
A BILL FOR AN ACT

RELATING TO INNOVATION IN EDUCATION

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

1 SECTION 1. The Legislature finds that Hawaii's desire for
2 economic growth that benefits all residents depends on building
3 our state's human resources.

4 Realization of Hawaii's longstanding desire for economic
5 diversification and sustainability turns on applying that high-
6 skill human resource to the creation and adoption of innovation
7 across the economy.

8 Hawaii now also faces the challenge of a globally
9 interconnected economy. Global competition will determine where
10 a product or service is produced, where it is sold and who
11 captures its value.

12 Hawaii's continued prosperity and ability to preserve its
13 quality of life and preferred life-style depends on the state's
14 investment in human resource and innovation as the driver of
15 economic development and as the State's response to the
16 challenge of globalization.

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1 **The Vision**

2 Hawaii's economic development policy should shift toward
3 developing its human resources and its innovation capacity.

4 Hawaii's human resource potential is its greatest under-
5 utilized economic development driver. Increasing Hawaii's
6 innovation capacity will enable its companies and citizens to
7 compete in a global economy. Unleashing both is the key to
8 Hawaii's future prosperity.

9 The two are integrally inter-related. Without high-skilled
10 human resource, innovation will not occur or be applied.
11 Without innovation, there will not be the demand for that human
12 resource.

13 **Innovation and What it Accomplishes**

14 Innovation is the dynamic process whereby Hawaii creates
15 and introduces new ideas and new approaches to accomplish tasks.
16 It is the process of nurturing ideas, turning them into products
17 or services and into value, revenues and income.

18 Innovation often is the result of scientific discovery -
19 but it's more than that. It is a process which links together
20 Hawaii's knowledge, assets and networks of human capital to
21 transform ideas, insights and invention into new processes,
22 products and services that capture market share.

1 Innovation's measurable results are new or improved
2 products, service or production process; the opening up of a new
3 market; the adoption of a new technology; or an improvement to a
4 business organization or process.

5 Innovation is industry-agnostic; government does not pick
6 winner or losers. Innovation applies to Hawaii's existing and
7 new industries.

8 Innovation will increase Hawaii's standard of living
9 through steady growth in productivity. Productivity growth
10 depends on human capital and innovation capacity. Innovation
11 increases value and income either by reducing bottom line costs
12 – applying technology in ways that lower costs in order to
13 compete – or by growing top line revenues through the
14 introduction of new or differentiated products and services that
15 command a price premium in the market.

16 Innovation will lead to sustainability. We will achieve
17 increases in our gross state output with use of fewer natural
18 resources, including land.

19 Innovation will lead to economic diversification. It will
20 lead to new innovation- and knowledge-intensive companies with
21 higher-paying jobs in areas where Hawaii has natural competitive
22 advantages.

1 Innovation will grow Hawaii's traditional industries with
2 increased productivity and higher-paying jobs. Innovation has
3 been part of Hawaii's history: Without innovation, our sugar
4 and pineapple industries could not have survived facing hostile
5 trade practices on a high-cost, isolated and distant mid-Pacific
6 land mass.

7 **The Policy Framework**

8 The following are 10 key interrelated policy components of
9 a multi-year initiative to transform Hawaii's economy toward
10 human resource development and innovation:

- 11 (1) Graduates from Hawaii's secondary education system
12 with analytical and problem-solving skills that come
13 from exposure to rigorous science, technology,
14 engineering and math (STEM) education.
- 15 (2) An environment that efficiently and transparently
16 deploys public resources to encourage the creation of
17 products and services that are globally competitive.
- 18 (3) Regulatory and tax policies that reward productivity.
- 19 (4) A higher education system that drives human resource
20 development and innovation.

- 1 (5) A high-skilled workforce based on individual choice
2 and employer needs to encourage lifetime learning and
3 skill building.
- 4 (6) An environment that encourages risk-taking and
5 creativity.
- 6 (7) Links to innovation and creativity centers in the
7 Asia-Pacific region that encourage the flow of people,
8 products and ideas.
- 9 (8) Broadened access to technology tools, including
10 wireless broadband service on all islands.
- 11 (9) Quality assurance and accountability measures,
12 consistent with best practices as set out by credible
13 local and national experts.
- 14 (10) Government leading innovation by example.

15

16 The above requires a fundamental re-thinking and
17 realignment of public resources dedicated to secondary and
18 higher education, workforce and economic development into a
19 comprehensive framework to encourage human resource development
20 and innovation capacity in Hawaii's economy. The success of
21 this realignment will be nothing short of a restructuring of
22 Hawaii's economy.

1 A multiple-year strategy is necessary to achieve the
2 "innovation economy".

3 This Act is part of an initial package of initiatives
4 focusing on innovation introduced for the 2007 Legislative
5 Session. Together with its companion bills, this package begins
6 to achieve -

7 A 21st Century workforce with science, technology,
8 engineering, math and problem-solving skills sufficient to
9 ensure innovation and sustainability of Hawaii's economy;
10 Higher education institutions as "drivers" for innovation;
11 Continued public investment in the state's innovation
12 infrastructure;
13 Addressing the capital gap for Hawaii's emerging technology
14 and creative industry companies;
15 Opportunities for incumbent workers to engage in life-long
16 learning and skill-building;
17 Residents and businesses with international exposure,
18 orientation and skills to interact with and compete in a
19 global economy;
20 An innovation environment that encourages the creation of
21 new products and services that command global market share;
22 and

1 Analytical capability to assess policy performance and
2 progress toward innovation economy objectives.

3 In particular, this Act addresses the concern that Hawaii's
4 need for a workforce that is more skilled and competitive in
5 science and technology is growing. Data show that due to the
6 aging of the workforce, we will have increasingly more skilled
7 jobs opening up in the coming years than we will have young
8 people trained and ready to fill them.

9 A major problem is that our education system is not
10 preparing an adequate number of high school graduates with the
11 basic science, technology, engineering and math (STEM) skills
12 needed to move easily into pre-engineering and science at either
13 the four-year college level, or into the technology programs of
14 the community colleges. In fact, high school students appear to
15 be moving away from science and technology. For instance,
16 enrollments in the college of engineering at the university of
17 Hawaii are currently down roughly twenty-five per cent from the
18 mid-1980s. Moreover, according to the national center for
19 public policy and higher education, only eighteen per cent of
20 Hawaii's eighth graders test proficient in math compared with
21 thirty-eight per cent among the top states. In science only

1 fifteen per cent of Hawaii eighth graders test proficient
2 compared with forty-one per cent among the top states.

3 However, over the last decade new approaches to generating
4 higher participation and achievement by high school students in
5 technical areas have emerged, in the form of technical academies
6 run at selected high schools and effective contextual (learning
7 in the context of practical applications) learning programs such
8 as FIRST (fostering interest and respect for science and
9 technology) robotics and project EAST. The academy model mixes
10 high-quality instruction with practical, project-based
11 contextual learning experiences that generate enthusiasm among
12 students and show them the practical application of the academic
13 skills.

14 In Hawaii, the pioneering academy efforts were CISCO
15 academies, sponsored by computer network equipment giant CISCO
16 to create a pool of computer network skilled high school
17 graduates. Leveraging the success of the CISCO academy, the
18 community colleges, with the department of education and the
19 private sector, developed construction academies that created a
20 pool of apprenticeship-ready high school graduates for the
21 construction industry. There are now twenty-three CISCO
22 academies and twenty-seven construction academies in operation

1 at high schools around the state. These academies provide both
2 high school and college credit that meet DOE standards and
3 college standards. Since 2000, nineteen hundred students have
4 graduated from the CISCO academies. There are currently about
5 one thousand students enrolled in construction academies. The
6 Hawaii construction academy is recognized as a national best
7 practice and has been presented at national forums such as the
8 U.S. department of labor's annual workforce innovations meeting
9 of the nation's employment and training community.

10 The successful CISCO and construction academy models have
11 the advantage of supplementing the existing academic environment
12 with high quality, project-based learning without taxing the
13 resources of the existing schools as they struggle to meet the
14 many mandates for improvement and change that they face. The
15 academies utilize existing facilities and provide training and
16 resource assets for the programs and faculty of their respective
17 high school campuses. By providing high quality, standards-
18 based instruction, they reduce the cost of remedial education
19 usually needed to bring entering students up to college
20 standards. Very importantly, they instill confidence in average
21 students that they are capable of academic achievement beyond
22 their expectations.

1 There are two major challenges. The first is the
2 difficulty that practicing teachers face in keeping up with
3 content changes that occur ever more rapidly. The second is
4 that too many science and math classes are taught by teachers
5 that are not qualified in these subjects, particularly in the
6 elementary and middle schools. The center for the study of
7 teaching has reported that the most consistent and powerful
8 predictor of student achievement in science and mathematics was
9 the presence of teachers who were fully certified and had at
10 least a bachelor's degree in the subjects taught.

11 Innovative programs such as the one developed by the
12 university of Hawaii college of engineering are helping to
13 update the STEM skills and knowledge of middle school teachers
14 and improving the curriculum for teaching STEM to students, but
15 there is need for more flexible programs to reach more teachers.

16 Another important component in developing strong STEM
17 skills is the opportunity for students to participate in an
18 internship program at either the high school or college level.
19 This experience greatly enhances their educational preparation
20 and provides a clearer understanding of career possibilities.
21 In addition to technical knowledge and skills, students acquire

1 experience in a professional setting and a better understanding
2 of the expectations they will face on the job.

3 The final link in the education pipeline, universally
4 recognized as critical to the success of a knowledge-based
5 economy, is a vibrant postsecondary education system that meets
6 not only the traditional education expectations of its citizens,
7 but becomes a true partner in addressing the needs of the state
8 to have a highly skilled workforce, create knowledge-based
9 products and services, and provide the global orientation and
10 entrepreneurial skills required to succeed in today's world.
11 One proven way to enhance that strength is by retaining and
12 recruiting distinguished faculty through the endowment of
13 faculty chairs.

14 Recruiting more prestigious faculty will result in an
15 improved academic and research reputation, which will further
16 enhance the university's ability to attract top talent. Other
17 impacts should include: increased research funding; supporting
18 additional students and technical support staff; and, increased
19 development of innovations and inventions that can be
20 transferred to the private sector for commercialization.

21 The Legislature finds that it is crucial to address these
22 needs. The purposes of this Act are to:

- 1 (1) Develop a manageable, expandable, comprehensive system
2 of STEM academies and pre-academies, based on the
3 successful CISCO and construction academy models that
4 will focus on developing STEM skills in Hawaii's
5 school children from middle school through high
6 school;
- 7 (2) Increase the quality STEM teaching in Hawaii's schools
8 through providing enhanced professional development
9 opportunities for practicing teachers and attracting
10 highly qualified people with STEM degrees to the
11 teaching profession;
- 12 (3) Increase opportunities for high school and college
13 students to gain experience through internships;
- 14 (4) Increase the number of Hawaii high school graduates
15 seeking degrees or certificates in STEM disciplines by
16 providing scholarships to accredited institutions of
17 higher education in Hawaii; and
- 18 (5) Increase the quality of STEM education in Hawaii's
19 postsecondary education institutions through the
20 creation of endowed chairs in STEM disciplines.

21 SECTION 2. There is established within the university of
22 Hawaii community college system, the statewide Hawaii excellence

1 through science and technology (HiEST) academy program. The
2 program will be headed by a director and staffed by one support
3 specialist, one secretary and a fiscal/records support position.

4 The purpose of the HiEST academy program shall be to
5 increase the readiness and motivation of Hawaii high school
6 graduates to pursue post secondary training and career options
7 in science, technology, engineering, and math (STEM)
8 disciplines.

9 The HiEST academy program shall partner with the department
10 of education, interested high schools, and appropriate public,
11 non-profit and private agencies, to establish individual HiEST
12 academies at up to fourteen selected high schools throughout the
13 state. School participation in the HiEST program shall be
14 voluntary.

15 The selected high schools shall provide space on or
16 adjacent to their campus for the academy program. All
17 instructors in the high school academies shall be certified to
18 teach to both department of education and community college
19 standards and courses taught through the academies shall provide
20 students with both high school and university of Hawaii academic
21 credit to the maximum extent possible.

1 The HiEST academy program shall place priority on engaging
2 students who are not involved in advanced placement programs,
3 international baccalaureate programs and advanced science and
4 mathematics programs. It is anticipated that the project will
5 lead to better-prepared graduates, able to transfer to the
6 colleges of their choice without the need for remediation.

7 The HiEST academy shall support the partnership of the
8 university of Hawaii and the department of education in the
9 American diploma project, which establishes a dialogue and joint
10 curriculum assessment between teachers from high school and
11 college. This dialogue helps ensure a smooth transition from
12 high schools to college and improves the abilities of students
13 to meet their educational and career objectives.

14 Each HiEST academy shall have a lead instructor employed by
15 the community college system. Additional qualified instructors
16 may be hired by the community colleges. Teachers, including
17 those with the department of education, may also teach within
18 the academy program after appropriate certification training by
19 the community college system.

20 Each of the seven community colleges of the university of
21 Hawaii shall endeavor to partner with two high schools on their

1 respective islands to establish the fourteen HiEST academies
2 statewide. Each community college shall also consult regularly
3 with the respective county economic development boards,
4 workforce investment boards and other stakeholders to advise
5 them of plans and progress on development of the HiEST academies
6 and invite input.

7 HiEST academies shall work with the host high school to
8 implement the required academic programs as well as project-
9 based, contextual learning programs designed to use and expand
10 students' academic skills. The programs shall be designed
11 primarily for grades eleven and twelve for math, science and
12 technology, coupled with math development for grades nine and
13 ten.

14 Each high school academy program will strive to enroll at
15 least twenty-five per cent of the high school student body in
16 academy programs within two years of its inception. The
17 statewide fourteen HiEST academies shall strive to serve four
18 thousand high school students by the end of its second year of
19 operation with one thousand graduating from high school and the
20 HiEST academies per year.

1 The academy system shall also strive to reduce the need for
2 math and English remediation among its graduated academy members
3 attending post secondary training to no more than twenty per
4 cent.

5 The academy shall develop performance measures to ensure
6 that the programs conducted are contributing substantially and
7 directly to an increase in high school graduates ultimately
8 entering post secondary STEM programs and pursuing STEM related
9 occupations.

10 SECTION 3. There is established within the university of
11 Hawaii, the statewide fostering inspiration and relevance
12 through science and technology (FIRST) pre-academy program. The
13 pre-academy program shall be headed by a director and staffed by
14 six field staff (two for Oahu, two for the island of Hawaii and
15 one each in Kauai and Maui counties) and a secretary. When
16 appropriate, the functions of the field staff may be contracted
17 to qualified private or nonprofit providers.

18 The pre-academy program shall partner with the HiEST
19 academies, other relevant programs within the university of
20 Hawaii system, the department of education, interested schools
21 in areas served by HiEST academies, and appropriate public and

1 private agencies, to establish a program of contextual learning
2 for middle school students in science, technology engineering
3 and math. The program shall also provide contextual learning
4 programs for students enrolled in the HiEST academies in
5 cooperation with the HiEST academy staff.

6 The mission of the FIRST pre-academy program with respect
7 to middle schools shall be to stimulate the interest and
8 achievement of students in STEM skills and help prepare those
9 students for entry into the HiEST academy program beginning in
10 ninth grade. The mission of the pre-academy program with
11 respect to students enrolled in the HiEST academies shall be to
12 support and complement the HiEST academy's academic programs
13 with contextual learning projects.

14 The goal of the pre-academy shall be to serve at least
15 sixteen thousand students statewide, between sixth and twelfth
16 grades, with contextual learning experiences in STEM-related
17 skills. The pre-academy shall also strive to motivate and
18 prepare a pool of at least one thousand students per year to
19 enter the HiEST academy program.

20 School participation in the FIRST pre-academy programs
21 shall be voluntary. Selected schools shall be responsible for

1 providing space and necessary logistical support to pre-academy
2 programs serving the school. The staff and affiliated
3 contextual learning and teacher training specialists of the pre-
4 academy shall strive to tailor the mix and nature of the
5 contextual learning projects and training for teachers to the
6 needs of each individual school served.

7 To achieve its mission, the FIRST pre-academy program shall
8 house and provide direction for a statewide robotics and space
9 contextual learning program and a program of research
10 experiences for teachers (RET).

11 The robotics and space contextual learning program shall be
12 headed by a state coordinator and staffed by two field staff.
13 The mission of the robotics and space contextual learning
14 program shall be to develop STEM skills among students in FIRST
15 pre-academy and HiEST academy programs through robotics- and
16 space-technology-based, contextual projects and competitions.
17 The robotics and space contextual learning program shall work
18 with existing programs to expand and deepen activities such as,
19 but not limited to, NASA explorer schools, FIRST robotics, FIRST
20 lego league, FIRST vex, botball and underwater robotics
21 challenge.

1 The director and staff of the robotics and space contextual
2 learning program shall coordinate and cooperate with the
3 director and staff of the FIRST pre-academy and HiEST academy
4 programs in establishing a well integrated system of STEM
5 related, contextual learning programs under the administration
6 of the pre-academy. The robotics and space contextual learning
7 program shall enlist, encourage, train and support volunteer
8 teachers and other mentors to conduct robotics and space-related
9 programs at the school level.

10 The goal of the robotics and space contextual learning
11 program shall be to involve three thousand students.

12 The research experiences for teachers (RET) program shall
13 be administered by the university of Hawaii college of
14 engineering in cooperation and coordination with the FIRST pre-
15 academy. The purpose of the RET program shall be to support the
16 development of middle school teacher skills, knowledge and
17 development of middle school curriculum materials in STEM
18 subject areas, with a particular focus on wireless
19 communications.

20 In particular, the RET program shall: educate teachers in
21 the advances in technology in wireless communications and

1 engineering; enhance teacher research skills through the use of
2 software and innovative uses of equipment; provide teacher
3 participants with hands on research experiences; support
4 teachers in developing classroom lessons and program activities
5 which meet their course objectives and student performance
6 standards; and provide opportunities to share and collaborate
7 with other teacher participants to ensure successful
8 implementation of curricula and programs.

9 Specific activities of the RET programs shall include:
10 providing on site lectures, demonstrations, and laboratory tours
11 at the university of Hawaii and middle schools; reviewing
12 wireless communication concepts, methods, history, and
13 applications; reviewing engineering and relevant science
14 concepts, research methodology, and real-world applications;
15 reviewing key components of inquire-based teaching materials;
16 providing teachers with technical content support; assisting
17 teachers in adapting state-of-the-art engineering research into
18 a meaningful classroom experience for students; providing semi-
19 annual video conference/seminar to transfer relevant information
20 and experiences among teacher participants and sponsors;
21 providing summer engineering workshop for teachers; and
22 maintaining a website for content and program dissemination.

1 The director and staff of the FIRST pre-academy program
2 shall develop additional contextual learning projects and summer
3 STEM training programs for elementary, middle school and high
4 school teachers. For additional contextual learning projects
5 priority shall be given to the areas of global positioning
6 system technology, ocean science, astronomy, earth science and
7 wireless communications technology, and other STEM-skills
8 stimulating subjects as appropriate.

9 The FIRST pre-academy shall develop performance measures to
10 ensure that all programs conducted under the pre-academy are
11 contributing substantially and directly to an increase in
12 student performance in STEM academics and matriculation into the
13 HiEST academy.

14 SECTION 4. There is established within the university of
15 Hawaii, a professional development program to provide practicing
16 elementary, middle and high school teachers of science and
17 mathematics with opportunities to increase their knowledge and
18 understanding of recent developments in science, technology and
19 mathematics. The program shall be open to both certificated and
20 non-certificated teachers. Design of the program shall include
21 evaluation of best practices in other school jurisdictions. In

1 recognition that the year-round public school calendar has
2 shortened the summer period, that not all schools are on the
3 same academic calendar, and that programs throughout the year,
4 offered in a variety of formats, would facilitate immediate
5 implementation in the classroom, the program shall have the
6 following attributes:

- 7 (1) Flexibility. The program shall provide a variety of
8 options designed to meet the specific needs of
9 Hawaii's teachers, which may include summer
10 institutes, a combination of summer, after school or
11 weekend institutes, distance learning through video
12 conferencing or other mechanisms, Neighbor Island
13 locations, or other options.
- 14 (2) Accountability. The program shall provide a method to
15 track the student outcomes derived from participation
16 in the program.

17 The goal of the professional development program for
18 practicing teachers is to provide training for two thousand six
19 hundred teachers during the biennium.

20 SECTION 5. There is provided funding to support a
21 successful recruitment program currently funded under the U.S.
22 department of education transition to teaching (TTT) program

1 that has resulted in ninety new qualified mathematics and
2 science teachers since it began four-and-a-half years ago. The
3 TTT program provides stipends as recruitment incentives for
4 people who hold degrees in STEM subjects to get their teaching
5 certificates through the university of Hawaii's post
6 baccalaureate certificate in secondary education (PBCSE)
7 program. The university's TTT grant will expire in 2008. There
8 is a chronic shortage of science and mathematics teachers and
9 the PBSCE program is an effective method to address the problem,
10 however recruitment for potential STEM teachers is difficult and
11 the incentive of stipends has proven effective. The goal of the
12 program is to produce twenty new science or mathematics teachers
13 each year.

14 SECTION 6. There is established within the department of
15 business, economic development and tourism, the
16 business/education internship and mentorship program. The
17 purpose of this program is to establish, with the cooperation of
18 educational institutions, intern, mentorship and other
19 experiential learning arrangements within the business
20 community, nonprofit sector and government, for Hawaii high
21 school students and Hawaii high school graduates attending
22 college in Hawaii or elsewhere. The goals of this program are

1 to provide Hawaii students with experience in the world of work
2 to improve their career choices, and to provide an opportunity
3 for Hawaii employers to establish relationships with students
4 who represent an essential source of skills for Hawaii's future
5 economic growth and prosperity. The department may contract
6 with appropriate government, non-profit or for-profit entities
7 to accomplish the purpose and goals of this program.

8 Section 7. There is established, within the high
9 technology development corporation, a STEM scholarship program
10 to provide graduates of HiEST academies with scholarships to
11 pursue STEM degrees or certificates in approved STEM
12 disciplines. Chapter 206M, Hawaii revised statutes, is amended
13 by adding a new section to part I to be appropriately designated
14 and to read as follows:

15 "Section 206M- STEM scholarship special fund. (a)
16 There is established in the state treasury a fund, to be known
17 as the STEM scholarship special fund, into which shall be
18 deposited appropriations made by the state legislature and any
19 funds received from other sources to support the intent of the
20 fund.

21 (b) The board shall administer the fund with the advice of
22 the Hawaii innovation council;

1 (c) The expenses of administering the fund shall be paid
2 from the money in the fund;

3 (d) At the discretion of the board, administration of the
4 fund may be accomplished by contracting with a qualified person,
5 as provided in §206M-3(3), or appointing employees as provided
6 in §206M-3(6), or a combination thereof;

7 (e) The treasurer of the state shall invest the money in
8 the fund not currently needed to meet the obligations of the
9 fund in the same manner as other public funds may be invested;

10 (f) Money in the fund at the end of a state fiscal year
11 shall not revert to the state general fund;

12 (g) The fund shall be used to provide scholarships (up to
13 eight semesters at an accredited institution of higher education
14 in Hawaii) for Hawaii high school graduates who meet the
15 following requirements:

16 (1) Is a resident of Hawaii;

17 (2) Prior to the tenth grade, agreed in writing, together
18 with the student's custodial parents or guardian, that
19 the student would:

20 (A) Graduate from a public or accredited nonpublic
21 secondary school located in Hawaii that meets the

- 1 admission criteria of an accredited institution
2 of higher learning;
- 3 (B) Complete the STEM curriculum offered by a HiEST
4 (Hawaii excellence through science & technology)
5 academy;
- 6 (C) Not illegally use controlled substances (as
7 defined in Chapter 329, Hawaii revised statutes;
- 8 (D) Not commit a crime or infraction (as defined in
9 Chapters 329, Hawaii revised statutes; and
- 10 (E) Apply for admission and be accepted to attend an
11 accredited institution of higher learning in the
12 state of Hawaii to pursue a degree or certificate
13 in a STEM discipline; and
- 14 (3) Certifies in writing that the conditions of the
15 written agreement as described in §206M- - (g) (2) have
16 been met.
- 17 (h) The maximum amount of the scholarship shall be set at
18 the tuition equivalent of a full-time student enrolled at the
19 university of Hawaii at Manoa;
- 20 (j) The board shall adopt rules pursuant to chapter 91 to
21 implement this section, including, but not limited to:

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- 1 (1) Rules to create the agreement signed by the student and
2 the student's custodial parents or guardian, as
3 described in Section 206M- (g) (2) and the
4 certification as described in Section 206M- (g) (3);
5 (2) Rules to determine which accredited institutions of
6 higher education are included in the scholarship
7 program;
8 (3) Rules to determine which degrees or certificates
9 qualify as being defined as STEM disciplines;
10 (4) Rules to establish the application process to obtain
11 the scholarship; and
12 (5) Rules to establish criteria for disqualification as a
13 recipient of a STEM scholarship, including appeals
14 procedures.
15 (k) The board shall include in its annual budget request
16 sufficient funds to implement the purpose of this section."

17 SECTION 8. There is established, within the high
18 technology development corporation, an eminent scholars program
19 to be funded by the state akamai investment matching special
20 fund to enable accredited universities in Hawaii to provide
21 donors with an incentive in the form of matching grants for
22 donations to establish permanently endowed faculty positions in

1 science, technology, engineering and mathematics at any
2 accredited university in Hawaii.

3 Currently, the university of Hawaii has a little over two
4 dozen endowed chairs and distinguished professorships, with only
5 five in non-health related STEM disciplines. There are no STEM
6 chairs in Hawaii's other universities. All funds appropriated
7 for the akamai investment matching program shall be deposited
8 into the special fund and invested until the board of directors
9 of the high technology development corporation allocates the
10 funds to a university to match private donations on a dollar for
11 dollar basis. The goal is to create up to five endowed STEM
12 chairs.

13 SECTION 9: Chapter 206M, Hawaii revised statutes, is
14 amended by adding a new section to part I to be appropriately
15 designated and to read as follows:

16 "Section 206M- State akamai investment matching
17 special fund. (a) There is established in the state treasury a
18 fund, to be known as the akamai investment matching special
19 fund, into which shall be deposited appropriations made by the
20 state legislature and matching private donations.

21 (b) The board shall administer the fund with the advice of
22 the Hawaii innovation council;

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1 (c) The expenses of administering the fund shall be paid
2 from the money in the fund;

3 (d) At the discretion of the board, administration of the
4 fund may be accomplished by contracting with a qualified person,
5 as provided in §206M-3(3), or appointing employees as provided
6 in §206M-3(6), or a combination thereof;

7 (e) The treasurer of the state shall invest the money in
8 the fund not currently needed to meet the obligations of the
9 fund in the same manner as other public funds may be invested;

10 (f) Money in the fund at the end of a state fiscal year
11 shall not revert to the state general fund;

12 (g) The fund shall be used as a funding mechanism to
13 create new endowed faculty chairs in science, technology,
14 engineering and mathematics at accredited universities in
15 Hawaii;

16 (h) No state appropriations deposited into the fund shall
17 be expended unless matched by private funds on a dollar-for-
18 dollar basis;

19 (i) The board shall adopt rules pursuant to chapter 91 to
20 implement this section, including, but not limited to:

H.B. NO. 1268

- 1 (1) Rules to determine which accredited institutions of
2 higher education are to be included in the eminent
3 scholars program;
- 4 (2) Rules to determine which university departments
5 qualify as being defined as STEM disciplines;
- 6 (3) Rules to establish the application process for
7 universities to request funding to support an endowed
8 chair. The board shall take into consideration the
9 following criteria before approving state matching
10 funds to establish a position:
 - 11 (A) The ability for the position to contribute to
12 Hawaii's economic development;
 - 13 (B) The ability for the position to make a
14 significant contribution to the university's
15 academic quality;
 - 16 (C) The ability for the position to obtain
17 significant amounts of annual research from
18 highly competitive grant sources; and
 - 19 (D) The field of the proposed position and its
20 potential funding sources, relationship to
21 existing research at the applying university and

1 in the State of Hawaii, size and scope of related
2 industries, and other relevant factors."

3 SECTION 10. Chapter 206M, Hawaii revised statutes, is
4 amended by adding two new subsections to Section 206M-3.5 on
5 annual reports to read as follows:

6 "Section 206M-3.5 **Annual reports.** The development corporation
7 shall report annually to the legislature twenty days prior to
8 the convening of the session on the impact of the program on:

- 9 (1) Increasing the awareness of the federal small business
10 innovation research program and the number of
11 companies submitted proposals to federal agencies;
12 (2) Increasing the number of phase I awards received by
13 Hawaii businesses under the small business innovation
14 research program; [and]
15 (3) Increasing the number of phase I to phase II
16 conversions by Hawaii businesses [-];
17 (4) Providing STEM scholarships to graduates of HiEST
18 academies; and
19 (5) Funding endowed STEM chairs at Hawaii's universities."

20 SECTION 11. There is appropriated from general funds the
21 sum of \$3,204,016, or so much thereof as may be necessary for FY
22 2007-2008 and the amount of \$1,672,888 or so much thereof as may

1 be necessary for FY 2008-2009, for establishing the HiEST
2 academy program. The sums appropriated shall be expended by the
3 university of Hawaii for the purposes of this Act.

4 SECTION 12. There is appropriated from general funds the
5 sum of \$1,402,230 or so much thereof as may be necessary for FY
6 2007-2008 and the amount of \$2,054,240 or so much thereof as may
7 be necessary for FY 2008-2009, for establishing the FIRST
8 academy program. Of the sums appropriated, \$314,925 for FY
9 2007-2008 and \$419,900 for FY 2008-2009, shall be expended for
10 the robotics and space contextual learning program. Of the sums
11 appropriated, \$187,905 for FY 2007-2008 and \$250,540 for FY
12 2008-2009, shall be expended for the research experiences for
13 teachers (RET) program. Of the sums appropriated, \$546,900 for
14 FY 2007-2008 and \$753,800 for FY 2008-2009, shall be expended
15 for additional experiential programs. The sums appropriated
16 shall be expended by the University of Hawaii for the purposes
17 of this Act.

18 SECTION 13. There is appropriated from general funds the
19 sum of \$350,000 or so much thereof as may be necessary for FY
20 2007-2008 and the amount of \$700,000 or so much thereof as may
21 be necessary for FY 2008-2009, for developing programs for
22 professional development in STEM for practicing teachers. The

1 sums appropriated shall be expended by the university of Hawaii
2 for the purposes of this Act.

3 SECTION 14. There is appropriated from general funds the
4 sum of \$350,000 or so much thereof as may be necessary for FY
5 2007-2008 and the amount of \$350,000 or so much thereof as may
6 be necessary for FY 2008-2009, for providing stipends to attract
7 STEM graduates to the university of Hawaii post baccalaureate
8 certificate in secondary education program. The sums
9 appropriated shall be expended by the university of Hawaii for
10 the purposes of this Act.

11 SECTION 14. There is appropriated from general funds the
12 sum of \$110,000 or so much thereof as may be necessary for
13 fiscal year 2007-2008, and \$110,000 or so much thereof as may be
14 necessary for fiscal year 2008-2009, for the business and
15 education internship and mentorship program. The sums
16 appropriated shall be expended by the department of business,
17 economic development, and tourism for the purposes of this Act.

18 SECTION 15. There is appropriated from general funds the
19 sum of \$2,000,000 or so much thereof as may be necessary for
20 fiscal year 2007-2008, and \$3,000,000 or so much thereof as may
21 be necessary for fiscal year 2008-2009, for the state akamai
22 investment matching special fund. The sums appropriated shall

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1 be expended by the university of Hawaii for the purposes of this
2 Act.

3 SECTION 16. Statutory material to be repealed is bracketed
4 and stricken. New statutory material is underscored.

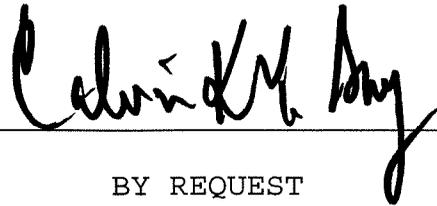
5 SECTION 17. This Act shall take effect on July 1, 2007.

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INTRODUCED BY: _____



BY REQUEST

9

JAN 22 2007

JUSTIFICATION SHEET

DEPARTMENT: Business, Economic Development, and Tourism

TITLE: RELATING TO INNOVATION IN EDUCATION.

PURPOSE: The purposes of this Act are to: (1) develop a manageable, expandable, comprehensive system of science, technology, engineering, and mathematics (STEM) academies and pre-academies, based on the successful CISCO and construction academy models that will focus on developing STEM skills in Hawaii's school children from middle school through high school; (2) increase the quality STEM teaching in Hawaii's schools through providing enhanced professional development opportunities for practicing teachers and attracting highly qualified people with STEM degrees to the teaching profession; (3) increase opportunities for high school and college students to gain experience through internships; (4) increase the number of Hawaii high school graduates seeking degrees or certificates in STEM disciplines by providing scholarships to accredited institutions of higher education in Hawaii; and (5) increase the quality of STEM education in Hawaii's postsecondary education institutions through the creation of endowed chairs in STEM disciplines.

MEANS: (1) Appropriating State general funds to the University of Hawaii to establish the Hawaii Excellence through Science & Technology (HiEST) Academy Program and the Fostering Inspiration and Relevance from Science (FIRST) Pre-Academy program, which

includes selected, successful contextual learning and teacher training and support programs. The programs will operate within fourteen high school complexes and involve both community college and DOE faculty. The STEM initiative also creates a powerful partnership between the department of education, the University of Hawaii and established contextual education programs.

- (2) Appropriating State general funds to the University of Hawaii to: (a) develop a flexible program to provide professional development opportunities to practicing teachers to upgrade STEM content and teaching practices; and (b) provide stipends to attract graduates with STEM degrees to the Post Baccalaureate Certificate in Secondary Education program.
- (3) Appropriating State general funds to the department of business, economic development, and tourism to implement a program of STEM internships for high school and college students.
- (4) Amending Chapter 206M, Hawaii Revised Statutes, by adding a new section to establish a special fund to be administered by the High Technology Development Corporation to provide scholarships to graduates of the HiEST academies who are accepted by an accredited university in the Hawaii to pursue a STEM degree.

- (5) Amending Chapter 206M, Hawaii Revised Statutes, by adding a new section to establish a special fund and appropriating State general funds to be administered by the High Technology Development Corporation to provide matching funds for private contributions to establish endowed chairs in STEM disciplines at accredited universities in Hawaii.

JUSTIFICATION:

Hawaii's need for a workforce that is more skilled and competitive in science and technology is growing. Data show that due to the aging of the workforce, we will have increasingly more skilled jobs opening up in the coming years than we will have young people trained and ready to fill them. Moreover, our education system is not preparing an adequate number of high school graduates with the basic science, technology, engineering and math (STEM) skills needed to move easily into pre-engineering and science at either the four-year college level, or into the technology programs of the community colleges. In fact, high school students appear to be moving away from science and technology.

The HiEST and FIRST Academy models build on new approaches to generating higher participation and achievement by high school students in technical areas such as the CISCO academies, that are creating a pool of computer network skilled high school graduates, and construction academies that are creating a pool of apprenticeship-ready high school graduates for the construction industry. The academy

model has the advantage of supplementing the existing academic environment with high quality, project-based learning without taxing the resources of the existing schools as they struggle to meet the many mandates for improvement and change that they face. They utilize existing facilities and provide training and resource assets for the programs and faculty of their respective high school campuses. By providing high quality, standards-based instruction, they reduce the cost of remedial education usually needed to bring entering students up to college standards. Very importantly, they instill confidence in average students that they are capable of academic achievement beyond their expectations. Contextual learning (learning in the context of practical applications) has shown great promise in cutting through the abstract and disengaged atmosphere of standard academic presentation. In addition, innovative programs developed by the University of Hawaii College of Engineering are helping to update the STEM skills and knowledge of middle teachers and improving the curriculum for teaching STEM to students.

A critical element to providing the programs described here is the development of outstanding K-12 teachers in science and mathematics that are adequately prepared to provide students with the tools they need to function in a global society where science, technology, engineering and mathematics play an ever increasing role in the jobs they will fill and their everyday lives. The professional development programs and the stipends to attract STEM graduates to teaching will help meet the critical shortage of math and science teachers in the state.

An important component in developing strong STEM skills is the opportunity for students to participate in an internship or mentoring program at either the high school or college level. This experience greatly enhances their educational preparation and provides a clearer understanding of career possibilities. In addition to technical knowledge and skills, students acquire experience in a professional setting and a better understanding of the expectations they will face on the job.

In order to meet the needs that have been described above, we must encourage students to enter the FIRST and HiEST academies. A method that has worked well in Indiana is the provision of scholarships to students who sign an agreement, with a parent or guardian, to meet certain requirements. This incentive should ensure that a good number of students will graduate from a HiEST academy and pursue a STEM degree at a Hawaii university. This will help meet our needs for highly trained workers and enable Hawaii residents to stay in the State to pursue well paying careers.

The competitiveness of a university is determined by the strength of its faculty. One proven way to enhance that strength is by retaining and recruiting distinguished faculty through the endowment of faculty chairs.

Endowed chairs are supported by the income generated by an endowment fund established with a gift or gifts from private sources. Typically, the donations are made for specific disciplines and are often named after the donor or in honor of a

distinguished member of the field. In addition to the prestige accorded the holder of an endowed chair, funding is provided to support his or her teaching, research, and service responsibilities.

To support an endowed chair in a STEM field would require up to \$2 million. Currently, the University of Hawaii has a little over two dozen endowed chairs and distinguished professorships, with only five in non-health related STEM disciplines. There are no STEM chairs in Hawaii's other universities.

Impact on the public: The ultimate goal of the Innovation in Education initiative is to raise the skill level of the economy, thereby producing higher incomes and a better standard of living for Hawaii's residents.

Impact on the department: The Innovation in Education initiatives will have minimal impact on the operations of the core department as most of the components will be run by other agencies and groups: University of Hawaii and High Technology Development Corporation.

GENERAL FUND:

Total request: \$7,416,246 for FY 2007-2008 and \$7,887,128 FY 2008-2009, as follows:

- (1) \$3,204,016 for FY 2007-2008 and \$1,672,888 for FY 2008-2009 for the HiEST academies, and \$1,402,230 for FY 2007-2008 and \$2,054,240 for FY 2008-2009 for the FIRST academies;
- (2) \$350,000 for FY 2007-2008 and \$700,000 for FY 2008-2009 for professional development programs, and \$350,000 for FY 2007-2008 and \$350,000 for FY 2008-2009 for

stipends for STEM graduates to become teachers;

- (3) \$110,000 for FY 2007-2008 and \$110,000 for FY 2008-2009, for the business/education internship and mentorship program;
- (4) No funds appropriated since the scholarships would not be needed until the next biennium, to be factored into the spending plan; and
- (5) \$2,000,000 for FY 2007-2008 and \$3,000,000 for FY 2008-2009 for the endowed chairs.

OTHER FUNDS: Endowed chairs funds to be matched dollar-for-dollar by private contributions.

PPBS PROGRAM DESIGNATION:

OTHER AFFECTED AGENCIES: University of Hawaii, High Technology Development Program

EFFECTIVE DATE: July 1, 2007