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# 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 high-skill  
6 human resources 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 resources and innovation as the driver of  
15 economic development and as the State's response to the  
16 challenge of globalization.

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



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

6 The two are integrally inter-related. Without high-skilled  
7 human resources, innovation will not occur or be applied.  
8 Without innovation, there will not be the demand for human  
9 resources.

10 Innovation is the dynamic process whereby Hawaii creates  
11 and introduces new ideas and new approaches to accomplish tasks.  
12 It is the process of nurturing ideas, turning them into products  
13 or services and into value, revenues, and income.

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

19 Innovation's measurable results are new or improved  
20 product, service, or production process; the opening up of a new  
21 market; the adoption of a new technology; or an improvement to a  
22 business organization or process.



1 Innovation is industry-agnostic; government does not pick  
2 winners or losers. Innovation applies to Hawaii's existing and  
3 new industries.

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

12 Innovation will lead to sustainability. We will achieve  
13 increases in our gross state output with the use of fewer  
14 natural resources, including land.

15 Innovation will lead to economic diversification. It will  
16 lead to new innovation- and knowledge-intensive companies with  
17 higher-paying jobs in areas where Hawaii has natural competitive  
18 advantages.

19 Innovation will grow Hawaii's traditional industries with  
20 increased productivity and higher-paying jobs. Innovation has  
21 been part of Hawaii's history. Without innovation, our sugar  
22 and pineapple industries could not have survived facing hostile



1 trade practices on a high-cost, isolated, and distant mid-  
2 Pacific land mass.

3 The following are ten key interrelated policy components of  
4 a multi-year initiative to transform Hawaii's economy toward  
5 human resources development and innovation:

- 6 (1) Graduates from Hawaii's secondary education system  
7 with analytical and problem-solving skills that come  
8 from exposure to rigorous science, technology,  
9 engineering, and math (STEM) education;
- 10 (2) An environment that efficiently and transparently  
11 deploys public resources to encourage the creation of  
12 products and services that are globally competitive;
- 13 (3) Regulatory and tax policies that reward productivity;
- 14 (4) A higher education system that drives human resources  
15 development and innovation;
- 16 (5) A high-skilled workforce based on individual choice  
17 and employer needs to encourage lifetime learning and  
18 skill building;
- 19 (6) An environment that encourages risk-taking and  
20 creativity;



- 1           (7) Links to innovation and creativity centers in the  
2           Asia-Pacific region that encourage the flow of people,  
3           products, and ideas;
- 4           (8) Broadened access to technology tools, including  
5           wireless broadband service on all islands;
- 6           (9) Quality assurance and accountability measures,  
7           consistent with best practices as set out by credible  
8           local and national experts; and
- 9           (10) Government leading innovation by example.

10          The above requires a fundamental re-thinking and  
11          realignment of public resources dedicated to integrating  
12          secondary and higher education and workforce and economic  
13          development into a comprehensive framework to encourage human  
14          resources development and innovation capacity in Hawaii's  
15          economy. The success of this realignment will be nothing short  
16          of a restructuring of Hawaii's economy.

17          A multiple-year strategy is necessary to achieve the  
18          "innovation economy."

19          This Act is part of an initial package of initiatives  
20          focusing on innovation introduced for the 2007 legislative  
21          session. Together with its companion measures, this package  
22          begins to achieve:



- 1 (1) A twenty-first century workforce with science,  
2 technology, engineering, math, and problem-solving  
3 skills sufficient to ensure innovation and  
4 sustainability of Hawaii's economy;
- 5 (2) Higher education institutions as "drivers" for  
6 innovation;
- 7 (3) Continued public investment in the State's innovation  
8 infrastructure;
- 9 (4) Addressing the capital gap for Hawaii's emerging  
10 technology and creative industry companies;
- 11 (5) Opportunities for incumbent workers to engage in  
12 life-long learning and skill-building;
- 13 (6) Residents and businesses with international exposure,  
14 orientation, and skills to interact with and compete  
15 in a global economy;
- 16 (7) An innovation environment that encourages the creation  
17 of new products and services that command global  
18 market share; and
- 19 (8) Analytical capability to assess policy performance and  
20 progress toward innovation economy objectives.

21 In particular, this Act addresses the concern that Hawaii's  
22 need for a workforce that is more skilled and competitive in



1 science and technology is growing. Data show that due to the  
2 aging of the workforce, we will have increasingly more skilled  
3 jobs opening up in the coming years than we will have young  
4 people trained and ready to fill them.

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

20 However, over the last decade new approaches to generating  
21 higher participation and achievement by high school students in  
22 technical areas have emerged, in the form of technical academies



1 run at selected high schools and effective contextual (learning  
2 in the context of practical applications) learning programs such  
3 as FIRST (fostering interest and respect for science and  
4 technology) robotics and project EAST. The academy model mixes  
5 high-quality instruction with practical, project-based  
6 contextual learning experiences that generate enthusiasm among  
7 students and show them the practical application of the academic  
8 skills.

9 In Hawaii, the pioneering academy efforts were CISCO  
10 academies, sponsored by computer network equipment giant CISCO  
11 to create a pool of computer network skilled high school  
12 graduates. Leveraging the success of the CISCO academy, the  
13 community colleges, with the department of education and the  
14 private sector, developed construction academies that created a  
15 pool of apprenticeship-ready high school graduates for the  
16 construction industry. There are now twenty-three CISCO  
17 academies and twenty-seven construction academies in operation  
18 at high schools around the State. These academies provide both  
19 high school and college credit that meet the department of  
20 education standards and college standards. Since 2000, nineteen  
21 hundred students have graduated from the CISCO academies. There  
22 are currently about one thousand students enrolled in





1 construction academies. The Hawaii construction academy is  
2 recognized as a national best practice and has been presented at  
3 national forums such as the U.S. Department of Labor's annual  
4 workforce innovations meeting of the nation's employment and  
5 training community.

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

19 There are two major challenges. The first is the  
20 difficulty that practicing teachers face in keeping up with  
21 content changes that occur ever more rapidly. The second is  
22 that too many science and math classes are taught by teachers



1 that are not qualified in these subjects, particularly in the  
2 elementary and middle schools. The center for the study of  
3 teaching has reported that the most consistent and powerful  
4 predictor of student achievement in science and mathematics was  
5 the presence of teachers who were fully certified and had at  
6 least a bachelor's degree in the subjects taught.

7 Innovative programs such as the one developed by the  
8 University of Hawaii college of engineering are helping to  
9 update the STEM skills and knowledge of middle school teachers  
10 and to improve the curriculum for teaching STEM to students, but  
11 there is need for more flexible programs to reach more teachers.

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

20 The final link in the education pipeline, universally  
21 recognized as critical to the success of a knowledge-based  
22 economy, is a vibrant post-secondary education system that meets



1 not only the traditional education expectations of its citizens,  
2 but becomes a true partner in addressing the needs of the State  
3 to have a highly skilled workforce, create knowledge-based  
4 products and services, and provide the global orientation and  
5 entrepreneurial skills required to succeed in today's world.  
6 One proven way to enhance that strength is by retaining and  
7 recruiting distinguished faculty through the endowment of  
8 faculty chairs.

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

16 The legislature finds that it is crucial to address these  
17 needs. The purpose of this Act is to:

18 (1) Establish a pre-academy, based on the successful CISCO  
19 and construction academy models that will focus on  
20 developing STEM skills in Hawaii's school children  
21 from middle school through high school;



1           (2) Increase the number of Hawaii high school graduates  
2           seeking degrees or certificates in STEM disciplines by  
3           providing scholarships to accredited institutions of  
4           higher education in Hawaii; and

5           (3) Increase the quality of STEM education in Hawaii's  
6           postsecondary education institutions through the  
7           creation of endowed chairs in STEM disciplines.

8           SECTION 2. Chapter 206M, Hawaii Revised Statutes, is  
9           amended by adding two new sections to part I to be appropriately  
10          designated and to read as follows:

11          "§206M- Science, technology, engineering, and math  
12          (STEM) scholarship special fund. (a) There is established in  
13          the state treasury a fund, to be known as the STEM scholarship  
14          special fund, into which shall be deposited appropriations made  
15          by the state legislature and any funds received from other  
16          sources to support the intent of the fund.

17          (b) The board shall administer the fund with the advice of  
18          the Hawaii innovation council.

19          (c) The expenses of administering the fund shall be paid  
20          from the money in the fund.

21          (d) At the discretion of the board, administration of the  
22          fund may be accomplished by contracting with a qualified person,



1 as provided in section 206M-3(a)(3), or appointing employees as  
2 provided in section 206M-3(a)(6), or a combination thereof.

3 (e) The treasurer of the State shall invest the money in  
4 the fund not currently needed to meet the obligations of the  
5 fund in the same manner as other public funds may be invested.

6 (f) Money in the fund at the end of a state fiscal year  
7 shall not revert to the state general fund.

8 (g) The fund shall be used to provide scholarships (up to  
9 eight semesters at an accredited institution of higher education  
10 in Hawaii) for Hawaii high school graduates who:

11 (1) Are residents of Hawaii;

12 (2) Prior to the tenth grade, agreed in writing, together  
13 with their custodial parents or guardians, that they  
14 would:

15 (A) Graduate from a public or accredited nonpublic  
16 secondary school located in Hawaii that meets the  
17 admission criteria of an accredited institution  
18 of higher learning;

19 (B) Complete the STEM curriculum offered by an  
20 academy or other applied or contextual learning  
21 program;



- 1           (C) Not illegally use controlled substances, as  
2           defined in chapter 329;
- 3           (D) Not commit a crime or infraction ,as defined in  
4           chapter 329; and
- 5           (E) Apply for admission and be accepted to attend an  
6           accredited institution of higher learning in the  
7           State of Hawaii to pursue a degree or certificate  
8           in a STEM discipline; and
- 9           (3) Certify in writing that the conditions of the written  
10           agreement as described in paragraph (2) have been met.
- 11           (h) The maximum amount of the scholarship shall be set at  
12           the tuition equivalent of a full-time student enrolled at the  
13           University of Hawaii at Manoa.
- 14           (i) The board shall adopt rules pursuant to chapter 91 to  
15           implement this section, including, but not limited to:
- 16           (1) Rules to create the agreement signed by the student  
17           and the student's custodial parents or guardian, as  
18           described in subsection (g)(2) and the certification  
19           as described in subsection (g)(3);
- 20           (2) Rules to determine which accredited institutions of  
21           higher education are included in the scholarship  
22           program;



- 1       (3) Rules to determine which degrees or certificates  
2       qualify as being defined as STEM disciplines;  
3       (4) Rules to establish the application process to obtain  
4       the scholarship; and  
5       (5) Rules to establish criteria for disqualification as a  
6       recipient of a STEM scholarship, including appeals  
7       procedures.

8       (k) The board shall include in its annual budget request  
9       sufficient funds to implement the purpose of this section.

10       **§206M- State akamai investment matching special fund.**

11       (a) There is established in the state treasury a fund, to be  
12       known as the akamai investment matching special fund, into which  
13       shall be deposited appropriations made by the state legislature  
14       and matching private donations.

15       (b) The board shall administer the fund.

16       (c) The expenses of administering the fund shall be paid  
17       from the money in the fund.

18       (d) At the discretion of the board, administration of the  
19       fund may be accomplished by contracting with a qualified person,  
20       as provided in section 206M-3(a)(3), or appointing employees as  
21       provided in section 206M-3(a)(6), or a combination thereof.



1       (e) The treasurer of the State shall invest the money in  
2 the fund not currently needed to meet the obligations of the  
3 fund in the same manner as other public funds may be invested.

4       (f) Money in the fund at the end of a state fiscal year  
5 shall not revert to the state general fund.

6       (g) The fund shall be used as a funding mechanism to  
7 create new endowed faculty chairs in science, technology,  
8 engineering, and mathematics at accredited universities in  
9 Hawaii.

10       (h) No state appropriations deposited into the fund shall  
11 be expended unless matched by private funds on a dollar-for-  
12 dollar basis.

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

15       (1) Rules to determine which accredited institutions of  
16 higher education are to be included in the eminent  
17 scholars program;

18       (2) Rules to determine which university departments  
19 qualify as being defined as STEM disciplines; and

20       (3) Rules to establish the application process for  
21 universities to request funding to support an endowed  
22 chair. The board shall take into consideration the





1 following criteria before approving state matching  
2 funds to establish a position:

3 (A) The ability for the position to contribute to  
4 Hawaii's economic development;

5 (B) The ability for the position to make a  
6 significant contribution to the university's  
7 academic quality;

8 (C) The ability for the position to obtain  
9 significant amounts of annual research from  
10 highly competitive grant sources; and

11 (D) The field of the proposed position and its  
12 potential funding sources, relationship to  
13 existing research at the applying university and  
14 in the State of Hawaii, size and scope of related  
15 industries, and other relevant factors."

16 SECTION 3. Chapter 304A, Hawaii Revised Statutes, is  
17 amended by adding a new section to be appropriately designated  
18 and to read as follows:

19 **"§304A- Fostering inspiration and relevance through**  
20 **science and technology pre-academy program; established. (a)**  
21 There is established within the University of Hawaii, the  
22 statewide fostering inspiration and relevance through science



1 and technology (FIRST) pre-academy program. The pre-academy  
2 program shall be headed by a director and staffed by six field  
3 staff (two for Oahu, two for the island of Hawaii, and one each  
4 in Kauai and Maui counties) and a secretary. When appropriate,  
5 the functions of the field staff may be contracted to qualified  
6 private or nonprofit providers.

7 The pre-academy program shall partner with other the  
8 academies, other relevant programs within the University of  
9 Hawaii system, the department of education, interested schools  
10 in areas served by the academies and relevant programs, and  
11 appropriate public and private agencies, to establish a program  
12 of contextual learning for middle school students in science,  
13 technology, engineering, and math (STEM) subjects.

14 (b) The mission of the FIRST pre-academy program with  
15 respect to middle schools shall be to stimulate the interest and  
16 achievement of students in STEM skills and help prepare those  
17 students for entry other academies or program beginning in ninth  
18 grade. The mission of the pre-academy program shall be to  
19 support and complement other academies' academic programs with  
20 contextual learning projects.

21 The goal of the pre-academy shall be to serve at least  
22 sixteen thousand students statewide, between sixth and twelfth



1 grades, with contextual learning experiences in STEM-related  
2 skills. The pre-academy shall also strive to motivate and  
3 prepare a pool of at least one thousand students per year to  
4 high school academies or other applied or contextual learning  
5 programs.

6 (c) School participation in the FIRST pre-academy programs  
7 shall be voluntary. Selected schools shall be responsible for  
8 providing space and necessary logistical support to pre-academy  
9 programs serving the school. The staff and affiliated  
10 contextual learning and teacher training specialists of the  
11 pre-academy shall strive to tailor the mix and nature of the  
12 contextual learning projects and training for teachers to the  
13 needs of each individual school served.

14 (d) The director and staff of the FIRST pre-academy  
15 program shall develop additional contextual learning projects  
16 and summer STEM training programs for elementary, middle, and  
17 high school teachers. For additional contextual learning  
18 projects priority shall be given to the areas of global  
19 positioning system technology, ocean science, astronomy, earth  
20 science and wireless communications technology, and other  
21 STEM-skills stimulating subjects as appropriate.



1        The FIRST pre-academy shall develop performance measures to  
2 ensure that all programs conducted under the pre-academy are  
3 contributing substantially and directly to an increase in  
4 student performance in STEM academics and matriculation into  
5 high school academies and other applied or contextual learning  
6 programs."

7        SECTION 4. Section 206M-3.5, Hawaii Revised Statutes, is  
8 amended to read as follows:

9        "**§206M-3.5 Annual reports.** The development corporation  
10 shall report annually to the legislature twenty days prior to  
11 the convening of the session on the impact of the program on:

12        (1) Increasing the awareness of the federal small business  
13 innovation research program and the number of  
14 companies submitted proposals to federal agencies;

15        (2) Increasing the number of phase I awards received by  
16 Hawaii businesses under the small business innovation  
17 research program; [~~and~~]

18        (3) Increasing the number of phase I to phase II  
19 conversions by Hawaii businesses[~~+~~];

20        (4) Providing STEM scholarships to graduates of academies  
21 or applied or contextual learning programs; and

22        (5) Funding endowed STEM chairs at Hawaii's universities."



1 SECTION 5. There is established, within the high  
2 technology development corporation, an eminent scholars program  
3 to be funded by the state akamai investment matching special  
4 fund established under section 206M- , to enable accredited  
5 universities in Hawaii to provide donors with an incentive in  
6 the form of matching grants for donations to establish  
7 permanently endowed faculty positions in science, technology,  
8 engineering, and mathematics at any accredited university in  
9 Hawaii.

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

20 SECTION 6. There is appropriated out of general revenues  
21 of the State of Hawaii the sum of \$1,402,230, or so much thereof  
22 as may be necessary for fiscal year 2007-2008, and the sum of



1 \$2,054,240, or so much thereof as may be necessary for fiscal  
2 year 2008-2009, for establishing the FIRST academy program;  
3 provided that, of the sums appropriated, \$546,900 for fiscal  
4 year 2007-2008, and \$753,800 for fiscal year 2008-2009, shall be  
5 expended for additional experiential programs.

6 The sums appropriated shall be expended by the University  
7 of Hawaii for the purposes of this Act.

8 SECTION 7. There is provided funding to support a  
9 successful recruitment program currently funded under the U.S.  
10 Department of Labor's Transition to Teaching program that has  
11 resulted in ninety new qualified mathematics and science  
12 teachers since it began four-and-a-half years ago. The  
13 Transition to Teaching program provides stipends as recruitment  
14 incentives for people who hold degrees in STEM subjects to get  
15 their teaching certificates through the University of Hawaii's  
16 post-baccalaureate certificate in secondary education program.  
17 The university's transition to teaching program grant will  
18 expire in 2008. There is a chronic shortage of science and  
19 mathematics teachers and the post-baccalaureate certificate in  
20 secondary education program is an effective method to address  
21 the problem. However, recruitment for potential STEM teachers  
22 is difficult and the incentive of stipends has proven effective.



1 The goal of the program is to produce twenty new science and  
2 mathematics teachers each year.

3 There is appropriated out of general revenues of the State  
4 of Hawaii the sum of \$350,000, or so much thereof as may be  
5 necessary for fiscal year 2007-2008, and the sum of \$350,000 or  
6 so much thereof as may be necessary for fiscal year 2008-2009,  
7 for providing stipends to attract STEM graduates to the  
8 University of Hawaii post baccalaureate certificate in secondary  
9 education program.

10 The sums appropriated shall be expended by the University  
11 of Hawaii for the purposes of this Act.

12 SECTION 8. There is appropriated out of general revenues  
13 of the State of Hawaii the sum of \$2,000,000, or so much thereof  
14 as may be necessary for fiscal year 2007-2008, and the sum of  
15 \$3,000,000, or so much thereof as may be necessary for fiscal  
16 year 2008-2009, to the state akamai investment matching special  
17 fund.

18 SECTION 9. There is appropriated out of the state akamai  
19 investment matching special fund of the State of Hawaii the sum  
20 of \$2,000,000, or so much thereof as may be necessary for fiscal  
21 year 2007-2008, and the sum of \$3,000,000, or so much thereof as



1 may be necessary for fiscal year 2008-2009, for the eminent  
2 scholars program.

3       The sums appropriated shall be expended by the University  
4 of Hawaii for the purposes of this Act.

5       SECTION 10. Statutory material to be repealed is bracketed  
6 and stricken. New statutory material is underscored.

7       SECTION 11. This Act shall take effect on July 1, 2007.





**Report Title:**

FIRST Pre-Academy; STEM Teaching; Scholarships; Appropriation

**Description:**

Establishes the fostering inspiration and relevance through science and technology (FIRST) pre-academy program; establishes the STEM scholarships special fund; establishes the eminent scholars program; establishes the state akamai investment matching special fund; and makes appropriations. (SD1)

