DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM
RESEARCH & ECONOMIC ANALYSIS DIVISION

Response to the Legislature Regarding

HOUSE CONCURRENT RESOLUTION 297 CD 1, 2010

REQUESTING REPORTS ON THE ECONOMIC VALUE OF EXPANDED WORKFORCE DEVELOPMENT CAPACITY AND STEM INITIATIVES.

House Concurrent Resolution 297 CD 1, 2010 Requested, among other things, that "a report on the economic value of expanded workforce development capacity be provided by the Department of Business, Economic Development, and Tourism." The resolution further elaborated that the report should address "the economic value of expanded workforce development capacity of emerging industries in defense and dual use, astronomy, engineering, aquaculture, biotech, digital media, and related industries."

In order to address this task, it was necessary for DBEDT to make some assumptions about the intent of that particular request in HCR 297, which was not elaborated on in the *Where As* section of the Resolution.

It is assumed that the request is linked with the primary thrust of HCR 297, which noted the Legislature's support for, and interest in the expansion of educational programs focused on developing skills in Science, Technology, Engineering and Math (STEM skills). Based on this Legislative interest, the resolution requested updated reports on the progress towards this objective by the agencies and organizations conducting STEM initiatives.

This response also assumes that the specific request for the value of expanded workforce capacity is meant to provide the Legislature with some measure of the economic importance of how the successful expansion of STEM training might affect economic growth and development, particularly in emerging technology industries like the ones cited in the resolution.

STEM AND ECONOMIC DIVERSIFICATION

Measuring the ultimate economic impact of STEM programs is a challenging request that can, unfortunately be addressed only partially within the time limits of HCR 297, data availability and resource constraints of the current budget and staffing. However, some information has been assembled that may be of help to the Legislature.

The importance of increasing the proportion of workers in the economy with strong technical skills has been recognized for some time. Technical skills, particularly those concentrated in Science, Engineering, Technology and Mathematics, commonly known as STEM skills, are the key to raising living standards and for America's competitiveness in the world economy. For Hawaii, an increasingly more skilled workforce opens up opportunities to diversify the economy into technology and innovation industries.

As HCR 297 noted, numerous efforts are underway involving many organizations and educational agencies to interest and engage elementary and secondary students in

activities and curricula that will build stronger STEM skills among high school graduates. Ultimately, what these efforts should lead to is an increasing proportion of post secondary degrees and certificate programs in formal STEM disciplines. That will increase the supply of labor force entrants with the technical skills needed to support the expanding technology, innovation, health care and other industries where these skills are pivotal for growth.

STEM OCCUPATIONS IN TECHNOLOGY AND THE ECONOMY

The, Occupational Information Network (O*NET) sponsored by the U.S. Department of Labor, is the authoritative source for identifying occupations requiring STEM skills. The detailed list of those occupations includes more than 160 very specific occupations in which the skills of science, technology, engineering and math are the prime tools of the job (See Attachment 1).[1]

Using the O*NET occupational codes (with some adjustments), DBEDT has utilized its data sources to compile the number of STEM jobs in the economy and how much the technology sector accounts for STEM labor force demand.[2] Summary results are shown in Table 1 below.[3]

Table 1. Distribution of STEM Jobs, Technology and Non Technology, 2009

	Hawaii Economy	Technology Sector	
	Civ. Jobs	Civ. Jobs	% in Tech
All Occupations	**839,393**	**25,412**	**3.0%**
STEM	68,483	9,812	14.3%
Non STEM	770,910	15,600	2.0%
% In STEM Occupations	8.2%	38.6%	

Source: DBEDT, EMSI Data

The Table shows that while jobs in STEM occupations account for about 8 percent of total jobs in Hawaii, they account for nearly 39% of the jobs in the Technology Sector.[4] Moreover, while the Technology Sector accounts for just a little over 3% of the workforce, including self employed and proprietors, it utilized 14% of Hawaii's STEM workforce.

The proportion of STEM jobs in technology verses the economy as a whole is interesting. It shows that while technology is a heavy user of STEM-skilled workers, the bulk of Hawaii's STEM workforce (86%) is employed outside of the Technology Sector.

It is also interesting that while the Technology Sector has a significantly higher proportion of STEM jobs in the economy, that proportion is not as overwhelming as one

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[1] However, there are many other occupations, such as the health professions, that are not classified as STEM occupations, but which do require a strong background in elements of science and math education.

[2] The principal data source is provided by Economic Modeling Services, Inc. (EMSI) which utilizes a variety of official primary statistics sources.

[3] These data are part of a forthcoming report by DBEDT, entitled *Hawaii's Technology Workforce.*

[4] The Technology Sector was redefined for Hawaii through a 2007 joint project between the Hawaii Science and Technology Institute (HiSciTech), DBEDT, and other stakeholders. Updated measures of the technology sector may be found at: http://hawaii.gov/dbedt/info/economic/data_reports/emerging-industries.

might have thought. Instead of 100%, 75% or even 50% of the jobs, STEM occupations represent less than 40% of the Technology Sector's overall job count. This indicates that while core technical skills may be essential for technology, the industry still relies heavily on non-STEM occupations.

VALUE OF EXPANDED WORKFORCE DEVELOPMENT CAPACITY

The economic impact of expanding workforce development capacity, leading to an increase in the supply of STEM trained workers depends upon a large number of factors.[5] It would be necessary to conduct a formal, study with adequate resources to develop the new data and information to more fully address this question, especially for difficult-to-measure areas such as dual use and other market-defined activities.

However, if we assume that an overall increase in STEM training capacity results in an increase in the proportion of jobs in STEM occupations in Hawaii's economy, we can make some partial inferences about potential economic value. In particular, we can estimate the increase in wages and salaries generated by a higher proportion of STEM jobs. One way to do this is by projecting how much of an increase in average and overall wages and salaries might be generated by different growth scenarios for STEM occupations over the next decade.

The base scenario is set out in Table 2 below. The projection for 2009 to 2019 is for an additional 73,800 jobs in Hawaii's economy. This is a very conservative BLS-based projection, which assumes an annual increase in jobs per year of less than 1%. In 2009, 8.2% of all jobs were in occupations classified by O*NET as STEM related. The annual average wage for STEM occupations in 2009 was estimated at $50,731, while non-STEM jobs averaged a lower $39,634.[6] This resulted in an overall average wage for all occupations of $40,539 in 2009.

Table 2. Base Scenario

Senario	Description	2009 Jobs	2019 Jobs	Change in Jobs	Aver.Ann. % chng in jobs	Est Ann Ave Wages 2009	Implied Ann Ave Wages 2019 (In 2009 dollars)	Change in Ave Wages from Base Scenario 2009-19	Change in Total Wages 2019 ($bil.)
Base	**All Occupations**	**839,393**	**913,182**	**73,789**	**0.8%**	**$40,539**	**$40,539**	**$0**	**$37.0 bil.**
	Total STEM	68,483	74,503	6,020	0.8%	$50,731	$50,731		$3.8 bil.
	% STEM	8.2%	8.2%	8.2%					
	Implied Non STEM	770,910	838,679	67,769	0.8%	$39,634	$39,634		$33.2 bil.

Source: DBEDT, Data and Projections from EMSI.

If the proportion of STEM occupations remains the same at 8.2%, the additional 73,800 jobs will increase total real wages and salaries (from about $34 billion in 2009 to $37 billion in 2019, measured in constant 2009 dollars). However, there will be no real

[5] For instance, would expanded capacity attract students? Would industry fully absorb more trained workers? What industries would absorb what STEM specialties? Would they be mainly technology industries or other industries that currently utilize 86% of the STEM workforce? How much more output value would be generated by a given increase in STEM occupations for a given industry?

[6] Based on annualized hourly average wages for all workers in the occupation

gain in the overall average wage since the proportion of higher-paying STEM jobs remains constant.[7]

What we would like to know is how much more total and average wages would increase if more STEM graduates were supplied and absorbed into the economy. Scenarios 2 and 3 explore those implications. In these scenarios the overall increase in jobs is held constant for the 2009 to 2019 period, but the proportion of STEM jobs is allowed to increase.

Scenario 2 in Table 3 shows what might happen if the proportion of STEM jobs in Hawaii's economy increased to the national proportion (9.8%) by 2019.[8]

Table 3, Scenario 2

Senario	Description	2009 Jobs	2019 Jobs	Change in Jobs	Aver.Ann. % chng in jobs	Est Ann Ave Earnings 2009	Implied Ann Ave Earnings 2019 (In 2009 dollars)	Change in Ave Earnings from Base Scenario 2009-19	Change in Total Earnings 2019 ($bil.)
2	**All Occupations**	**839,393**	**913,182**	**73,789**	**0.8%**	**$40,539**	**$40,726**	**$187**	**$170 mil.**
	Total STEM	68,483	89,851	21,368	2.8%	$50,731	$50,731		$779 mil.
	% STEM	8.2%	9.8%	29.0%					
	Implied Non STEM	770,910	823,331	52,421	0.7%	$39,634	$39,634		-$608 mil.

Source: DBEDT, Data and Projections from EMSI.

In this scenario, 29% of the gain in jobs over the 2009 to 2019 period would be accounted for by STEM occupations. The average real wages of STEM and non STEM jobs remain constant, but the greater proportion of higher-paid STEM workers would raise the overall average by $187 per year. Total real wages in 2019 would be about $170 million more than had STEM and non STEM jobs increased proportionately as in the Base Scenario.

Scenario 2 is based on a modest increase in the proportion of STEM jobs from 8.2% to 9.8% of the workforce.

Scenario 3 in Table 4 takes the illustration to its maximum. This scenario explores the impact on wages if all of the additional jobs under the very conservative EMSI/BLS projections were to be in STEM occupations.

Of course, it is unlikely, but if all the roughly 73,800 projected jobs created between 2009 and 2019 were to be in STEM occupations, the STEM proportion would increase from 8.2% in 2009 to 15.6% of all jobs in 2019.

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[7] For presentation purposes in this illustration, it is assumed that there are no overall gains in real wages from productivity. There would likely be gains through productivity, but introducing estimates for those gains here would cloud the comparison of how changing proportions of STEM and non STEM jobs impacts total and average wages.

[8] EMSI/BLS base projections expect Hawaii's proportion of STEM workers to increase marginally to 8.4% by 2019. The same projections for the U.S. show no change in the 9.8% proportion over the 2009 to 2019 period.

With the average wage still held constant, the new mix of jobs would raise the overall average annual wage by $824 per year over the base scenario of a constant STEM proportion.

In terms of total wages and salaries paid, there would be $752 million more per year economy-wide under this scenario than under the base scenario.

Table 4. Scenario 3

Senario	Description	2009 Jobs	2019 Jobs	Change in Jobs	Aver.Ann. % chng in jobs	Est Ann Ave Earnings 2009	Implied Ann Ave Earnings 2019 (In 2009 dollars)	Change in Ave Earnings from Base Scenario 2009-19	Change in Total Earnings 2019 ($bil.)
3	**All Occupations**	**839,393**	**913,182**	**73,789**	**0.8%**	**$40,539**	**$41,363**	**$824**	**$752 mil.**
	Total STEM	68,483	142,272	73,789	7.6%	$50,731	$50,731		$3.4 bil.
	% STEM	8.2%	15.6%	100.0%					
	Implied Non STEM	770,910	770,910	(0)	0.0%	$39,634	$39,634		-$2.7 bil.

Source: DBEDT, Data and Projections from EMSI.

SUMMARY & CONCLUSIONS

This brief report has attempted to provide some information on the potential economic value of increased workforce development capacity for high skilled, STEM occupations. It was noted that time and resource constraints precluded a thorough, formal study of potential impacts.

Using information available from current data and studies in progress, this report showed that under very conservative assumptions, bringing Hawaii's proportion of STEM occupations just to the national average by 2019 could generate nearly $190 per year more in average wages in the economy overall and increase total wages by $170 million. Boosting the proportion of STEM occupation even more would result in proportionally more gain in both average and total wages.

Conservative as the projections may be, the key to determining if significant gains in incomes would result from an increase in the capacity to trains STEM workers lies in what STEM occupations are targeted and how private industry would respond to the increased supply of STEM workers, as well as a number of other factors.

On the broader question of how the expansion of STEM training might affect economic growth and development, particularly in emerging technology industries like the ones cited in HCR 297, a quantitative answer cannot be provided at this time, pending a thorough study. It is noted, however, that the research work of the Hawaii Workforce Development Council, as well as organizations such as the Hawaii Institute for Public Affairs (HIPA), and Enterprise Honolulu has shown education levels, particularly in technical areas, to be the key ingredient supporting a more productive economy and higher living standards.

ATTACHMENT 1. ALL O*NET STEM OCCUPATIONS

Occupational Code	Occupation	STEM Discipline
13-2011.01	Accountants	Computer Science
15-2011.00	Actuaries	Mathematics
17-3021.00	Aerospace Engineering and Operations Technicians	Engineering
17-2011.00	Aerospace Engineers	Engineering
17-2021.00	Agricultural Engineers	Engineering, Life Sciences
25-1041.00	Agricultural Sciences Teachers, Postsecondary	Life Sciences
19-4011.01	Agricultural Technicians	Life Sciences
49-3011.00	Aircraft Mechanics and Service Technicians	Engineering
45-2021.00	Animal Breeders	Life Sciences
19-1011.00	Animal Scientists	Life Sciences
17-1011.00	Architects, Except Landscape and Naval	Engineering
17-3011.01	Architectural Drafters	Engineering
25-1031.00	Architecture Teachers, Postsecondary	Engineering
19-2011.00	Astronomers	Physics/Astronomy
19-2021.00	Atmospheric and Space Scientists	Physics/Astronomy
25-1051.00	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	Geosciences, Mathematics, Physics/Astronomy
13-2011.02	Auditors	Computer Science
17-3027.01	Automotive Engineering Technicians	Engineering
49-3023.01	Automotive Master Mechanics	Engineering
49-3023.02	Automotive Specialty Technicians	Engineering
49-2091.00	Avionics Technicians	Engineering
17-2199.01	Biochemical Engineers	Chemistry
19-1021.00	Biochemists and Biophysicists	Chemistry, Life Sciences, Physics/Astronomy
11-3051.03	Biofuels Production Managers	Life Sciences
11-9041.01	Biofuels/Biodiesel Technology and Product Development Managers	Environmental Science, Life Sciences
43-9111.01	Bioinformatics Technicians	Life Sciences
25-1042.00	Biological Science Teachers, Postsecondary	Life Sciences
19-4021.00	Biological Technicians	Life Sciences
19-1020.01	Biologists	Life Sciences
11-3051.04	Biomass Production Managers	Life Sciences
17-2031.00	Biomedical Engineers	Engineering
15-2041.01	Biostatisticians	Life Sciences
11-9199.11	Brownfield Redevelopment Specialists and Site Managers	Environmental Science
15-1099.10	Business Intelligence Analysts	Computer Science
25-1011.00	Business Teachers, Postsecondary	Computer Science, Mathematics
17-2041.00	Chemical Engineers	Chemistry, Engineering
51-9011.00	Chemical Equipment Operators and Tenders	Chemistry
51-8091.00	Chemical Plant and System Operators	Chemistry
19-4031.00	Chemical Technicians	Chemistry, Life Sciences
25-1052.00	Chemistry Teachers, Postsecondary	Chemistry, Geosciences

19-2031.00	Chemists	Chemistry, Physics/Astronomy
17-3011.02	Civil Drafters	Engineering
17-3022.00	Civil Engineering Technicians	Engineering
17-2051.00	Civil Engineers	Engineering
19-2041.01	Climate Change Analysts	Environmental Science
19-3031.02	Clinical Psychologists	Life Sciences
15-1011.00	Computer and Information Scientists, Research	Computer Science
11-3021.00	Computer and Information Systems Managers	Computer Science
17-2061.00	Computer Hardware Engineers	Computer Science, Engineering
15-1021.00	Computer Programmers	Computer Science
25-1021.00	Computer Science Teachers, Postsecondary	Computer Science
15-1071.01	Computer Security Specialists	Computer Science
15-1031.00	Computer Software Engineers, Applications	Computer Science, Engineering
15-1032.00	Computer Software Engineers, Systems Software	Computer Science, Engineering
15-1041.00	Computer Support Specialists	Computer Science
15-1051.00	Computer Systems Analysts	Computer Science
11-9021.00	Construction Managers	Engineering
35-2012.00	Cooks, Institution and Cafeteria	Life Sciences
13-1051.00	Cost Estimators	Engineering
19-3031.03	Counseling Psychologists	Life Sciences
11-9011.02	Crop and Livestock Managers	Life Sciences
15-1061.00	Database Administrators	Computer Science
29-2051.00	Dietetic Technicians	Life Sciences
29-1031.00	Dietitians and Nutritionists	Life Sciences
17-3023.03	Electrical Engineering Technicians	Computer Science, Engineering
17-3029.02	Electrical Engineering Technologists	Engineering
17-2071.00	Electrical Engineers	Engineering
17-3029.03	Electromechanical Engineering Technologists	Engineering
51-2023.00	Electromechanical Equipment Assemblers	Engineering
17-3023.01	Electronics Engineering Technicians	Computer Science, Engineering
17-3029.04	Electronics Engineering Technologists	Engineering
17-2072.00	Electronics Engineers, Except Computer	Engineering
11-9041.00	Engineering Managers	Chemistry, Computer Science, Engineering, Geosciences, Life Sciences, Physics/Astronomy
25-1032.00	Engineering Teachers, Postsecondary	Chemistry, Computer Science, Engineering, Geosciences, Life Sciences, Physics/Astronomy
13-1041.01	Environmental Compliance Inspectors	Life Sciences
17-3025.00	Environmental Engineering Technicians	Engineering, Environmental Science
17-2081.00	Environmental Engineers	Engineering, Environmental Science
19-2041.02	Environmental Restoration Planners	Life Sciences
19-4091.00	Environmental Science and Protection Technicians, Including Health	Environmental Science
25-1053.00	Environmental Science Teachers, Postsecondary	Environmental Science
19-2041.00	Environmental Scientists and Specialists, Including Health	Environmental Science
19-1041.00	Epidemiologists	Life Sciences

45-4021.00	Fallers	Life Sciences
25-9021.00	Farm and Home Management Advisors	Life Sciences
11-9012.00	Farmers and Ranchers	Life Sciences
13-2099.01	Financial Quantitative Analysts	Computer Science
17-2111.02	Fire-Prevention and Protection Engineers	Engineering
45-1011.07	First-Line Supervisors/Managers of Agricultural Crop and Horticultural Workers	Life Sciences
45-1011.08	First-Line Supervisors/Managers of Animal Husbandry and Animal Care Workers	Life Sciences
45-1011.06	First-Line Supervisors/Managers of Aquacultural Workers	Life Sciences
35-1012.00	First-Line Supervisors/Managers of Food Preparation and Serving Workers	Life Sciences
33-3031.00	Fish and Game Wardens	Life Sciences
45-3011.00	Fishers and Related Fishing Workers	Life Sciences
51-3092.00	Food Batchmakers	Life Sciences
19-4011.02	Food Science Technicians	Life Sciences
19-1012.00	Food Scientists and Technologists	Life Sciences
19-4093.00	Forest and Conservation Technicians	Life Sciences
45-4011.00	Forest and Conservation Workers	Engineering, Life Sciences
19-1032.00	Foresters	Engineering, Life Sciences
19-1029.03	Geneticists	Life Sciences
17-1022.01	Geodetic Surveyors	Engineering
19-2042.00	Geoscientists, Except Hydrologists and Geographers	Geosciences
27-1024.00	Graphic Designers	Computer Science
25-1071.00	Health Specialties Teachers, Postsecondary	Life Sciences, Physics/Astronomy
25-1192.00	Home Economics Teachers, Postsecondary	Life Sciences
17-2112.01	Human Factors Engineers and Ergonomists	Engineering
19-2043.00	Hydrologists	Geosciences
17-3026.00	Industrial Engineering Technicians	Engineering
17-2112.00	Industrial Engineers	Engineering
17-2111.01	Industrial Safety and Health Engineers	Engineering
19-3032.00	Industrial-Organizational Psychologists	Life Sciences
45-4023.00	Log Graders and Scalers	Life Sciences
45-4022.00	Logging Equipment Operators	Life Sciences
17-2199.04	Manufacturing Engineers	Engineering
17-2121.02	Marine Architects	Engineering
17-2121.01	Marine Engineers	Engineering
17-2131.00	Materials Engineers	Engineering
19-2032.00	Materials Scientists	Engineering
25-1022.00	Mathematical Science Teachers, Postsecondary	Mathematics
15-2091.00	Mathematical Technicians	Mathematics
15-2021.00	Mathematicians	Mathematics
17-3027.00	Mechanical Engineering Technicians	Engineering
17-3029.07	Mechanical Engineering Technologists	Engineering
17-2141.00	Mechanical Engineers	Engineering
17-2199.05	Mechatronics Engineers	Computer Science, Engineering

19-1042.00	Medical Scientists, Except Epidemiologists	Life Sciences
19-1022.00	Microbiologists	Life Sciences
17-2199.06	Microsystems Engineers	Engineering
17-2151.00	Mining and Geological Engineers, Including Mining Safety Engineers	Engineering
19-1029.02	Molecular and Cellular Biologists	Life Sciences
17-2199.09	Nanosystems Engineers	Physics/Astronomy
11-9121.00	Natural Sciences Managers	Chemistry, Computer Science, Engineering, Geosciences, Life Sciences, Mathematics, Physics/Astronomy
15-1081.00	Network Systems and Data Communications Analysts	Computer Science
19-3039.01	Neuropsychologists and Clinical Neuropsychologists	Life Sciences
17-2161.00	Nuclear Engineers	Engineering
19-4051.01	Nuclear Equipment Operation Technicians	Engineering, Physics/Astronomy
29-2033.00	Nuclear Medicine Technologists	Physics/Astronomy
19-4051.02	Nuclear Monitoring Technicians	Engineering, Physics/Astronomy
51-4012.00	Numerical Tool and Process Control Programmers	Computer Science
11-9011.01	Nursery and Greenhouse Managers	Life Sciences
15-2031.00	Operations Research Analysts	Computer Science, Mathematics
19-1031.03	Park Naturalists	Life Sciences
17-2171.00	Petroleum Engineers	Engineering
17-2199.07	Photonics Engineers	Physics/Astronomy
19-2012.00	Physicists	Mathematics, Physics/Astronomy
25-1054.00	Physics Teachers, Postsecondary	Mathematics, Physics/Astronomy
19-4099.02	Precision Agriculture Technicians	Life Sciences
17-2111.03	Product Safety Engineers	Engineering
19-3039.00	Psychologists, All Other	Life Sciences
25-1066.00	Psychology Teachers, Postsecondary	Life Sciences
19-1031.02	Range Managers	Life Sciences
13-2099.02	Risk Management Specialists	Mathematics
19-3031.01	School Psychologists	Life Sciences
13-1199.02	Security Management Specialists	Computer Science
19-1013.00	Soil and Plant Scientists	Chemistry, Life Sciences, Physics/Astronomy
19-1031.01	Soil and Water Conservationists	Life Sciences
15-2041.00	Statisticians	Life Sciences, Mathematics
15-1081.01	Telecommunications Specialists	Computer Science
17-2051.01	Transportation Engineers	Engineering
19-3099.01	Transportation Planners	Engineering
53-6051.07	Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation	Engineering
17-2199.02	Validation Engineers	Engineering
15-1099.13	Video Game Designers	Computer Science
11-9121.02	Water Resource Specialists	Engineering
17-2051.02	Water/Wastewater Engineers	Engineering
49-9099.02	Wind Turbine Service Technicians	Engineering
19-1023.00	Zoologists and Wildlife Biologists	Life Sciences

Source: O*NET On Line, All STEM Disciplines, http://online.onetcenter.org/ November 2010.

ATTACHMENT 2: HCR 297, CD 1

HOUSE OF REPRESENTATIVES
TWENTY-FIFTH LEGISLATURE, 2010
STATE OF HAWAII

H.C.R. NO. 297 S.D. 1 C.D .1

HOUSE CONCURRENT RESOLUTION

REQUESTING REPORTS ON THE ECONOMIC VALUE OF EXPANDED WORKFORCE DEVELOPMENT CAPACITY AND STEM INITIATIVES.

WHEREAS, in 2007, the National Governors Association made improving the nation's economic competitiveness through innovation its primary focus, and in a report titled, "A Benchmarking of the Hawaii Educational System," Monitor Group and the National Governors Association Center for Best Practices profiled how Hawaii's educational system was performing relative to national averages; and

WHEREAS, although Hawaii's high school graduation rate is close to the national average, its postsecondary completion rate is below the national average, and significantly below the highest-performing states; and

WHEREAS, the 2007 Legislature strongly endorsed initiatives related to science, technology, engineering, and math (STEM) fields, and creative media education as the most practical, hands-on means of increasing students' interest in pursuing math and science and technology careers; and

WHEREAS, emphasizing the need to build upon solid performance outcomes, the Legislature enacted:

(1) Act 111, Session Laws of Hawaii 2007, which expanded existing STEM programs like robotics (including FIRST Lego League, Junior FIRST Lego League, botball, underwater ROV, VEX, Micro-Robot, and robotics camps) and Research Experiences for Teachers – Middle School; and

(2) Act 271, Session Laws of Hawaii 2007, which expanded the Environmental and Spatial Technology program (Project EAST);

and

WHEREAS, the initial legislative targets for 2007-2008 were to double the existing 48 STEM, Research Experiences for Teachers – Middle School, Project EAST, and robotics programs within public schools to achieve a level of 84 school initiatives, and these goals were far exceeded during 2008-2010; now, therefore,

BE IT RESOLVED by the House of Representatives of the Twenty-fifth Legislature of the State of Hawaii, Regular Session of 2010, the Senate concurring, that a report on the economic value of expanded workforce development capacity be provided by the Department of Business, Economic Development, and Tourism (DBEDT), which is responsible for tracking growth of emerging industries in defense and dual-use, astronomy, engineering, aquaculture, biotech, digital media, and related industries; and

BE IT FURTHER RESOLVED that an update on STEM initiatives, including Research Experiences for Teachers – Middle School, Project EAST, Hi-EST, and FIRST academies, and other robotics within Hawaii schools, is requested from the following:

(1) University of Hawaii College of Engineering;

(2) Department of Education;

(3) DBEDT;

(4) Robotics Organizing Committee; and

(5) Economic Development Alliance of Hawaii Inc., and the Hawaii 3Ts School Technology Laboratories Fund, under section 302A-1314, Hawaii Revised Statutes;

and

BE IT FURTHER RESOLVED that these entities provide their respective written reports to the Legislature no later than 20 days prior to the convening of the 2011 Regular Session on:

(1) The economic value of expanded workforce development capacity of emerging industries in defense and dual-use, astronomy, engineering, aquaculture, biotech, digital media, and related industries; and
(2) The status of each entity's STEM initiatives, activities, and recommendations for long-term expansion and funding requirements;

and

BE IT FURTHER RESOLVED that certified copies of this Concurrent Resolution be transmitted to the Dean of the University of Hawaii College of Engineering; Superintendent of Education; Director of the Department of Business, Economic Development, and Tourism; Executive Director of the Robotics Organizing Committee; and Chair of the Economic Development Alliance of Hawaii Inc.