LEGISLATIVE REPORT

SUBJECT: Relating to the State Budget

REFERENCE: HB 200, HD1, SD1, CD1
Section 132
Act 164 (SLH 2011)

ACTION REQUESTED: Report on STEM and creative media programs: (1) Defining STEM and applicable programs within the department; (2) Listing and describing applicable creative media programs to be highlighted in the report; (3) specifying the approximate number of eligible students and the number of participating students for the STEM and creative media programs by program; (4) evaluate projects demonstrating cost-effective outcomes and improved student performance in STEM and creative media experiential learning programs; and (5) encompass all initiatives and outcomes for the pilot HiEST Academies.

DOE REPORT:
Introduction:

The Department of Education (DOE) continues to support Science, Technology, Engineering and Mathematics (STEM) initiatives by infusing STEM resources into standards-based curriculum, assessment and instruction in schools. Currently all K-8 students and teachers have access to the digital media resources of Discovery Education in Science and Literacy until March 2013. The students and teachers of 20 high schools also have access to the digital media resources until July 2012. STEM is integral to Hawaii's Race To The Top plan in which students will graduate career and college ready; have an opportunity to receive a diploma with STEM distinction and pursue STEM-related post-secondary options.

FINDINGS:

(Action 1) - Defining STEM and applicable programs within the department.

The DOE has developed a STEM Learning Strategy and Network as part of its Race-to-the-Top initiative. The STEM Learning Strategy incorporates a definition of STEM education which states that: STEM education integrates the study of science, technology, engineering and mathematics by using scientific inquiry and engineering design as unifying processes. STEM emphasizes innovation and the development of problem-solving, critical thinking and collaboration skills through student-focused, rigorous, relevant, and authentic learning.

The DOE has yet to identify STEM programs based on this STEM education definition, however, schools have developed their own programs that are STEM related.
While individual schools have developed programs that engage students in learning STEM-related content, the DOE through its RTTT initiatives is developing STEM curriculum modules, authentic assessments and providing professional development aimed at integrating STEM into every math and science course. This ensures all students work towards becoming STEM literate. The DOE is also networking with EPSCoR, Women in Technology and other partners in providing STEM education to leverage resources and calibrate understandings of STEM literacy. Meanwhile, the DOE continues to support STEM programs at individual schools to ensure alignment with STEM literacy goals.

(Action 2) - Listing and describing applicable creative media programs to be highlighted in the report.

Finalization of the Memorandum of Agreement was completed on September 12, 2011. Implementation is currently underway, but has no specific school-level programs to highlight at this time. Initially, plans are to deliver Creativity Academy concepts through the Arts and Communication Career Pathway programs. Initiatives also target Business and Industrial and Engineering Technology pathway programs. The DOE, in partnership with Kapiolani Community College (KCC), has taken the following actions thus far.

- A standards developer/writer has been hired by KCC. To date, the Arts and Communication Core standards and Digital Media standards have been developed. In addition, drafts of the Animation and Graphic Design standards have been developed.
- A curriculum developer has been hired by KCC. Initial digital lessons that are aligned to the Arts and Communication Core standards have been developed. Included are lessons which integrate basic chemistry and subatomic particle concepts. Curriculum development will continue and plans are to complete these lessons by mid January 2012.
- A web designer is currently being contracted to allow for online support and access to all resources and lessons.
- Teacher training sessions have begun. The first session was held on Oahu on Monday, November 28, 2011 and will continue on the neighbor islands through December 12, 2011. Neighbor island training sessions will be held at Maui, West Hawaii, and East Hawaii districts. This initial training introduced teachers to the Creativity Academy goals, resources and lessons aligned to the standards. The resources included integrated science and creative media lessons and activities. Teachers were also introduced to a computer-aided design program that could be used to create 3D models. Subsequent teacher training sessions are planned for March 2012 and June 2012.
- Three 3D printers have been purchased for three schools, all of which use design and innovation within their Design Technology programs.

(Action 3) - Specifying the approximate number of eligible students and the number of participating students for the STEM and creative media programs by program.
The following are examples of such programs: Aiea Intermediate’s STEM Signature School, Project Environmental and Spatial Technology (EAST), Challenger Center Hawaii and Hawaii Excellence through Science and Technology (HiEST).

Although the DOE did not have oversight, Project EAST had 13 schools participating in the program statewide: seven in Maui County (Baldwin High School, Kihei Charter High School, King Kekaulike High School, Lahainaluna High School, Maui High School, Molokai Middle School and Molokai High School), one on the Big Island (Keaau High School), two on Kauai (Chiefess Kamakahelei Middle School and Kauai High School), three on Oahu (McKinley High School, Mililani High School and Farrington High School). Project EAST has served over 2,400 students since 2000. Student evaluations have been administered annually. Project EAST reports that students who have participated show significant career intent in STEM-related fields:

- over 76% showed increased interest in STEM due to Project EAST
- 71% plan to pursue a STEM related degree

The Challenger Center Hawaii has been impacting students and teachers across our state for 18 years. To date, the center has educated over 85,000 6th-8th grade students using a hands-on approach to Language Arts and STEM.

(Action 4) - Encompass all initiatives and outcomes for the pilot HiEST Academies. The following schools participated in the HiEST program: Waipahu High, Campbell High, Baldwin High, Kau High and Pahala Elementary, Oloman, Waialua High and Intermediate, Kahuku High and Intermediate, Pearl City HS and Highlands Intermediate. Approximately 1,040 students (408 students in math and 630 in physical science) have participated in the HiEST program.

Much of the data for programs not under the DOE was gathered up to Spring 2009 from various websites. The Office of the Governor worked directly with the University of Hawaii at Manoa and the Community Colleges to oversee HiEST and provided funds for the program through Honolulu Community College. In addition, agencies external to the DOE received funds to support Project EAST.

The DOE was not the coordinator for these initiatives and no reports were submitted for DOE review.

(Action 5) - Evaluate projects demonstrating cost-effective outcomes and improved student performance in STEM and creative media experiential learning programs.

The DOE will report on cost-effective outcomes to programs under direct oversight. A report will be provided for current DOE STEM and creative media programs at the end of SY 2011 – 2012.