Report of the Joint Committee on the Education of Students in High Demand Fields

January 2008

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Executive Summary

The state of Washington educational system is being called to action. The Committee on the Education of Students in High Demand Fields finds that the time for studies and meetings is past – the time for action is upon us and we must grasp the opportunity before our global economic competitors overtake us and pass us by.

The Committee held two meetings where a variety topics were discussed. No specific proposals were advanced or voted upon. With this in mind, the discussions suggested 3 possible legislative ideas.

The Committee determined that there is the need for a definition of "high employer demand program of study" for use by the community and technical colleges, DCTED, L&I, and the Employment Security Department. By adopting a definition of high demand, the state can better focus its efforts on increasing the number of Washington students being prepared for employment in Washington.

There was consensus that the state should continue to earmark funds for mid-level and baccalaureate level enrollments in high demand fields. The Committee, however, was divided over whether enrollments at existing institutions should be increased or whether there is a need for a new University of Washington branch campus to expand enrollment opportunities in high demand fields, whether this is best accomplished exclusively by expanding capacity at existing institutions, or whether both approaches need to be done simultaneously.

Finally, the Committee supports the implementation of a specific marketing campaign to ensure that high demand enrollments are largely filled by Washington students. The objectives of the marketing plan would be to increase student interest in high demand fields of study and to increase public awareness of high demand fields and degrees.

Introduction

Higher education is an important investment for students and the state. "Higher education is the ticket to a good job and economic security. A strong higher education system supports individual financial success, a strong state economy, and a competitive nation".[1]

The state of Washington leads the nation in providing employment for people with baccalaureate degrees, but ranks 36th in the nation in the production of degrees. It is estimated that for job openings in Washington that require a bachelor's degree, 47% will be in fields identified as high demand or high impact, but that only 14% of Washington students each year graduate with degrees in one of these fields[2]. Nationally, business leaders warn that we are losing our comparative advantage in STEM disciplines (science, technology, engineering, and mathematics) and that this will lead to a loss of economic advantage. Additionally, the in-state supply at the mid-level of education and training is sufficient to fill only 87% of employer job openings that require this level of training.

To study this issue, the 2007 legislature established the Committee on the Education of Students in High Demand Fields (hereinafter the Committee)[3]. The Committee consists of legislators, and representatives from state education and labor force agencies, faculty, students, labor, and employers.

The Committee was charged with the: (1) development of a plan to increase the capacity of Washington institutions of higher education to produce degrees in high impact, high demand areas of study; (2) development of a marketing project to inform students, parents, and educators of opportunities in high demand fields; (3) investigation into ways to motivate students to take more mathematics and science courses; and (4) identification of ways that the business community could enter into more partnerships with the state to ensure that Washington institutions of higher education produce graduates in high demand fields that are ready and able to find employment in Washington.

Two Committee meetings were held over the 2007 interim period. In addition, a subcommittee developed a marketing plan based upon the issues and priorities identified by the Committee. This report is organized into issue area segments that first identify and briefly discuss the issue, and then offer possible responses discussed by the Committee.

The issue areas include: student demand, employer needs, precollege preparation, public and private post-secondary system capacity, the possible roles of private business, and marketing to students. At the conclusion of the report, some specific responses are discussed.

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[1] National Conference of State Legislatures Blue Ribbon Commission on Higher Education.
[2] State of Washington Employment Security Department.
[3] SB 5731 (2007).

2007 STATE BUDGET PROVISIONS REGARDING HIGH DEMAND FIELDS

During the 2007 legislative session, a number of budget items were provided to enhance high demand enrollments[4]. In addition, a number of budget provisions were made to enhance the mathematics and science education in the K-12 system[5]. Taken together, these represent a $133.7 million investment specifically targeted for the preparation of students to help meet the needs of employers for employees in high demand fields during the 2007-08 biennium.

While this is not an insignificant amount, it represents only a portion of the solution to the issue of recruiting and retaining Washington students so that they may better compete for jobs in Washington and in the global economy.

DEFINING HIGH DEMAND

During the discussions of the Committee, it became apparent that the definition of "high demand" varies depending upon with whom you are speaking.

From the student's point of view, "high demand" is likely to be defined as a program in which student demand exceeds program capacity. The student's have trouble getting into the program because there are simply not enough seats available at the institution to accommodate student demand. High student demand, however, may not correspond to high employer demand. "High employer demand" fields of study, however, are commonly understood to mean programs in which the numbers of students prepared for employment per year is substantially less than the number of projected job openings per year in that field.

Before taking a peek at what data exists regarding specific demands, however, it is useful to look at the big picture. What do we know about how many degrees we need to produce by 2018 to keep up with other global challenge states[6]?

The figures differ depending upon whether the state chooses to maintain the current level of service for a given percentage of students or to close the skills gap compared to other global challenge states. The chart below summarizes HECB[7] data regarding how many degrees at different levels will be required to maintain service levels (adjusted for population increases) or close the gaps with other global challenge states in the year 2018. Note that this is aggregate data that does not differentiate between academic areas of

[4] See the 2007-09 Budget Notes: $27.9 mill for math and science enrollments; $26.1 mill for high demand enrollments (including at community and technical colleges and 4 year institutions); $5 mill for GET Ready for Math and Science Scholarships; $1 mill for Future Teacher Scholarships; $3.2 mill to expand nursing education at WSU; $2.25 mill to improve student retention at EWU; and $750,000 for the Transitions Math Project at UW.

[5] See the 2007-09 Budget Notes: $39.5 mill for math and science professional development; $6.6 mill to increase the number of teachers; $6 mill to expand LASER; $5.5 mill for math and science regional support; $5.4 mill for math and science instructional coaches; $2.3 mill for math and science curriculum development; and $2.2 mill for other math and science related support services.

[6] The current global challenge states are: Massachusetts, Washington, California, Colorado, Maryland, New Jersey, Connecticut, and Virginia, plus Minnesota and North Carolina. *Source: Washington Learns Higher Education Advisory Committee.*

[7] Washington Higher Education Coordinating Board data presented at the December 13, 2007 HECB meeting.

study. The number in parenthesis indicates Washington's 2006 public and private production levels.

Demand for Degrees in the Year 2018

	Maintain Service	Global Challenge
Mid-Level Degrees (26,800)	29,600	36,200
BA/BS (28,600)	31,300	42,400
Grad and Professional (11,200)	12,100	19,800

To meet the global challenge state average enrollment levels by 2018, Washington public higher education institutions will need to increase full-time student funded enrollment from the 2007 level of 224,900 to 297,000 FTE. Although this data is helpful in identifying Washington's challenge, it does not help us identify the academic disciplines where the demands will be the greatest. To whose demands are we responding?

STUDENT DEMAND

Student characteristics are changing.

Student demand is influenced by the characteristics of the students entering higher education – and that is changing. Approximately 40% of today's higher education students fit the "traditional student" model[8]. Many students are now older, many are raising families, and often are returning to enhance their economic opportunities. Many take longer to obtain a degree and often attend part-time for a variety of reasons.

[8] See footnote 1.

Current Student Demand

Current student demand for post-secondary education is best indicated by what academic majors are favored by current students. Female students earned 56.6% of the bachelor's degrees in Washington during the 2005-06 academic year and the trend in this percentage is rising. Given the common belief that male students are more likely to enter science and engineering related fields, the relative proportion of female students may be increasingly affecting the data.

In fact, during the 2004-05 academic year, female students were awarded disproportionately higher numbers of undergraduate degrees in human sciences, health professions, education, public administration and social service, psychology, visual and performing arts, foreign languages, ethnic, cultural, and gender studies, communication, and journalism. Male students, on the other hand, were awarded disproportionately higher numbers of undergraduate degrees in computer and informational services, engineering, engineering technology, mathematics and statistics, business management and marketing, architecture, physical sciences, leisure studies, and history[9]. So the common belief appears to be supported by the data.

If this is so, is it a contributing factor to the issue being addressed? If so, the issues of increasing graduates in high employer demand fields may be tied, to some extent, to gender equity issues in those fields – getting female students

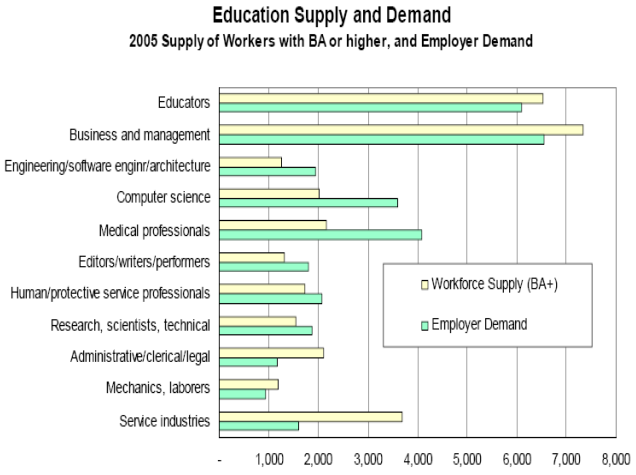
[9] HECB, *Gender Equity in Higher Education*, December 2006.

more interested in pursuing careers in high employer demand fields.

EMPLOYER DEMAND

United States Department of Commerce data show that the state of Washington is the leader in employing people with baccalaureate degrees, but is 36th in the production of bachelors degrees (US Department of Commerce 2004 State Science & Technology Indicators). Employer demand has been summarized quite well. Figure 1 shows that, in 2005, employer demand exceeded supply in engineering, computer science, medical/professionals, editors/writers, performers, human protective services professionals, research, science, and technical fields.

Figure 1



Source: HECB PowerPoint presentation, *Enrollment Degree Trends and Goals*, July 26, 2007.

An estimate of the gap between supply and demand in high employer demand fields for Washington is shown in Figure 2. The supply of baccalaureate level graduates in these fields is less than half the anticipated annual demand during the next four years.

Figure 2

Occupation	WA Annual openings 2007-2012 (in real #s)
High Demand Fields	
Computer Specialists	3,895
Engineers	1,553
Life Scientists	440
Secondary teachers	649
Health Diagnosing and Treating Pracitioners	3,353
Health Technologists & Technicians	1,670
High Demand openings	**11,560**

Source: Employment Security Department

Field	Degrees produced 2004-5
Computer Specialists	635
Engineering	1075
Teachers*	362
Life Scientists	1343
Nurses	825
Medical Researchers	82
High Demand produced	**4322**

Source: IPEDS

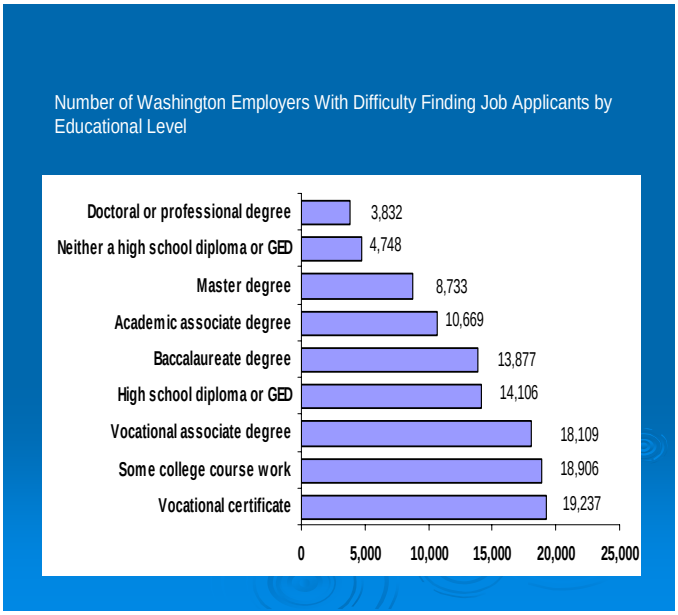
At the certificate and associate level, there are also significant gaps between supply and demand. For example, the demand for accounting technicians, aircraft mechanics, early childhood education teachers, health care practitioners, and science technicians, is 50% greater the supply; the demand for transportations workers and installation/ maintenance/and repair technicians is 25-50% greater than the supply; and the demand for automobile mechanics and construction trade workers is 15-25% greater than the supply.

A look at the numbers of associate and baccalaureate degrees awarded in the last decade appears to indicate that, with the exception of allied health and health sciences degrees, the state has not significantly increased production in high employer demand fields (See Appendices A and B). The number of degrees awarded has actually fallen at both levels in computer and information sciences and is treading water in engineering. New funding provided by

the legislature in 2007 may reverse this trend, focusing specifically on high demand fields.

This is not the entire story driving employer demand however. The WTECB[10] reports that 51% of Washington employers who were looking for workers reported difficulty finding qualified job applicants and that the scarcity affects all industries, not just high-tech and not solely at the baccalaureate level. Figure 3 shows that there are significant numbers of employers that are facing difficulties finding qualified workers at all levels of academic preparation.

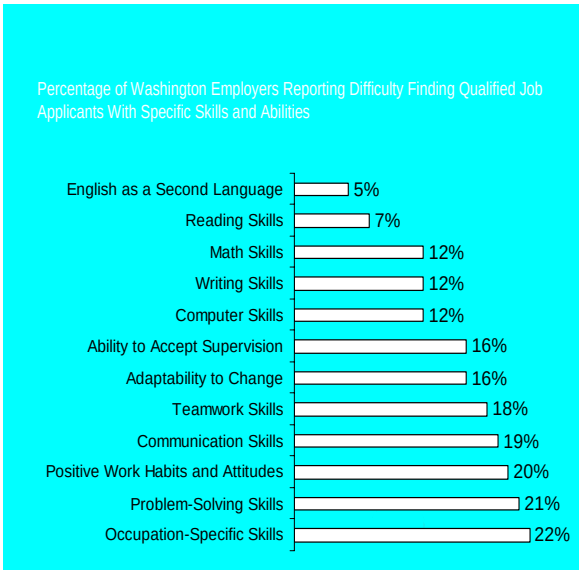
Figure 3



Source: HECB PowerPoint presentation, *Enrollment Degree Trends and Goals*, July 26, 2007.

It is not purely occupation-specific skill deficiencies that employers are seeking however. Although specific skills top the list employers are looking for more. Figure 4 shows that general problem-solving, critical thinking, positive work habits and communication skills also appear to be highly sought.

Figure 4



Source: HECB PowerPoint presentation, *Enrollment Degree Trends and Goals*, July 26, 2007

The gap between the number of prepared employees and employer demand appears to be the most acute at the mid-level[11] with projections that only 77% of the employer demand being met. The WTECB estimates that 26,000 more student FTEs and 7,500 more mid-level completers will be needed by 2010.

The impacts of the skill shortages are also significant. A 2005 WTECB survey shows that 17% of the employers reported reduced output or sales, 16% reported lowered productivity, and 14% reported reduced quality as a result of the shortages.

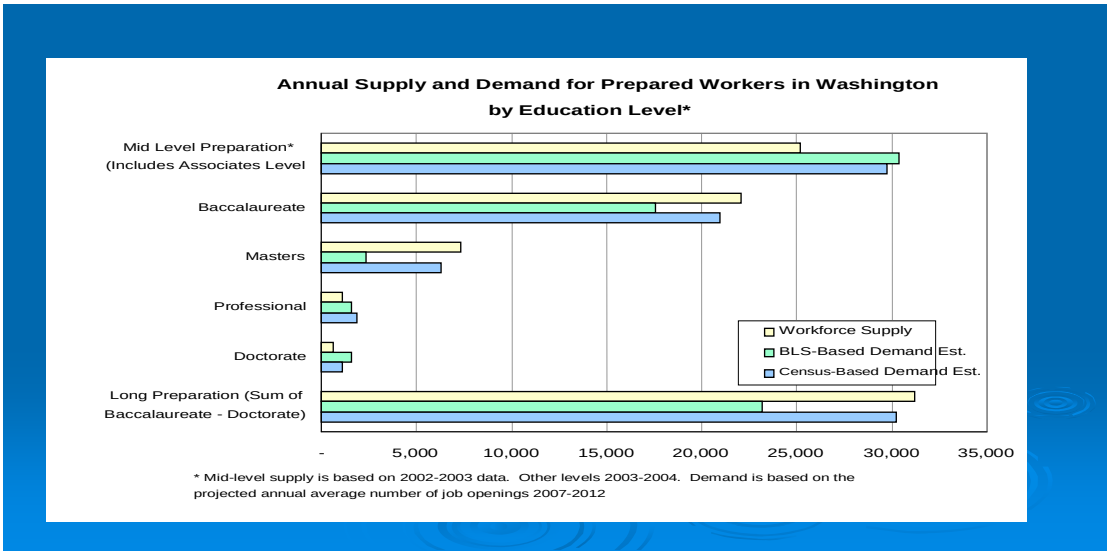
[10] Workforce Training and Education Coordinating Board 2005 Biennial Employer Survey.

[11] Including both baccalaureate and associate degree levels and with the highest employer demands in accounting, aircraft mechanics, auto/diesel mechanics, construction trades, education, healthcare practitioners, installation/maintenance/repair, science technology, and transportation.

Dissonance

There appears to be a disconnect between student demand for academic degrees and employer demand for trained employees. Figure 5 shows workforce supply compared to employer demand in 2002-03. The upper bar in each preparation level indicates supply and the lower two bars indicate employer demand as estimated using different measures. Mid-level, professional, and doctorate level workforce supply lags behind employer demand, but baccalaureate and masters level workforce supply appears to exceed demand according to the method used to produce this chart. There are other methods of analysis, not presented to the Committee, that yield different conclusions about aggregate levels of supply and demand. The HECB and others routinely conduct other analyses that demonstrate a significant demand at the baccalaureate and graduate levels.

Figure 5



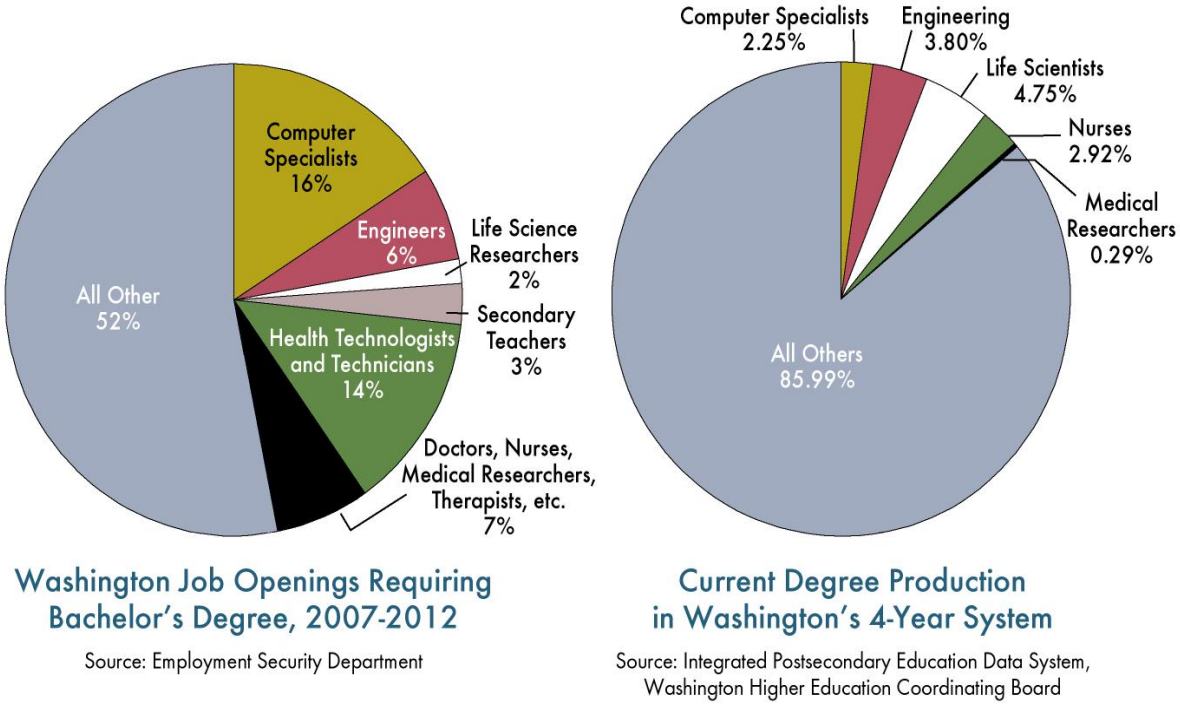
Source: HECB PowerPoint presentation, *Enrollment Degree Trends and Goals*, July 26, 2007

The dissonance between student demand and employer needs may help explain this phenomenon. Assuming, arguendo, that degree production and student demand are related, the academic disciplines chosen by students might be related to why baccalaureate level supply exceeds demand while employers report worker shortages.

Figure 6 clearly shows that even though the aggregate production of baccalaureate degrees may be adequate,

the numbers of degrees in employer high demand fields is not.

Figure 6



Source: Prosperity Partnership

Can this data be reconciled? Does the data indicate that the state should shift resources to high employer demand fields? The answer to this question is not quite so simple. Recall that Figure 4 (above) clearly illustrates that employers are looking for more than occupation-specific skills.

The data appear to lead to the conclusion that more could be done to encourage students to pursue fields of study in the high employer demand fields of computer science, engineering, allied health and health sciences and mid-level high demand fields, but that the shift in degree production should not be accomplished by sacrificing one of the most recognized strengths of our post-secondary educational system - a strong liberal education component. There is no reason to decrease degree production in other fields of study and perhaps inadvertently create other educational gaps. The need is for the creation of additional opportunities.

PREPARING STUDENTS FOR COLLEGE

Precollege Preparation

The pathways to post-secondary degrees in high demand fields depend on precollege preparation. Currently, 32% of our high school graduates require

remedial mathematics upon entering the state's two-year and four-year colleges and universities after graduating from high school[12]? The state is taking a number of steps to help alleviate this problem (See Appendix C for detail).

To support these activities and further promote the precollege preparation of students for careers in science, technology, engineering, and mathematics the 2007 legislature provided $85.4 million (See Appendix D for detail).

The 2007 legislature clearly acknowledged the need for policy adjustments and significant financial investments in mathematics and science programs for precollege preparation. The fruits of these investments should become evident in the next few years and have the potential to significantly increase the number of students prepared to pursue post-secondary education in high demand fields.

Academic Advising

The Committee discussed counseling in schools is an important component of attracting students to high employer demand fields. 2SHB 1906 also included provisions encouraging programs to attract middle and high school students to careers in mathematics and science. Middle schools approved to provide career and technical education programs or integrated hands-on experiences in mathematics and science receive enhanced funding through state apportionment formulas. A statewide director is appointed to conduct outreach to attract middle and high school students to careers in math, science, or technology and to educate students about the course work necessary to be adequately prepared to succeed in these fields. The director also develops public-private partnerships to promote scholarships and professional development opportunities for teachers; coordinates youth opportunities and participation in clubs, fairs, and competitions; and provides technical assistance to schools.

The Committee also discussed a number of issues that may arise after students get to college. Chief among these was whether students receive adequate counseling upon admission so that they have adequate information about prerequisites and sequential courses. These same concerns were expressed in relation to community college transfer students who too often encounter difficulties getting credit for the classes they have taken at the community college.

New statewide Major Related Programs are designed to ease student transfer. The Associate of Science – Transfer (AS-T) degree focuses on the math and science courses needed to prepare for biology, chemistry, earth science, physics, computer science and engineering majors. In a course-taking pattern that parallels students preparing at universities for science and engineering as freshmen and sophomores, transfer students pursuing the AS-T complete 45 quarter credits of general education courses at the community college.

Counseling is both an issue about helping students graduate in the shortest time possible so employers can hire them and an issue of affordability for

[12] HECB, Key facts about higher education in Washington (February 2007).

students. Efforts are underway at many institutions to provide better and more timely counseling services, including online counseling systems.

Most community college students do not experience significant difficulties transferring between community college and four-year institutions. Much work also has been and continues to be done in the area of aligning community college transfer classes with classes offered at the four-year institutions, as well as getting the alignment information to students in a timely fashion.

CAPACITY

SB 5731 specifically charged the Committee with the development of a plan to increase the capacity of Washington institutions of higher education to produce degrees in high impact, high demand areas of study. The Committee identified 3 areas in which to concentrate: creating new capacity, retention of students, and the roles private employers could make to the effort.

Public and Private Post-Secondary System Capacity

There is a universally recognized need to increase post-secondary enrollments in high demand fields. This broad statement, however, does not provide the guidance required to allocate the state's resources efficiently and it fails to recognize the progress made so far.

For example, at the University of Washington, approximately 30% of the annual baccalaureate degrees granted are in high demand fields crucial to Washington's economic success. Also, during the last 4 years, Washington State University, has seen a 50% increase in the number of students who intend to study engineering and computer science. These efforts to increase baccalaureate production received significant financial support during the last legislative session[13].

Without the contributions of Washington's community and technical college system, baccalaureate production would be even less. Thirty-nine percent of mathematics, science, engineering, and engineering technology baccalaureates are granted to transfer students from our community and technical colleges, as are 55% of the mathematics and science teacher baccalaureates[14]. Six hundred FTE's in engineering, computer science, mathematics and science, and mathematics/science teacher preparation and another 600 FTE's in workforce training have been funded for 2007-08.

Washington's independent colleges are also making significant contributions and have expressed a continuing interest in partnering with state and industry efforts to boost high demand field enrollments. In spite of all this investment, Washington employer demands continue to significantly exceed degree production[15]. This brings the discussion back to the beginning – how does the state boost enrollments in high demand fields?

Many employers are seeking workers with mid-level preparation, the

[13] See Footnote 4.
[14] State Board of Community and Technical Colleges.
[15] See Figure 6.

certificate and Associate degree levels. The state's community and technical colleges supply 81% of the state's new trained technical workers, but between now and 2012 a 17% shortfall in meeting that demand is predicted unless patterns change. Community and technical colleges change approximately 11% of their workforce education programs each year to try and keep pace with high demand employer needs[16] such as in the fields of accounting, aircraft mechanics, auto/diesel mechanics, construction trades, education, healthcare, installation/maintenance/repair, science technology, and transportation.

Community and technical colleges are more nimble in adapting to the immediate needs of employers for a number of reasons. Capacity in technical high demand fields at community and technical colleges has grown four-fold since 2000. Encouraging even more adaptation by encouraging cooperation between colleges and employers, including workplace-based educational programs, could be useful, as could continuing to facilitate transferability of community and technical college coursework, and generally boosting FTE's in high demand fields.

At the 4-year level, quickly adapting to market changes has historically been more challenging. Boosting enrollments in high demand fields is likely to require significant capital allocations and continued increases in state funded FTEs. The costs to the state, while significant, are likely to be less than the costs of falling behind in the competition for a share in the growing global economy. High demand employers share this concern. Partnerships between all of Washington's colleges and the private sector, in terms of on-site course offerings, distance education opportunities, internships and mentorships may hold potential for reducing costs.

In this effort, general education coursework must not be forgotten. While the goal is to increase the number of degrees in high demand fields, employers are demanding that general problem-solving, critical thinking, positive work habits and communication skills be included in those degrees[17]. An expansion in the number of degrees produced in high demand fields will need to be accompanied by similar investments in liberal education courses, providing wide ranging and cross-disciplinary knowledge and a demonstrated ability to apply knowledge to complex problems.

Once we have provided students with the skills required to participate in high demand fields and provided increased post-secondary capacity to accommodate them, we must help them sustain their interest. In this endeavor, post-secondary institutions and private employers each play a role.

Retention

The overall 6 year graduation rate for students in Washington's 4-year institutions is 66% - in the top tier for the country. Both 2 and 4-year institutions are making additional efforts to increase their retention rates. Of the students in the two-year college Opportunity Grant pilot program last

[16] State Board of Community and Technical Colleges.

[17] See Figure 4.

year, 73% were retained throughout their first year, while only 46% of students at a similar low socioeconomic level were able to go complete their first year. This was attributed to tuition waivers and a single contact point for students needing help, providing comprehensive counseling, as well as basic skills and job training programs in high demand fields. Four-year institutions have woven together many programs to increase their retention rates including:

1. honors programs
2. increased student support services
3. instructional centers in minority affairs
4. minority scholarships for engineering students
5. GEARUP[18]
6. NSF step grants[19]
7. McNair Programs[20]
8. math camps
9. Engineering Bridge Program[21]
10. CLUE[22]
11. WISE[23]
12. GO-MAP[24]

In spite of all these efforts, it is acknowledged that recruitment and retention of students in high demand fields remains an issue. For example, the retention rate for engineering and computer science at Washington State University is 40-50% even among students well qualified to continue[25]. This problem persists even thought WSU has worked hard to increase retention by: completing a major revision of the Introduction to Engineering course (including class size reductions), established a living-learning community for engineering and science students, established freshman pre-computer science courses, established a Team Mentoring Program for underrepresented minority students, and reduced class sizes in gateway engineering courses.

The retention issue is particularly acute for the underrepresented groups (minorities, women). Many institutions are responding by increasing counseling and the use of mentors and role models.

Academic advising and career counseling is an area where improvements can be made. Faculty involvement could be utilized to a greater extent and faculty have

[18] Gaining Early Awareness and Readiness for Undergraduate Programs. GEAR UP is a partnership of the Higher Education Coordinating Board, Office of the Governor, University of Washington, Washington Education Foundation, and a number of national, state, and local organizations.

[19] National Science Foundation

[20] TRIO Ronald E. McNair Post-Baccalaureate Achievement Program encourages low income, first-generation college students and students underrepresented in graduate education to consider careers in college teaching as well as prepare for doctoral study.

[21] A one week residential experience for incoming University of Washington first year or transfer students planning on majoring in engineering.

[22] University of Washington Center for Learning and Undergraduate Enrichment.

[23] Women in Science and Engineering is a university-level program housed within Engineering Advising and Diversity Center**,** designed to increase the recruitment and retention of women of all ethnic backgrounds in science and engineering (S&E) and to create an academic and social climate at the UW which is conducive to both men and women in S&E at the undergraduate and graduate levels.

[24] Graduate Opportunities & Minority Achievement Program, a division of The University of Washington Graduate School, committed to serving the needs of students of color and those from other underrepresented groups, while simultaneously providing opportunities for all students to learn and develop through experiences rich in cultural, ethnic, and racial diversity.

[25] Comments received from Associate Dean Robert G. Olsen, College of Engineering and Architecture, Washington State University.

expressed an interest in doing so, even though there are presently few career incentives for faculty to act as mentors and advisors. The private business community may also play a significant role in the effort to retain students through formalized internship and mentorship programs.

Responding to Industry Needs

Apprenticeships combine classroom studies with on-the-job training supervised by a journey-level craft person or trade professional. In Washington State, the classroom studies are offered by a variety of providers, including employer sponsored schools, union sponsored schools, and Washington's community and technical colleges.

There are approximately 15,000 registered apprentices in Washington[26]. Some of these programs prepare apprentices for high demand health care and construction careers. The operating budget passed by the Legislature included $945,000 for fiscal year 2007-08 and $1,890,000 for fiscal year 2008-09 to increase enrollment in apprenticeship training programs by 150 FTEs in each fiscal year. In 2006-07, 22 community and technical colleges served 10,253 students (2,696.5 FTE) in apprenticeship programs. This is 72.6% of the total 14,105 registered apprentices in the state in 2006.

Centers of Excellence are flagship programs at 12 community and technical colleges that build and sustain Washington's competitive advantage through statewide leadership. Each Center focuses on a targeted industry that drives the state's economy and is built upon a reputation for fast, flexible, quality education and training programs. Centers bring together industry representatives help to lead collaborative and coordinated statewide education and training efforts to build a competitive workforce in a global economy. They are brokers of information and resources related to their targeted industry for industry representatives, community-based organizations, economic development organizations, community and technical colleges, secondary education institutions, and four-year colleges and universities. They provide system coordination, coaching and mentoring to assist in building seamless educational and work-related systems.

Some educators have expressed concerns about "job outs' – students who do not complete their post-secondary education because they are offered employment in their chosen fields prior to completion[27]. Some colleges view this as an opportunity rather than a problem and are beginning to offer apprenticeships, shorter certificate programs, and paid internships to encourage academic completion.

Research shows student are more inclined to progress further through their education if they have a relevant connection to a job. A currently available example at Washington community and technical colleges is the Integrated Basic Education and Skills Training (I-BEST) program that pairs English as a second language and adult basic education instructors with professional-technical instructors in the classroom to provide students with literacy education and workforce skills at the same time. I-BEST challenges the

[26] --

[27] *Dealing With 'Job Outs '*Inside Higher Education, September 26, 2007.

traditional notion that students must first complete all levels of basic education before they can begin workforce training.

The Committee also discussed paid or for credit internships as a method of providing employment contacts for students, providing employers with specifically trained employees, and helping sustain student interest. In 2007, SB 5486 was introduced. It provided for a B&O tax credit, equal to 100 percent of the gross wages (or $1,000 whichever was less) paid to the student employee, for persons that employ one or more students enrolled in a program that would provide an undergraduate or graduate degree in mathematics, science, health science, engineering, or computer technology. The students were required be junior, senior, or graduate students; receiving academic credit for the employment, and the employment was required to be related to the person's employment needs. The same credit was allowed against the public utility tax for students enrolled in technical programs. This bill remains in the Senate Ways and Means Committee for 2008.

Washington also provides workforce development/rural and economically impacted community development funds for the start-up or expansion of local high demand programs linked to economic development. Successful proposals need to respond to local economic development strategies and include a plan for continuing programs developed with the funding. High demand funds are designated to respond to the state's industry skill gap needs. High demand grants are intended to establish ongoing funding for high demand, high cost programs that otherwise may not have been started or expanded. Increased capacity and successful graduation of highly skilled workers for improving the state's economy and competitive advantage are the intended results.

Washington employers are participating in the education of students for high demand fields, but they could be doing more. Specifically, the Committee concluded that mentorship and internship programs need to be expanded and that this would help with student recruitment and retention. Educational institutions are generally quite receptive to these efforts as long as academic quality is not sacrificed. The Committee would like to see even greater cooperation and coordination in this area.

MARKETING PLAN

All of the efforts by the state and private post-secondary institutions, employers, teachers, and advisors to increase capacity for the education of students in high employer demand fields may be for naught unless the potential students know about the opportunities. The Committee also supports the implementation of a specific marketing campaign to ensure that high demand enrollments are largely filled by Washington students.

A subcommittee was formed to develop specific marketing recommendations[28]. The objectives of the marketing plan

[28] Subcommittee members were Suzy Ames, SBCTC; Angela Kerwin, Prosperity Partnership; John Lederer, HECB; Lew McMurran, WSA; Bill McSherry, Prosperity Partnership; and Madeline Thompson, WTECB.

identified by the subcommittee were to increase student interest in high demand fields of study and to increase public awareness of high demand fields and degrees at the mid-level and baccalaureate level. Four target audiences were identified: (1) unlikely college students in middle school or high school with a focus on low income and underrepresented communities; (2) likely college students in middle school or high school; (3) adult learners; and (4) parents and educators.

The primary messages to be emphasized by the marketing plan are the potential financial gains for graduates in high demand fields, the opportunities for career advancement, and the attractiveness of employment in those careers. The subcommittee recommended that a private vendor should be retained to design and implement the marketing campaign. The campaign would include television, radio, and print, as well as web-based media. A key component would be the development of a website to inform students, parents and counselors of the various options available to earn a degree or certificate in a high demand field.

The Committee envisions a 3-5 year marketing campaign and anticipates start-up costs of approximately $375,000 for creative planning, production, collateral materials production, opinion research, and website creation, as well as another $375,000 is needed for advertising placements and project management. The Committee found that these anticipated costs are modest considering the state's investment in increasing enrollments and retention.

The Committee found that investments in increasing enrollments and retention in high demand fields of study and the marketing plan must go hand-in-hand. That is to say that the investments will be less than successful if the potential students are not aware of them and the marketing plan would be wasteful if the programs are inadequate.

CONCLUSIONS

The discussions of the Committee were far ranging. There were no formal votes taken on any issues. Four items were discussed that deserve future legislative consideration.

Defining high demand

One of the primary tasks of the Committee was to determine a common language for discussing what "high demand" means. While it is important to acknowledge that student and employer demands are not identical, the Committee recommends a definition of "high employer demand program of study" for use by the community and technical colleges, DCTED, L&I, and the Employment Security Department. The suggested definition is:

> An undergraduate or graduate certificate or degree program in which the number of students prepared for employment per year from in-state institutions is substantially less than the number of projected job openings per year in that field, statewide or in a substate region.

By adopting this definition of high demand, the state can better focus its efforts on increasing the number of Washington students being prepared for employment in Washington. The next step is to provide the capacity of Washington's post-secondary system to address the high employer demand.

Undergraduate Level Capacity

There was consensus that the state should continue to earmark funds for mid-level and baccalaureate level enrollment in high demand fields. There was also consensus recognizing a need to increase the capacity of Washington institutions of higher education to produce mid-level certificates and degrees in accounting, aircraft mechanics, auto/diesel mechanics, construction trades, education, healthcare practitioners, science technology, and transportation as well as baccalaureate level degrees in high demand fields. Increases in capacity will be needed to accommodate Washington's growing population with even more dramatic increases required to keep Washington competitive with the other global challenge states. There is continuing discussion regarding the most appropriate method to increase that capacity however.

Some Committee members expressed the sentiment that the most efficient way to increase post-secondary capacity is to expand capacity in existing programs at existing institutions. The Committee recognized that support for capacity in liberal arts courses at four-year institutions would also require augmentation since those courses contribute significantly toward skills identified as important by employers.

In 2007, the legislature provided funding to identify a site and proposed academic plan for a new University of Washington branch campus in the north Puget Sound. It was determined that this new institution would have an emphasis in high demand fields. The task force charged with developing the administrative plan issued a preliminary report in November 2007.[29]

[29] *Preliminary Academic Plan for the UW North Sound Campus,*

The task force predicted student demand for just over 5,000 additional total enrollments by 2025, assuming that establishing a UW campus would result in a 33% increase in the student participation rate in public four-year higher education on top of currently projected enrollment for the north Puget Sound region. The preliminary academic plan for the new campus analyzed the higher education needs for the state and the region, both for bachelor degrees in general and for STEM degrees.

The Committee did not reach consensus on how to increase the capacity of Washington institution in high demand fields. This spirited discussion is likely to continue among stakeholders and legislators.

Marketing Plan

The Committee supports the implementation of a specific marketing campaign to ensure that mid-level and baccalaureate level high demand enrollments are largely filled by Washington students.

The objectives of the marketing plan would be to increase student interest in high demand fields of study and to increase public awareness of high demand fields and degrees. Four target audiences were identified: (1) unlikely college students in middle school or high school with a focus on low income and underrepresented communities; (2) likely college students in middle school or high school; (3) adult learners; and (4) parents and educators.

The Committee recommends that a private vendor should be retained to design and implement a 3-5 year marketing campaign.

The Committee anticipates start-up costs of approximately $375,000 for creative planning, production, collateral materials production, opinion research, and website creation, as well as another $375,000 is needed for advertising placements and project management. The Committee found that these anticipated costs are modest considering the state's investment in increasing enrollments and retention.

Workplace-Based Education

There is evidence that internships, mentorships and other workplace-based educational experiences can contribute to the student's abilities to communicate, think critically, and contribute in a team environment. There is also evidence that this focus can increase retention in high demand fields. The Committee finds that employer workplace-based educational experiences should be encouraged.

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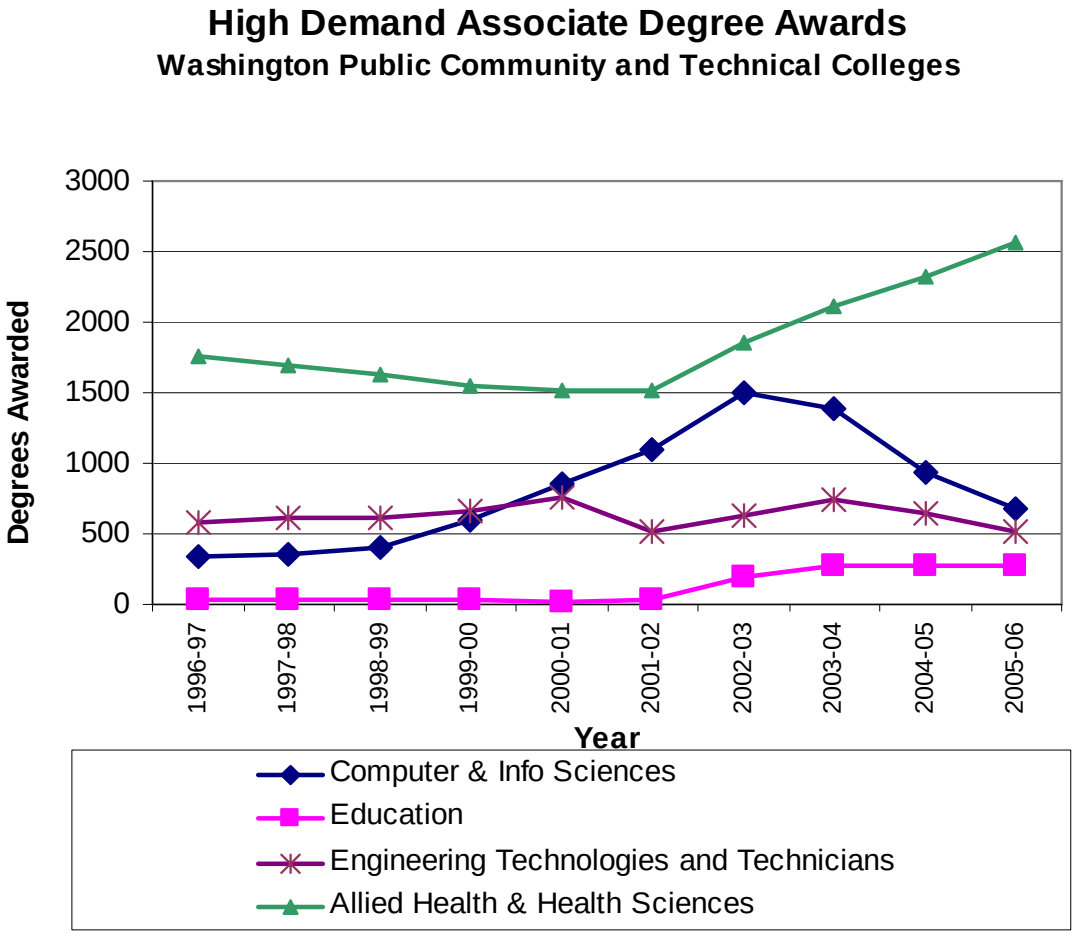
http://www.washington.edu/mediarel/pdfs/SIS_Report.pdf

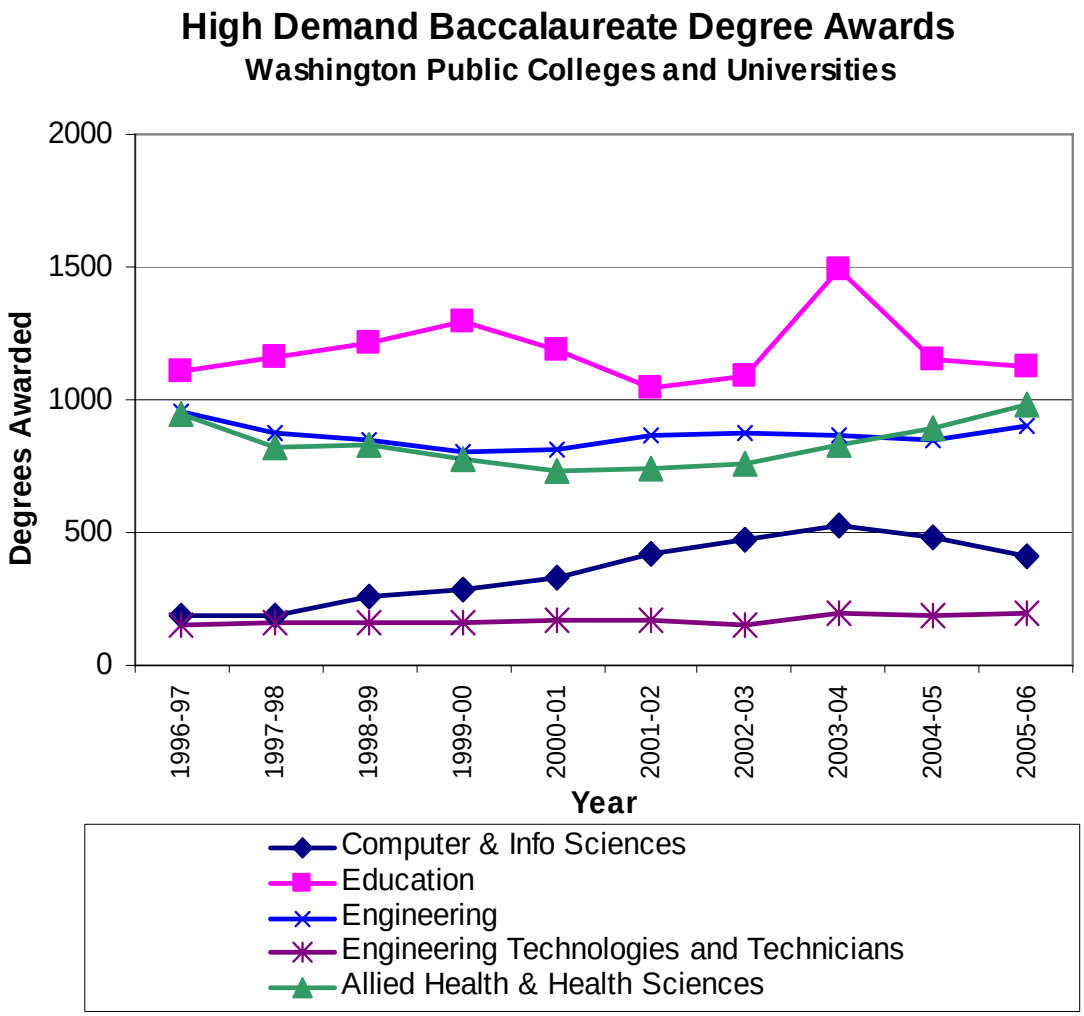
Appendix

Appendix A



Source: HECB PowerPoint presentation, *Enrollment Degree Trends and Goals*, July 26, 2007.

Appendix B



Source: HECB PowerPoint presentation, *Enrollment Degree Trends and Goals*, July 26, 2007.

Appendix C

The 2007 legislature passed 2SHB 1906 which, among many things, provides that:

1. The Superintendent of Public Instruction (SPI) is revising the Essential Academic Learning Requirements and Grade Level Expectations for mathematics. The State Board of Education (SBE) is being aided by an expert consultant and a Mathematics Advisory Panel of up to 16 members appointed by the SBE, including representation from academia, business and industry, educators, parents, and other individuals.
2. The SBE and the SPI are also revising the science standards by June 30, 2008, with a report to the Legislature by December 1, 2008.
3. The SBE is amending high school graduation requirements to include a minimum of three credits of mathematics and describe the required content. At least one of the credits may be a career and technical education course equivalent.
4. The SPI is identifying no more than three mathematics and science curricula for elementary, middle, and high school grade spans that align with the new standards and presenting them to the SBE for formal comment. Mathematics curricula must be identified by May 15, 2008, and science curricula by May 15, 2009. Subject to funding, at least one of the curricula must be available online at no cost to schools and parents.
5. An after school mathematics support program is created. The SPI provides grants to community-based nonprofit organizations that demonstrate the capacity to provide assistance in mathematics learning, with priority for proposals to serve middle and junior high school students.
6. A mathematics and science instructional coach program is created. The program includes a coaching institute, coaching support seminars, and additional coach development services.
7. Two new alternative routes to teacher certification are created. The Pipeline for Paraeducators program is for individuals with at least 3 years of classroom experience but without a college degree. A conditional scholarship of up to $4,000 /year for no more than 2 years is provided for candidates to enroll in a community or technical college. Upon completion of an Associate's Degree, the candidate is eligible to enroll in a Route One alternative route program to obtain a mathematics, special education, or ESL teaching certificate. The Retooling to Teach Mathematics and Science program is for current teachers and individuals who are not employed as teachers but who have an elementary teaching certificate. A conditional scholarship of up to $3,000/year is provided for these individuals to pursue a middle level or secondary mathematics or science endorsement through one of the PESB's pathways to endorsement.

8. The education and higher education agencies and institutions that make up the Transition Math Project are revising the Math Placement Test to serve as a common college readiness test for all two and four-year colleges and universities. The test must be implemented by September 1, 2009, with a common performance standard for college readiness.
9. Within funds appropriated for these purposes, the OSPI: obtains a statewide license or otherwise obtains and disseminates an interactive, project-based high school and middle school technology curriculum. The curriculum is being distributed to all school districts, or as many as feasible; supports an ongoing, inquiry-based science program that is based on research and aligned with the science GLEs; supports a public-private partnership to provide enriching opportunities in mathematics, engineering, and science for under-represented students; develops EALRs and GLEs for educational technology literacy and fluency; and obtains or develops classroom-based assessments for educational technology, which must be available for voluntary use by school districts by the 2010-11 school year.

Appendix D

MIDDLE SCHOOL CAREER AND TECHNICAL EDUCATION PROGRAMS - $3.0 MILLION Pursuant to Second Substitute House Bill 1906 (math and science), funding is provided to enhance allocations to some middle and junior high school career and technical education programs.

MATH/SCIENCE PROFESSIONAL DEVELOPMENT - $39.5 MILLION Funding is provided for: (1) three professional development days for each of middle and high school math and science teacher in the state; (2) specialized training for one math and one science teacher in each middle and high school to develop building-level expertise on the new math and science standards; and (3) two professional development days for fourth and fifth grade teachers to support district efforts to align instruction with new math and science state standards. These professional development days are in addition to the existing two Learning Improvement Days provided in existing state funding formulas for all certificated instructional staff.

PROMOTING ACADEMIC SUCCESS (PAS) FOR 12TH GRADE - $12.1 MILLION In the 2006 supplemental budget, funding was provided for the Promoting Academic Success (PAS) program to assist 11th grade students who are not successful in one or more subjects of the WASL. Additional funding is provided to serve 12th graders that still have not been successful on the WASL. This means that it would be possible for a student to receive PAS funding in their junior year, and again in their senior year.

INCREASE NUMBER OF TEACHERS - $6.6 MILLION Funding is provided to: (1) expand the Alternative Routes to Teacher Certification Program to produce an estimated 400 new teachers in math, science, special education or English as a Second Language; (2) create the Retooling To Teach Math and Science Program to produce an estimated 300 new teachers in those areas; and (3) increase the pipeline of paraeducators eligible for the Alternative Routes program.

EXPAND LASER - $6.0 MILLION State funding for LASER is expanded to reach additional classrooms each year. LASER provides complete toolkits for hands-on science projects, teacher training, research-based models for learning, and community support.

MATH/SCIENCE REGIONAL SUPPORT - $5.5 MILLION In order to support the additional professional development opportunities provided through the Education Reform program, funding is provided to each of the nine Educational Service Districts for a professional development specialist in mathematics in the 2007-08 school year and an additional specialist in science in the 2008-09 school year.

MATH AND SCIENCE INSTRUCTIONAL COACHES - $5.4 MILLION Funding is provided for 25 math instructional coaches in the 2007-08 and 2008-09 school years, and 25 science

instructional coaches in the 2008-09 school year. Each coach receives five days of training at a coaching institute prior to each being assigned to serve two schools.

MATH AND SCIENCE STANDARDS AND CURRICULUM - $4.7 MILLION Funding is provided to: (1) recommend new math standards aligned with international standards; (2) identify mathematics basic curricula, diagnostic, and supplemental materials that that align with the new international math standards; (3) support the development of state standards in science that reflect international content and performance levels; (4) evaluate science textbooks, instructional materials and diagnostic tools to determine the extent to which they are aligned with international standards; and (5) develop science WASL knowledge and skill learning modules to assist students performing at tenth grade Level 1 and Level 2 in science to improve their performance.

OTHER MATH AND SCIENCE ITEMS - $2.6 MILLION Other math and science items included in the budget include: (1) funding for the State Board of Education, and Professional Educators Standards Board to perform a variety of activities, with much of it focused on math and science; (2) paying for costs associated with high school students taking a college readiness test during 11th grade; and (3) providing after-school grants to community organizations that partner with school districts to provide mathematics support activities.