdisciplinary Studies.

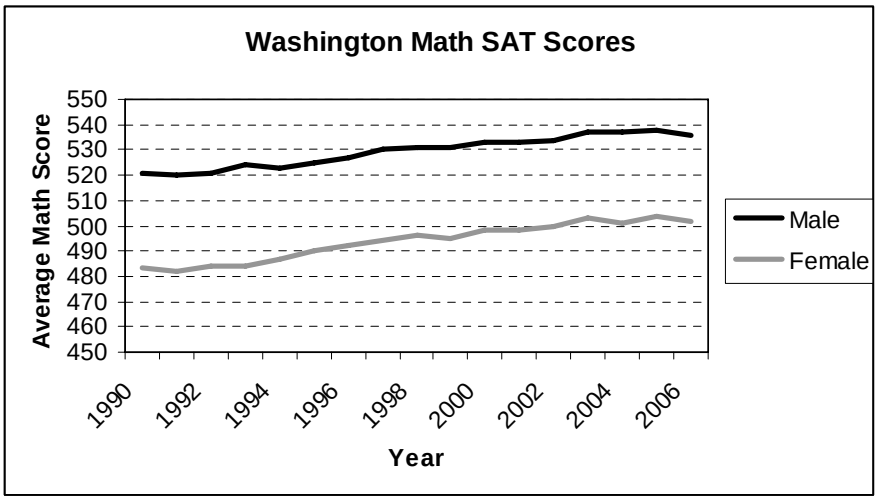
The HECB asked staff to examine why so many major programs exhibit disproportionate degree conferment rates, and also identify policy and program options for promoting greater gender equity. The Board was particularly concerned about academic fields that are in high demand in the state's economy, including science and technology, engineering, mathematics, and health sciences fields. A set of research questions was identified and are found in bold at the beginning of each section of this report.

Preparation

Are Washington's male and female students equally academically prepared to take science, technology, engineering and math (STEM) or health sciences courses when they enter college?

Washington State has only recently defined the skills, knowledge, and abilities that constitute college readiness in science and mathematics.[3] Statewide assessment information on math and science college readiness, based on these new definitions, does not yet exist. In lieu of assessment results based on state college readiness standards, researchers often turn to standardized tests such as the science and math National Assessment of Educational Progress (NAEP), and college entrance exams - math SAT and science and math ACT scores. The college entrance exams are relevant because they zero in on the students that intend to go to college. In 2005-06, 54 percent of Washington high school graduates took the SAT and 15 percent took the ACT.

Figure 1



Source: College Board, *Washington State Profile Report*, http://www.collegeboard.com/ prod_downloads/about/ news_info/cbsenior/yr2006/ washington-2006.pdf

[3] For information about the math readiness standards, go to http://www.transitionmathproject.org. For the science readiness standards, go to http://www.learningconnections.org/clc/hecb.htm.

On all of these standardized tests, male students scored higher than female students. The test score gaps were small, but they were steady and persistent (see Figure 1). The test score gap exists at both the national and statewide levels. For 2005-06, the average male student score on the math SAT in Washington exceeded the average female score by 38 points (a 7.4 percent gap), the math ACT gap was 7.7 percent, the science ACT gap was 6.4 percent, and the math and science advanced placement gap was 7.3 percent.

Complicating the matter further is the apparent lack of a strong correlation between aptitude for math and science in high school expressed in standardized tests, and later student success in college courses and science and engineering careers. A study looking at mean college GPAs for engineering and physics majors at MIT found that gender differences in math SAT scores did not translate into differences in classroom performance.[4] Another study found that when math SAT scores are matched, female students go on to earn higher grades in college mathematics classes.[5] Finally, a study found that less than one-third of men working in STEM fields were found to have math SAT scores above 650 (800 is the maximum score on the test).[6]

Researchers continue to posit theories on why standardized tests appear to systematically under-estimate female student achievement in science and math courses, and later college and career success in these fields (relative to that of male students). One theory is that the tests may be gender biased. Analysis of test items finds that many items show performance disparities by sex, making it possible to design a test that favors one gender or another by including items that favor that gender.[7] Another theory suggests that female students may be at a disadvantage vis-à-vis their male counterparts when asked to come up with "clever and speedy" applications of mathematical skills to unfamiliar problems and circumstances, and that female students tend toward a more reflective approach to mathematical problem solving that takes more time (thereby increasing time pressures on a timed test). This theory would be consistent with female students doing better than male students in classroom math and science exams on familiar and practiced concepts, and not as well on standardized tests.

Analysis of a national sample of high school transcripts bears this out; and in fact, suggests that female students may have a slight edge over their male counterparts with regard to math and science. Female high school graduates have recently surpassed male graduates in completing rigorous curricula, earning more mathematics and science credits and higher math and science GPAs.[8]

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[4] Gallagher, A. (1998). "Gender and Antecedents of Performance in Mathematics Testing," *Teacher College Record*, V. 100, No. 2, Winter 1998, pp. 297-314.

[5] Spelke, E.S. (2005). "Sex Differences in Intrinsic Aptitude for Mathematics and Science? A Critical Review" *American Psychologist*, Vol. 60, No. 9, December 2005, pp. 950-958.

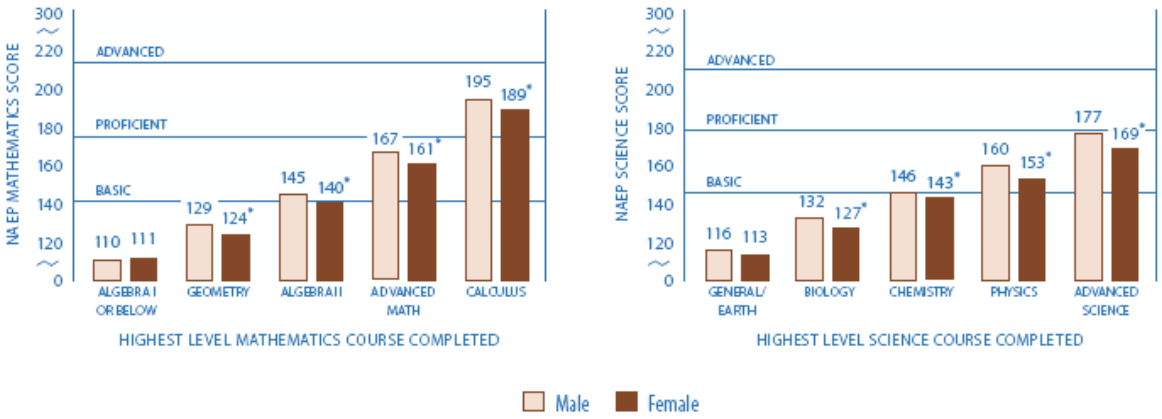
[6] National Academy of Sciences (2006), *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*. Washington, D.C.: National Academy Press.

[7] Spelke, E.S. (2005). *Supra*.

[8] National Center for Education Statistics (2007). *The Nation's Report Card, America's High School Graduates: Results from the 2005 High School Transcript Study*. See http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007467

So what happens when we look at standardized test scores and control for high school courses taken and GPA? As Figure 2 indicates, even when you control for the highest math and science course completed, male students outscore female students on the NAEP test. The same is true when you control for math and science GPA.

Figure 2
NAEP Mathematics and Science Scores
by Highest Course Completed and Gender



*Significantly different (p<.05) from males.

NOTE: Advanced mathematics includes courses, other than calculus, that are generally taken after algebra II (e.g., AP statistics and precalculus). Advanced science courses are courses that contain advanced content (like AP biology, IB chemistry, AP physics, etc.) or are considered second-year courses (chemistry II, advanced biology, etc.).

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, High School Transcript Study (HSTS), 2005.

Table 2

Mathematics Course-Taking Patterns
Washington SAT-Takers
2006

Years of Study	Test-Takers Number	Test-Takers Percent	Percent by Gender Male	Percent by Gender Female
More than 4 years	3,408	12%	50%	50%
4 years	16,461	57%	46%	54%
3 years	7,545	26%	42%	58%
2 years	1,139	4%	44%	56%
1 year	105	0%	44%	56%
1/2 year or less	65	0%	48%	52%
No response	5,427			
Course Work				
Algebra	26,275	92%	45%	55%
Geometry	25,502	90%	45%	55%
Precalculus	17,457	61%	46%	54%
Calculus	16,400	58%	47%	53%
Other Math Courses	8,842	31%	50%	50%
Computer Math	6,731	24%	42%	58%
AP/Honors Courses	7,708	27%	47%	53%

Note: 54 percent of all test-takers were female.
Source: The College Board, *State Profile Report: Washington, 2006*.

Table 3

Natural Sciences Course-Taking Patterns
Washington SAT-Takers
2006

Years of Study	Test-Takers Number	Test-Takers Percent	Percent by Gender Male	Percent by Gender Female
More than 4 years	1,578	6%	46%	54%
4 years	11,294	40%	46%	54%
3 years	10,167	36%	43%	57%
2 years	4,530	16%	47%	53%
1 year	689	2%	51%	49%
1/2 year or less	239	1%	45%	55%
No response	5,653			
Course Work				
Biology	26,690	94%	44%	56%
Chemistry	22,893	80%	45%	55%
Physics	13,390	47%	51%	49%
Geology, Earth, or Space Science	10,951	38%	45%	55%
Other Sciences	12,635	44%	42%	58%
AP/Honors Courses	6,109	21%	45%	55%

Note: 54 percent of all test-takers were female.
Source: The College Board, *State Profile Report: Washington, 2006*.

The 54 percent of Washington high school graduates that took the SAT exam in 2006 were asked about their course-taking behavior. This self-reported questionnaire data provides information on which math and science courses students planning to attend college have taken and plan to take in high school. The results are summarized in Tables 2 and 3.

These tables indicate that female students are taking upper-level science and math courses (with the exception of physics) at or near their representation in the test-taking population (54 percent of Washington SAT-takers are female), including AP/honors courses. Average grade point averages for mathematics self-reported by male and female test-takers are equal (3.2), and are slightly higher for female students for natural sciences (3.4 for female test-takers and 3.3 for male test-takers).[9]

The two main measures of math and science college readiness yield contradictory information on gender equity. Females in Washington state and nationally, appear to score consistently and slightly lower than their male counterparts do on standardized assessments of math and science aptitude. But when math and science high school course-taking behavior and grades are analyzed, female students appear to have a slight edge over their male counterparts. Because common practice in college admissions is to consider both test scores and high school transcripts, the two may balance each other out. This yields the conclusion that male and female high school graduates in Washington are roughly equally prepared to complete college-level math and science courses.

Interest

Are male and female lower-division students equally likely to take STEM and health sciences courses? Why do students who take introductory courses in these fields decide whether or not to major in them?

Despite the apparent rough parity in the academic preparation of male and female students for college-level work in the STEM and health sciences fields, the choices students make regarding college and careers seem to diverge before getting to college. National data from 2004 indicated that about 26 percent of female college freshmen intended to major in science and engineering fields, compared to 41 percent of freshman males.[10] Male freshmen are predisposed to major in every field of science and engineering except the biological and social sciences.

A look at Washington SAT-takers in 2005 shows that, even before getting to college, college-bound high school students are starting to make academic and career choices in a gender-skewed manner. Most college major fields indicate interest from either predominately male or predominantly female students. As Figure 3 indicates, only about one-third of intended major fields show rough proportional equity (less than 10 percentage point deviation) by gender.

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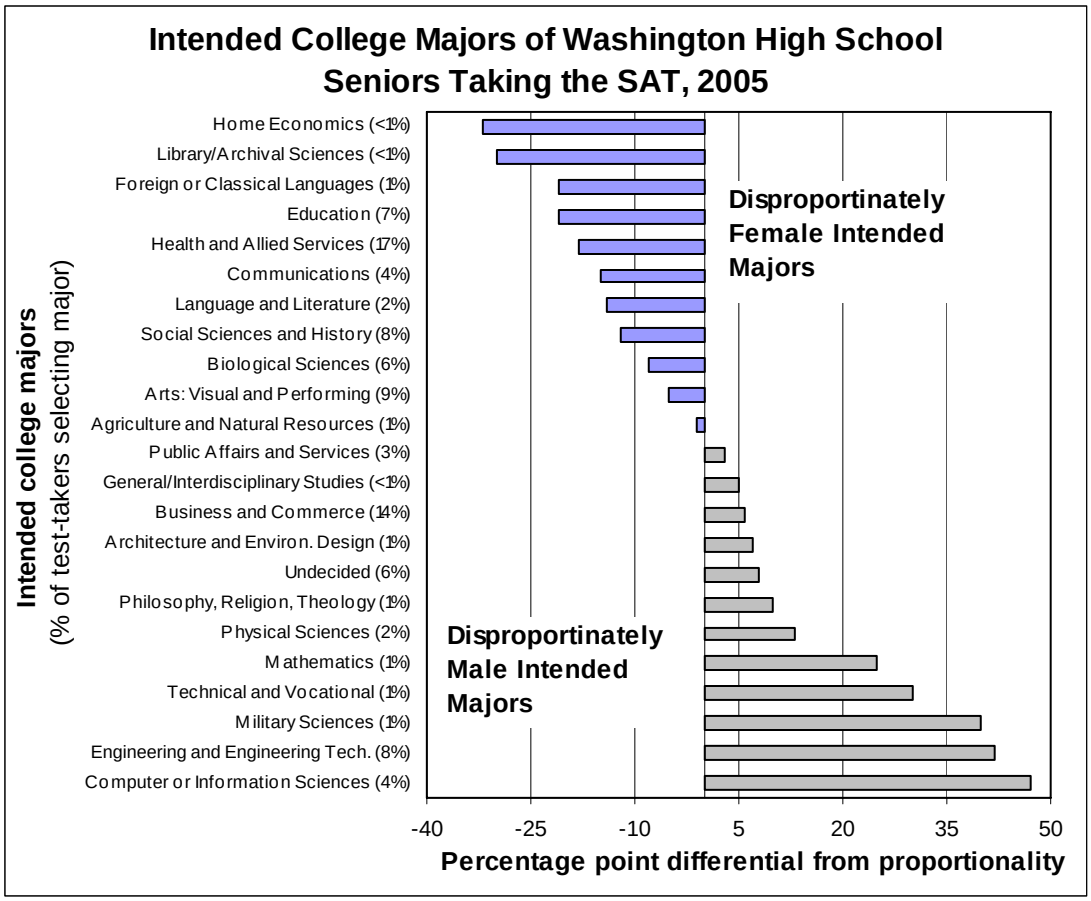
[9] The College Board (2006), *State Profile Report: Washington 2006.* See http://www.collegeboard.com/prod_downloads/about/news_info/cbsenior/yr2006/washington-2006.pdf.

[10] Based on data from the Higher Education Research Institute at UCLA, *Survey of American Freshmen*, as presented in National Science Foundation (2004), *Women, Minorities, and Persons with Disabilities in Science and Engineering, op. cit.*

Figure 3



Source: The College Board, *State Profile Report: Washington 2005*.

Figure 3 shows that by the senior year of high school when most test-takers sit for the SAT, intended college majors are highly skewed by gender for many fields of study. The percentages following each major are the percentage of all test-takers who selected the intended major on the questionnaire. The length of the bars indicates the percentage point deviation from proportionality: 44 percent of all test takers indicated an intended major were male, and 56 percent were female, so the bars represent the percentage point deviation from those benchmarks.

Table 4 shows the distribution for the fields of study currently in high demand by Washington employers. The STEM fields -- computer science, engineering, mathematics, physical and biological sciences -- are grouped together.

Table 4
Intention of Washington SAT-Takers to Major in High Demand Fields, 2005

	Test-Takers		Percent	
Intended Field of Study	**Number**	**Percent**	**Male**	**Female**
STEM Fields	5,168	21%	70%	30%
Health and Allied Services	4,220	17%	26%	74%
Education	1,806	7%	23%	77%

Source: The College Board, *State Profile Report: Washington 2005*.

Table 4 shows that nearly half of all high school students are interested in majoring in three high-demand fields of study, but their interest is highly skewed by gender. Convincing more female students to pursue the STEM fields and more male students to pursue health services and education may be an effective strategy for meeting employer demand for qualified workers in these fields.

Persistence

Are male and female students in Washington who take introductory courses in STEM and health sciences equally likely to persist and take additional courses and go on to get a degree in these fields? Have persistence rates changed over time?

National studies of student persistence in STEM fields by gender present a mixed picture that varies from study to study and for different fields within STEM. Engineering programs show higher rates of persistence for male students than for female students. This is particularly true for high-achieving students. One study found that only 29 percent of top undergraduate women remained in engineering programs, compared to 82 percent of top undergraduate men.[11]

The variables that affect persistence affect both men and women, but may affect women disproportionately. These variables include the presence of appropriate role models, student knowledge about engineering, and the student's willingness/ability to work long and stressful hours while managing other competing demands for his or her time. There is also a demographic factor that inhibits persistence of female students in all fields (not just STEM fields). Women comprise 60 percent of all students in the lowest income quartile, 62 percent of all students 40 and older, 62 percent of married or separated students with children or dependents, and 69 percent of single-parent students.[12]

Finally, the structure of the science and engineering curriculum itself may inhibit students from testing the waters in a field and from persisting in that field. On many campuses, students are not presented with a clear picture of the field of engineering and its applications until far into the

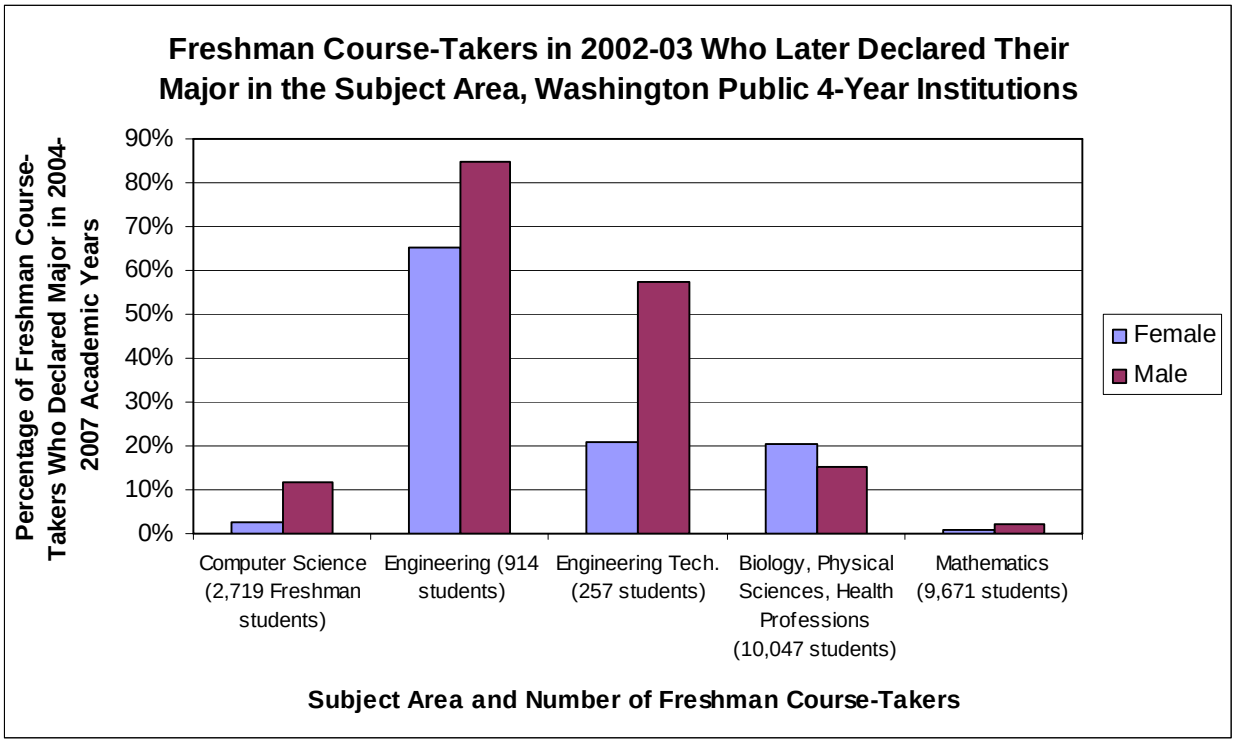
[11] National Research Council of the National Academies (2006). *To Recruit and Advance: Women Students and Faculty in Science and Engineering*, pages 46-50.

[12] *ibid*, page 51.

curriculum, often the second or third year of study. Women and under-represented minorities are less likely to be exposed to engineering as a profession prior to their first foray into the field, and may find the curriculum uninviting.[13]

To look at persistence rates by gender for students at Washington public 4-year institutions, HECB staff conducted an analysis using the state's Public Centralized Higher Education Enrollment System (PCHEES) database. First, a cohort of new freshman students who were taking STEM and health sciences courses in 2002-03 was identified. The system was queried to determine whether these students subsequently declared a major in the same fields in which they had taken courses as freshmen. The results are broken out by gender and presented in Figure 4. (Note that The Evergreen State College was not included in the analysis because all students major in the same Liberal Arts and Sciences academic field of study.)

Figure 4



Source: HECB analysis using PCHEES state data reporting system.

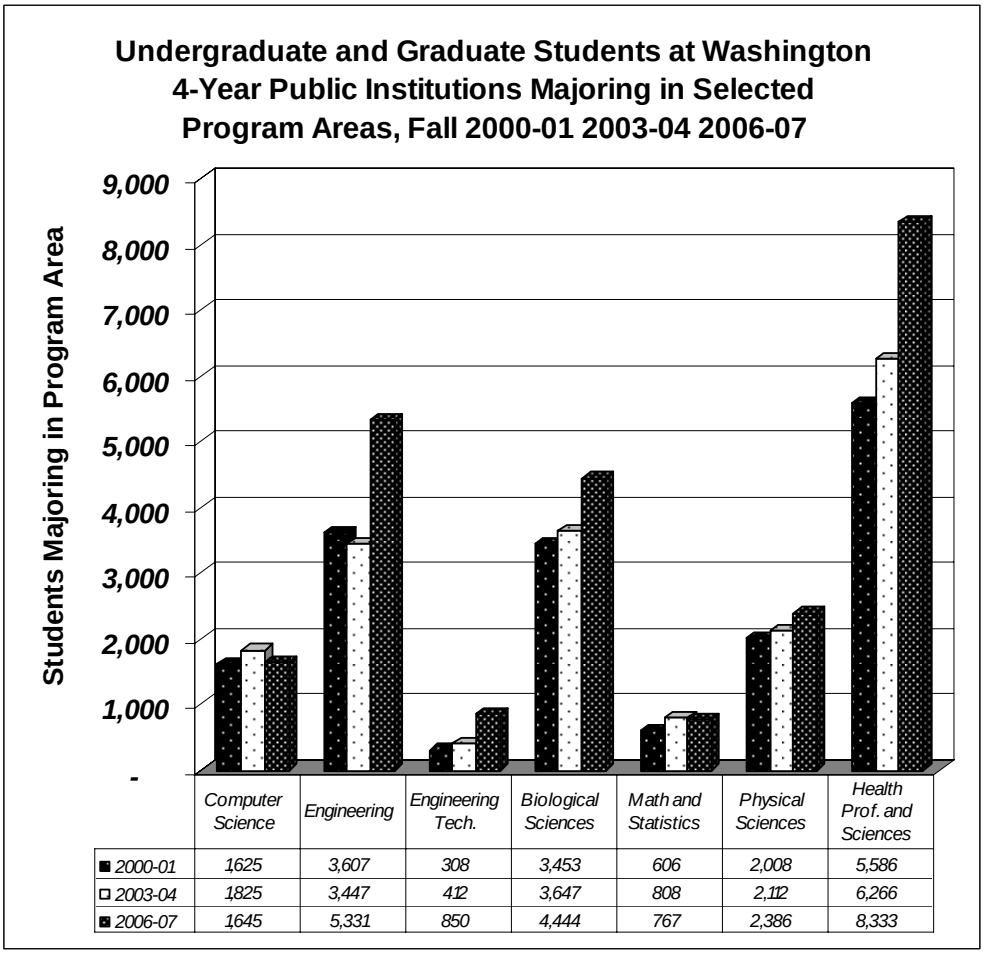
Many students take math and computer science courses as freshmen to support their studies in many other fields or to fulfill a distribution requirement, but they do not intend to major in math or computer science. This explains the low percentages of students who later choose to major in these subject areas. Biology, physical sciences, and health professions were grouped together because nurses, pre-med students, and other health professionals typically take biology and chemistry as freshmen. This is the only area studied where female students more often than male students tend to major in the field they first started studying as freshmen. Overall, more female than male students are majoring in the biological sciences and the health professions (including nursing).

[13] National Research Council of the National Academies (2006). *Supra*, page 53.

Male students who took computer science, engineering, engineering technology, and mathematics courses as freshmen were more likely than their female counterparts to later select those fields as majors. The chart indicates that most students (male and female) tend not to take engineering courses, even as freshmen, unless they intend to major in the subject. Based on the chart, gender inequality in student persistence is highest for computer science and engineering technology.

Over the last few years, the Washington State Legislature has funded the expansion of programs in the STEM and health sciences fields under its high-demand and math and science enrollment programs. HECB staff recently conducted a second analysis that looked at whether the increase in capacity has led to greater gender equalization of students majoring in the STEM and health sciences fields. Figure 5a shows the growth in the number of students majoring in these fields over the last few years, as a result of expanded capacity. Figure 5b shows that this expanded capacity has not led, in several instances, to greater proportionality by gender; and in some cases, the disparities have actually increased slightly. With the exception of engineering technology, biological sciences, and physical sciences, expanded capacity does not appear to have been accompanied by new strategies to recruit students that have not traditionally shown interest in these fields, at least with regard to gender.

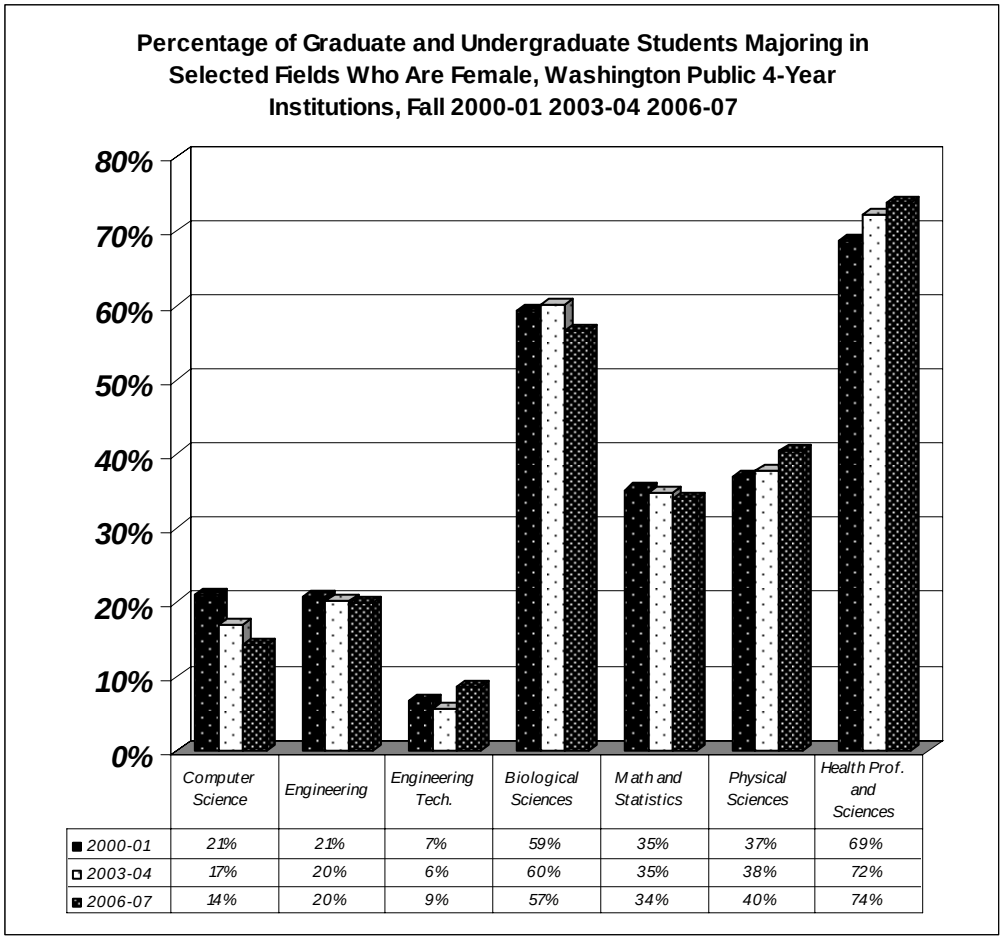
Figure 5a



	Computer Science	Engineering	Engineering Tech.	Biological Sciences	Math and Statistics	Physical Sciences	Health Prof. and Sciences
2000-01	1,625	3,607	308	3,453	606	2,008	5,586
2003-04	1,825	3,447	412	3,647	808	2,112	6,266
2006-07	1,645	5,331	850	4,444	767	2,386	8,333

Source: HECB analysis using PCHEES state data reporting system.

Figure 5b



	Computer Science	Engineering	Engineering Tech.	Biological Sciences	Math and Statistics	Physical Sciences	Health Prof. and Sciences
2000-01	21%	21%	7%	59%	35%	37%	69%
2003-04	17%	20%	6%	60%	35%	38%	72%
2006-07	14%	20%	9%	57%	34%	40%	74%

Source: HECB analysis using PCHEES state data reporting system.

Role Models

Do STEM and health sciences students persist at higher rates when they take courses taught by faculty of the same gender? What is the percentage in Washington of female faculty teaching in STEM fields, and male faculty teaching in the health sciences? How have these percentages changed recently? What are the faculty hiring pipeline trends and capacity issues (doctorate degree conferment rates, progression toward full professorship) in these fields?

To understand the importance of role models in promoting retention of female students, one needs to probe further into why female students do not pursue and persist in the STEM fields at rates similar to male students. Studies indicate that high school preparation, ability, and effort are not key determinates of persistence in STEM fields. Rather, the educational climate of science and engineering departments seems to matter most.[14]

[14] National Academy of Sciences (2006). *Supra*, p. 3-13.

The climate issues manifest themselves early on in the undergraduate student's experience. We know this because once students have declared themselves science and engineering majors, they are equally likely to complete the major (about 60 percent for both male and female students). What inhibits many students from selecting a field of study is role incongruity--a perceived difference between the stereotypical characteristics of their gender (and by extension, of themselves) and the attributes thought to be required for success in the field.[15]

There are also differences between male and female students in what attracts them to science and engineering. Women are almost twice as likely as men to have chosen science or engineering through the influence of a role model. Men are twice as likely as women to cite their skills in math and science as a primary reason for selecting a science or engineering major.[16]

Studies of why students leave science and engineering once they have selected it as their major field of study, also reveal gender differences. Female students cite getting a better education in another major, poor teaching, and poor career options. Male students cite course overload, loss of confidence, financial problems, and issues with competition.[17] A 1997 University of Washington study cited the importance of advising and a supportive community in the retention of female science, engineering, and mathematics majors.[18]

Given that the evidence shows that female students are turned off to STEM fields by a perceived gender role incongruity, attracted to the field by the influence of a role model, and fail to persist in the field when they perceive poor teaching, poor career options, and/or inadequate advising and support, it would follow that providing STEM students with more and better role models would improve the educational climate and increase persistence rates. Providing better role models for female students would focus precisely on the factors that inhibit female student selection of, and persistence in, STEM fields.

There is scientific evidence indicating that the academic environment, including the presence of a female instructor, can mediate students' automatic gender stereotypic beliefs. A 2004 University of Massachusetts study by Dasgupta and Asgari showed that, not surprisingly, women in male-dominated science and math classes at a coed college exhibited increased stereotypic beliefs than science and math students who attended a women's college. Importantly, this effect was mediated when the professor at the coed institution was female.[19]. This is important because the study results show that student pre-conceptions about gender-appropriate careers and leadership roles can be mediated in a coeducational environment by exposure to women in leadership positions. Presumably, the same is true for men in reverse.

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[15] i*bid., p. 3-14.*

[16] i*bid., p. 3-14.*

[17] i*bid., p. 3-14.*

[18] SG Brainard and L Carlin (1997). A Longitudinal Study of Undergraduate Women in Engineering and Science. http://fie.engrng.pitt.edu/fie97/papers/1252.pdf.

[19] N. Dasgupta and S. Asgari, "Seeing Is Believing: Exposure to Counterstereotypic Women Leaders and Its Effect on the Malleability of Automatic Gender Stereotyping." *Journal of Experimental Social Psychology*, Vol. 40, Issue 5, pp. 642-658.

The percentage of female faculty in STEM fields is low, ranging from 10 to 30 percent nationally across the science and engineering disciplines. The number is lowest in engineering, where nationwide, female faculty make up just 10 percent of all tenured and tenure track faculty.

At the University of Washington (UW), the state's largest institution, the female faculty ratios are similar to the national averages, although they are slightly better in engineering. The figures are presented in Table 5.

Table 5

University of Washington
Tenured and Tenure-Track Faculty in Selected Colleges and Departments,

College/Department	Total	% Female	College/Department	Total	% Female
College of Engineering	208	16%	*College of Arts and Sciences*	793	34%
Industrial Engineering	9	44%	Biology	36	31%
Civil and Environmental Eng.	33	21%	Astronomy	11	27%
Material Science and Eng.	10	20%	Statistics	20	25%
Bioengineering	10	20%	Atmospheric Sciences	16	19%
Electrical Engineering	38	16%	Mathematics	50	14%
Chemical Engineering	13	15%	Applied mathematics	9	11%
Computer Science and Eng.	43	9%	Earth and Space Science	22	9%
Mechanical Engineering	25	8%	Physics	44	9%
Aeronautics and Astronautics	18	6%	Chemistry	40	8%
School of Nursing	75	92%			
School of Public Health	119	36%			
School of Dentistry	57	32%	**Total UW-Seattle**	**3,051**	**32%**
School of Medicine	1,287	28%	**Total UW-Bothell**	**64**	**44%**
School of Pharmacy	35	26%	**Total UW-Tacoma**	**107**	**51%**

Source: UW Affirmative Action Reports, http://www.washington.edu/admin/eoo/AA_Reports.html

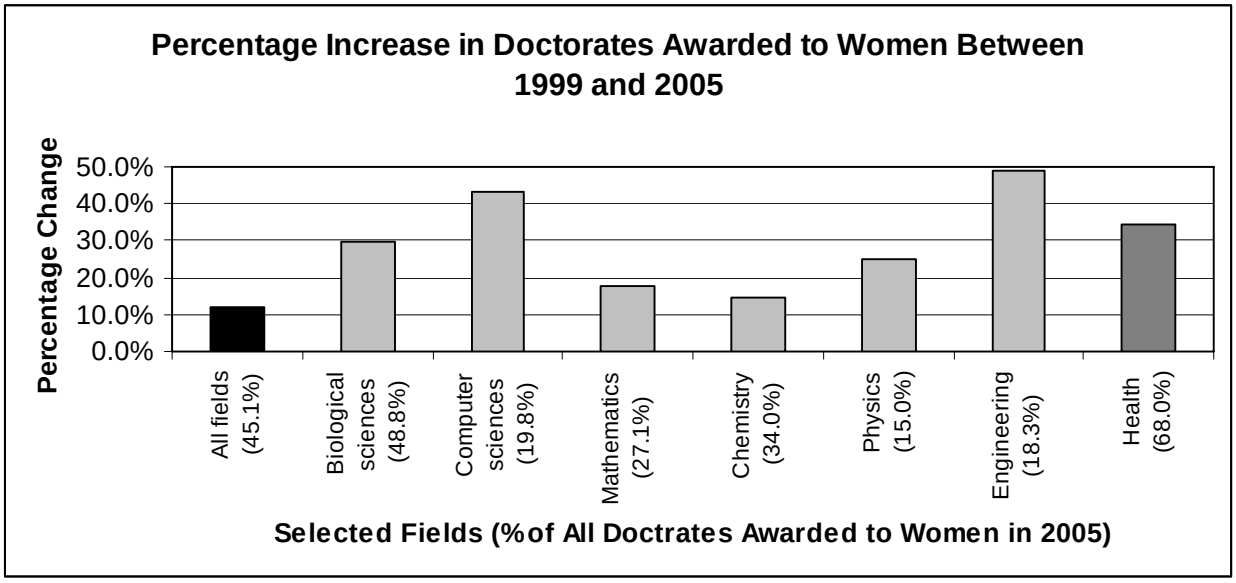
The percentage of women instructional faculty (in all subject areas and including non-tenure track faculty) is 41 percent across the six public institutions, ranging from 39 percent at the University of Washington to 49 percent at The Evergreen State College.[20]

Recruiting more women into faculty positions is inhibited by low percentages of women reaching the doctorate level in STEM fields (and men in health sciences fields). However, in all areas except health sciences, there have been dramatic improvements in the number of doctorates awarded to women in the last few years, as indicated in Figure 6. The percentage increase in doctorates awarded to women between 1996 and 2005 in the STEM fields indicated exceeded the overall percentage increase in doctorates awarded to women in all fields. In health sciences, over-representation of women doctorates increased during the period, making it more difficult to recruit men to some professorship positions, like nursing.

[20] Information is based on HECB analysis based on 2006-07 Common Data Set information provided by the institutions.

Nevertheless, it would seem appropriate for institutions to set a benchmark target for recruitment of new faculty that at least matched (if not exceeded) the gender distribution of doctorates awarded in the field. For example, a statistical disparity such as the one between the UW chemistry department (8 percent women tenure/tenure track faculty) and a 34 percent national doctoral award rate to women may signal a need for review and potentially modification of hiring procedures and practices.

Figure 6



Source: NSF Division of Science Resources Statistics, Survey of Earned Doctorates.

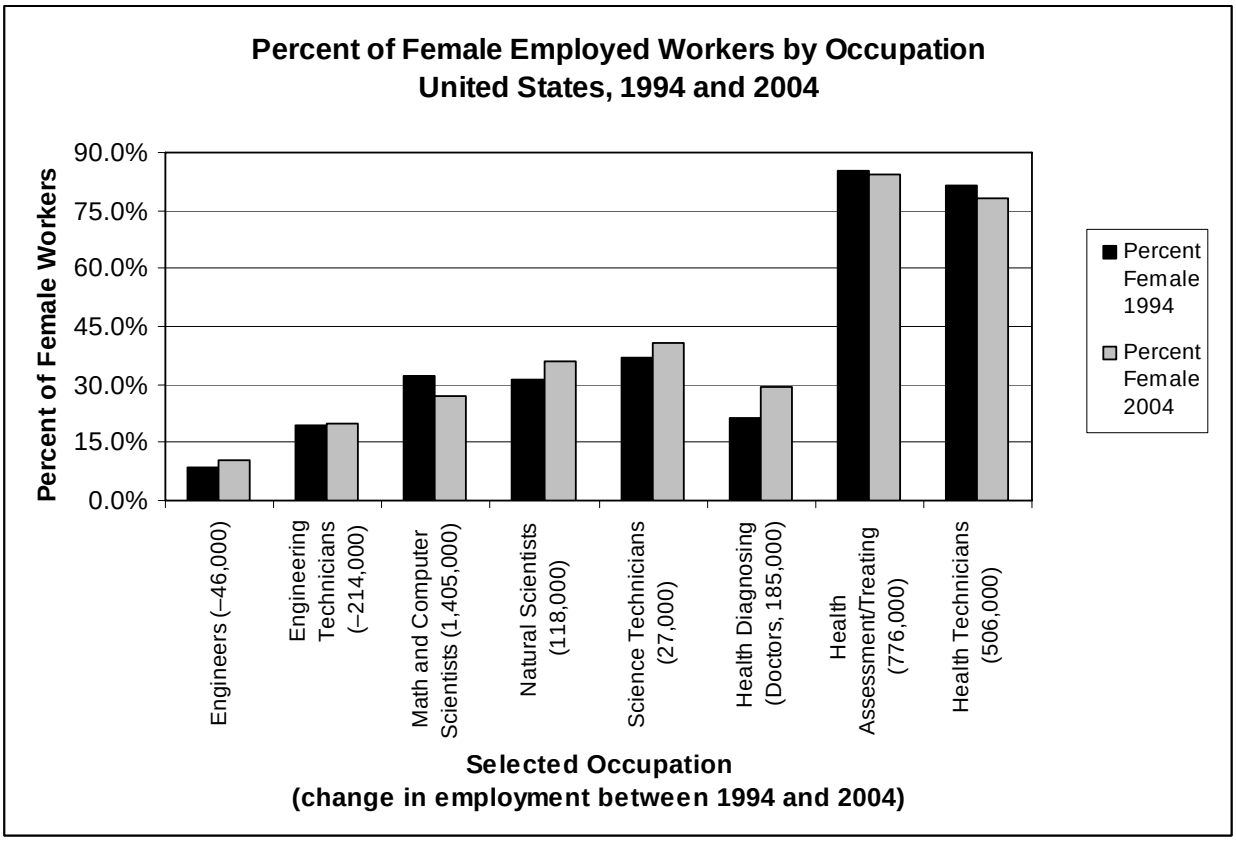
Outcomes

Are male and female graduates from Washington's STEM and Health Sciences programs equally likely to work in their field following graduation? Receive similar earnings? Continue their studies to achieve an advanced degree in their field?

Figure 7 shows national statistics indicating that the percentage of female professionals and managers working in the STEM fields and health diagnosing occupations is lower than that of men, as well as the overall percentage of female managers and professionals in all fields. The opposite is true in some of the health sciences professions where female nurses, therapists, and health technicians outnumber men.

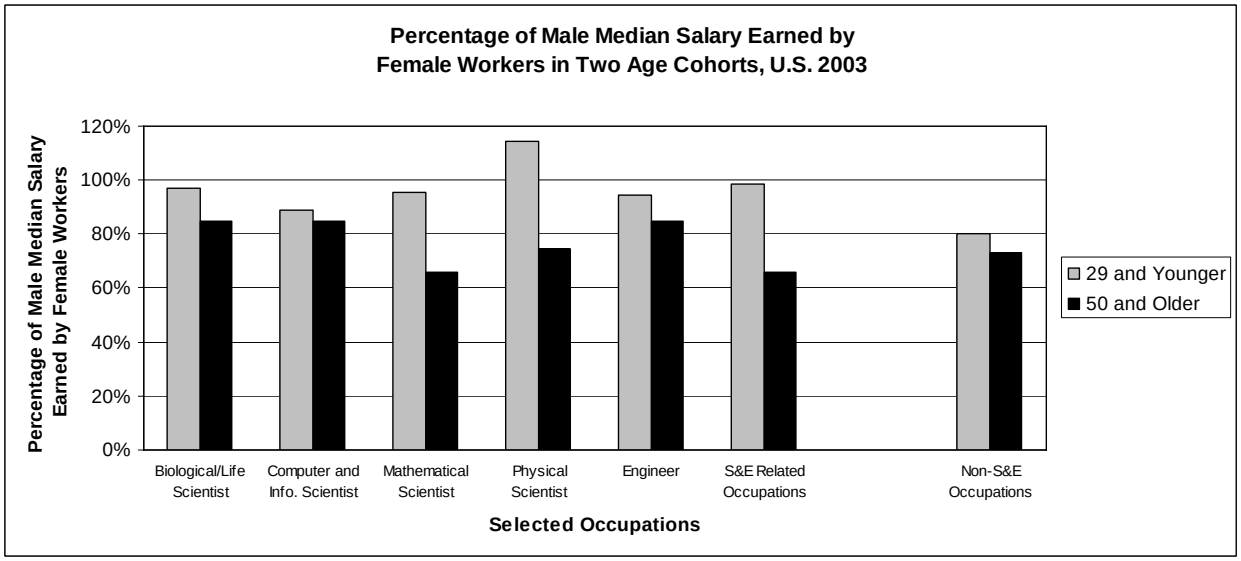
The figure also shows national-level changes in employed workers for selected occupational categories between 1994 and 2004, as well as changes in the percentage of female workers in each category over the period. The graph shows growth in all fields except engineering and engineering technicians over the 10-year period. Gains were made toward greater gender equity in each occupational category except for math and computer scientists, the category that experienced the largest total gain in employment, among those indicated. The largest percentage gain was for female workers in the health diagnosing occupations.

Figure 7



Source: NSF Division of Resources Statistics, from BLS Current Population Survey data.

Figure 8



Source: NSF Division of Resources Statistics, Scientists and Engineers Statistical Data System.

Figure 8 compares median female and male salaries for selected occupations. The grey bars indicate workers under age 29 and the black bars are for workers aged 50 and older. In each instance, younger female workers are showing greater wage parity with their male counterparts than older workers. This indicates either progress in wage parity for younger (recently hired) female workers or fewer opportunities for women to advance to higher paying jobs (the "glass ceiling"). It is possible that both explanations are happening simultaneously. Also of note is that wage parity with male counterparts in the 29-and-under age bracket is higher for all of the science and engineering occupations than for non-S&E occupations. This indicates that S&E jobs show greater gender pay equity than non-S&E jobs, at least for younger workers.

The wage parity picture in the health sciences is similar, even in occupations such as nursing and diagnostic support technicians that are dominated by female workers. According to the latest BLS Current Population Survey data, female registered nurses earn 90 cents for every dollar male nurses earn (90 percent of all registered nurses are female), and for physicians and surgeons (42 percent of all doctors are female) it is 72 cents on the dollar.[21]

HECB staff reviewed 2006 alumni survey data from the University of Washington and found that engineering, public health, and nursing baccalaureate students all earned more during their first year after college than other UW graduates, and those increased earnings were retained by engineering graduates in 5- and 10-year follow-up surveys. Contrary to the national data, women engineering respondents reported higher earnings than male respondents. Natural science majors had earnings levels and gender disparities that tended to track more closely to the overall university average.

Policy Options

What successful policies and programs have other states implemented to improve gender proportionality of students and faculty? What strategies have been proven effective at the institutional level that can be replicated statewide?

From the discussion above, we can draw the following conclusions to help inform policy options for increasing gender equity in academic programs:

- Male and female students are equally prepared to pursue post-secondary education in STEM and health science fields, even though there are relatively small and persistent differences by gender in test scores and course-taking behavior.
- However, even before getting to college, high school students exhibit a high degree of vocational self-segregation by gender when asked to identify probable major fields; patterns that persist through their college experience.

[21] Bureau of Labor Statistics, *Current Population Survey*, http://stats.bls.gov/cps/cpsaat39.pdf.

- Women who take STEM courses as freshmen are less likely to major in those fields than their male counterparts. Similarly, men who take courses in the pre-med/health sciences cluster are less likely to major in those subjects than are female students. Persistence rates vary by gender.
- Despite the recent growth of female doctoral graduates in STEM fields, the percentage of female faculty in these departments remains low.
- Women working in STEM fields earn a higher percentage of what men earn than they do in non-STEM fields, but wage parity has not yet been achieved in STEM fields or in health services. Wage disparity by gender seems to be highest for older workers, possibly due to the "glass ceiling" effect. The existence of this effect in our state is supported by UW wage survey data that shows wage disparities by gender for program graduates that often increase between the first, fifth, and tenth year after graduation.
- These research results suggest that appropriate policy and program areas of focus for new initiatives in Washington State would be:
    - increasing awareness of high school students (targeting under-represented gender students) to career opportunities in the STEM and health sciences fields, and providing these students with opportunities to interact with gender-minority role models working in these fields;
    - improving the welcoming experience of gender-minority students who express interest in the STEM and health sciences fields by enrolling in those courses as freshmen, in an effort to raise persistence rates and the number of gender-minority students that major in these fields;
    - Provide support and assistance to STEM and health sciences departments in their efforts to hire gender-minority faculty and faculty of color, and secure institution-wide commitment to achieving aggressive hiring targets.

Most of the program and policy initiatives designed to encourage greater gender equity in the STEM or health sciences fields has been at the institutional level or by partnerships between community organizations and K-12 schools and school districts. There are few examples of statewide policies or program initiatives undertaken by state higher education boards, executive officers, or at the state university system level.

Career Awareness

There is a high level of activity in Washington State in programs that encourage young girls in middle and high school to consider careers in STEM fields. In fact, Table 6 lists 27 community-based programs in Washington found in the National Girls Collaborative Project database. It is important to note that this in not an exhaustive list and that the programs vary greatly in design and intensity; some are one-day workshops, others are summer programs (typically one-to-three weeks), and others are year-round and intensive.

The near-absence of Eastern Washington programs from the database (only one is listed in Walla Walla) suggests that these opportunities may not be widespread throughout the state. Most of these programs involve partnerships with middle and high schools, and several involve

community and technical colleges and four-year institutions. However, program administrators are quick to note the difficulty of getting these experiential learning initiatives mainstreamed into the middle and high school curriculum, as well as the problem of achieving sufficient program scale to achieve a broad impact.

Table 6

Washington Programs Raising Girls' Awareness of STEM Careers

Program	Organization	City
Salish Sea Expeditions - Sea Investigators	Salish Sea Expeditions	Bainbridge Island
WWU Engineering Technology	Engineering Technology	Bellingham
Northeast Vocational Area Cooperative (NEVAC)	NorthEast Vocational Area Cooperative	Bothell
TechREACH	Puget Sound Center for Teaching, Learning and Technology	Bothell
Junior Recognition Scholars	Stanwood-Camano Branch AAUW	Camano Island
Girls Go Tech	Girl Scouts -- Pacific Peaks Council	DuPont
Scholar Recognition Program-Edmonds AAUW	American Association of University Women	Edmonds
Lakewood Computer Clubhouse	Lakewood Computer Clubhouse	Lakewood
MESA: Yakima/Tri-Cities	Yakima Valley Tri-Cities MESA	Richland
BioQuest	BioQuest	Seattle
Discovery Corps	Pacific Science Center	Seattle
Girl Scouts - Totem Council	Girl Scouts - Totem Council	Seattle
Inspiring Youth Through Technological Creativity	Red Llama	Seattle
MESA - Seattle	Seattle MESA	Seattle
Passages Northwest	Passages Northwest	Seattle
Reel Grrls	Reel Grrls	Seattle
Seattle Expanding Your Horizons	SMARTgirls	Seattle
Seattle Girls' School	Seattle Girls' School	Seattle
Society of Women Engineers-Pacific NW Section	Society of Women Engineers	Seattle
TechNet Program	Associated Recreation Council	Seattle
University of Washington Women's Initiative (UWWI)	University of Washington Women's Initiative	Seattle
Washington Aerospace Scholars	Washington Aerospace Scholars/The Museum of Flight	Seattle
Women Fly!	The Museum of Flight	Seattle
Girls on Ice	Girls on Ice (North Cascades Institute)	Sedro-Woolley
WSU Spokane CityLab	WSU Spokane CityLab	Spokane
AAUW-WA High School Scholars	Puyallup Valley Branch American Association of University Women	Tacoma
Great Explorations: A Math and Science Adventure	Great Explorations in Education	Walla Walla

Source: Northwest Girls Collaborative Project database, http://www.pugetsoundcenter.org/ngcp/directory/index.cfm

A state policy initiative to provide support for career awareness programs and to integrate them into school districts' academic programs could be modeled after the Massachusetts STEM Pipeline Fund. The Commonwealth has put $6.5 million in general fund resources into the program since 2003, providing grants of up to $350,000 for each project proposed by seven regional PreK-16 Networks. The grants are used to support teacher professional development and teacher mentoring, curriculum development, science fairs, career fairs, science academies, summer science camps, and many other important activities designed to increase interest in STEM fields.

Improving Student Persistence

The data presented in Figure 4 show that female students in Washington are less likely to major in computer science, engineering, or mathematics than their male counterparts, even after they take a course in these subjects as freshmen. The same is true, to a lesser degree, for male students taking courses in the pre-med/health sciences cluster. Although the latter is a more recent phenomenon, due in part to extraordinary efforts by the medical education profession to make careers in medicine, especially doctors, a more attractive and viable choice for female students.[22] Many institutions are working to extend some of the procedural, program and cultural changes that have occurred in medical education to the STEM fields to make them equally welcoming and supportive for female students.

One example is Carnegie Mellon University's Women in Computer Science Program, which succeeded in raising female enrollment from 7 percent in 1995 to 40 percent in 2000, but despite continued efforts has fallen back down to about 28 percent (still much higher than the Research I average of 15 percent). Activities included professional development training for high school AP computer science teachers in C^{++} and gender equity issues, modification of admissions criteria to de-emphasize prior programming experience, and development of a supportive community that included a new Women@CS Advisory Council.

The National Research Council identifies the following strategies for retaining female students in science and engineering programs: signal the importance of women, build K-12 bridging programs at the undergraduate level, improve advising, establish mentoring programs, change the pedagogical approach, increase engagement with students, and increase professional socialization.[23] It is easy to see from this list that student retention strategies need to be built primarily at the institutional level, based on the institution's analysis of when and where they are losing students and what support strategies are most needed and appropriate. From a statewide policy perspective, merely asking institutions to develop a student retention plan to promote gender equity may be a good place to start.

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[22] According to the Association of American Medical Colleges, the percentage of female medical school graduates has risen from 36 percent to 49 percent in the last 15 years. In 2005, 34 percent of full-time faculty at the University Of Washington School Of Medicine were women, exceeding the national average by 2 percentage points. However, there remain gender gaps at the UW and nationally with regard to rates of female tenured faculty and full professorships. See http://www.aamc.org/members/wim/statistics/stats06/start.htm.

[23] National Research Council of the National Academies (2006), *supra.*, p. 113.

Increasing Faculty Diversity

Students need role models to help them envision their career opportunities. Nothing can be more encouraging than having someone say to a student that they were once where they are now, and that they found a path that has led them to a fulfilling and rewarding career. This is why it is so important to have women faculty in the STEM fields and men teaching in the health science fields, especially nursing. The data presented above show that institutions across the country, including in Washington State, continue to struggle to attract, retain, and promote women faculty in the STEM fields and men in some health fields, despite recent improvements in the doctoral hiring pool.

There is a long list of successful programs and initiatives that departments and institutions have established to promote a more welcoming and supportive environment for faculty of all racial, ethnic, and gender groups. Activities include bringing in speakers on the topic, creating special recognition and awards for work in this area, developing diversity committees, assessing institutional patterns and practices, creating support networks and societies, providing workshops for search committee chairs and department chairs on diversity, revising hiring procedures and credential assessment rubrics, and providing support for dependent care. Most of the work has been done at the institutional or even the department level, where solutions can be customized within a given institutional context.

Recognizing that institutional culture can only be changed at the institutional level, the National Science Foundation (NSF) created the ADVANCE program in 2001. The program provides grants to institutions to assess themselves and implement a plan to increase participation and advancement of women scientists and engineers. Funding is available for partnerships engaged in adaptation, implementation, and dissemination of best practices. The program also provides opportunities for research fellowships for women scientists.

The University of Washington is the only institution in the state to receive support for institution-wide activities through the program. Since 2001, the university has received nearly $5 million to support a range of activities both on and off campus through the Center for Institutional Change (CIC) in the College of Engineering (see http://www.engr.washington.edu/advance/). The CIC organizes a range of activities involving 21 departments in the Colleges of Engineering and Arts and Sciences, including the monitoring of women faculty hiring and advancement in science and engineering, awards and recognition to women scientists, a transitional support program to promote faculty retention, a visiting scholars program, leadership workshops, mentoring programs, and cultural change/policy transformation advocacy within the institution. In addition, the CIC has received NSF support for national dissemination of best practices, and offered a well-attended national leadership workshop for department chairs and deans from across the country in July 2007.

One policy option available to Washington State is to create centers like the UW CIC at each public four-year institution. Essentially, Washington could create its own state version of the NSF ADVANCE program. The UW could provide technical assistance to the other five public institutions on self-assessment, strategy selection and implementation to promote cultural change. Private and neighboring state institutions could "buy in" to the network if they were interested in receiving technical assistance.

Selected References

The College Board (2005). *State Profile Report: Washington*. New York: The College Board.

Crandall, S.R. and Surabhi, J. (2007) "New Directions in Workforce Development: Do They Lead to Gains for Women?," *New England Journal of Public Policy,* Vol. 22, No. 1 and 2, pp. 81-98.

Freeman, C.E. (2004). *Trends in Educational Equity of Girls & Women: 2004* (NCES 2005-016). U.S. Department of Education, National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.

Gallagher, A. (1998). "Gender and Antecedents of Performance in Mathematics Testing," *Teacher College Record*, V. 100, No. 2, Winter 1998, pp. 297-314.

Higher Education Coordinating Board (2006), *Gender Equity in Higher Education.* Olympia, Washington: Washington Higher Education Coordinating Board.

King, J.E. (2006). *Gender Equity in Higher Education: 2006.* American Council on Education, Center for Policy Analysis. Washington, D.C.: American Council on Education.

National Academy of Sciences (2006). *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*. Washington, D.C.: National Academy Press.

National Center for Education Statistics (2007). *The Nation's Report Card, America's High School Graduates: Results from the 2005 High School Transcript Study* (NCES 2007-467). U.S. Department of Education, National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.

National Research Council of the National Academies (2006). *To Recruit and Advance: Women Students and Faculty in Science and Engineering.* Washington, D.C.: National Academy Press.

National Science Foundation, Division of Science Resources Statistics (2004). *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2004.* NSF 04-317. Arlington, Virginia: NSF.

Spelke, E.S. (2005). "Sex Differences in Intrinsic Aptitude for Mathematics and Science? A Critical Review" *American Psychologist*, Vol. 60, No. 9, December 2005, pp. 950-958.

RESOLUTION NO. 07-16

WHEREAS, The Higher Education Coordinating Board recognizes the critical need to expand degrees in science, technology, engineering and math (STEM) and health sciences fields to support economic growth in Washington State and the nation, and provide high paying jobs to Washington citizens; and

WHEREAS, Expanding enrollments in STEM and health sciences programs is essential to ensure that more degrees are awarded and high-demand jobs are filled; and

WHEREAS, The Board understands the importance of expanding the pipeline of students seeking STEM and health sciences careers, and that it is particularly important to focus on minority-gender and other under-represented students who have, in the past, shown limited interest and success in achieving degrees in these fields; and

WHEREAS, The Board has developed an Issue Brief on gender equity in STEM and health sciences academic programs that analyzes factors contributing to disproportionate degree conferment rates by gender, and policy options for achieving greater proportionality;

THEREFORE, BE IT RESOLVED that the Higher Education Coordinating Board approves the Gender Equity Issue Brief for publication and distribution, and that it endorses the development of a STEM Pipeline Initiative to enhance K-12 instruction in STEM fields and student awareness of STEM careers. The Board also approves establishment of a state program of support and technical assistance for Washington's public four-year institutions in their efforts to increase faculty diversity in STEM and health sciences departments—modeled after the National Science Foundation's ADVANCE program—with the goal of providing appropriate role models for under-represented students.

BE IT FURTHER RESOLVED, that staff are instructed to work with higher education institutions, the Legislature, the Governor's office, and education partners to fund and implement these programs.
Adopted:

September 27, 2007

Attest:

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Bill Grinstein, Chair

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Betti Sheldon, Secretary