

THE ACADEMIC ROADMAP PROJECT AT PVAMU

The Academic Roadmap Project facilitated a new partnership between Eisenhower High School, Houston Community College System and Prairie View A&M University. The Science Team in particular addressed perhaps the most relevant issue – preparing a more modern science learning and practicing environment that would facilitate students and teachers to choose and pursue science-related careers. Efforts are in place to extend this partnership to other high schools.

The following describes briefly the results of the project and the ways in which the project is being institutionalized. Relevant project details can be found at the website, <http://www.i2i.pvamu.edu/physics/index.htm>.

RESULTS OF THE PROJECT

The contents of the high school benchmark courses in Biology, Chemistry and Physical Science, and the entry-level university courses in these disciplines are similar. The difference lies in the depth of each subject matter that is covered. In high school benchmark courses students are introduced to the topics being covered, but at the university the course work is divided into two semesters to allow for greater depth of the material being covered. In addition, critical thinking skills are emphasized.

The project brought into focus several realizations:

- Science should be a core subject—not an add-on—in every year of school, starting in kindergarten.
- Science must be for all students, not just for scientists and engineers.
- Science should not be taught as words and formulas to be memorized from textbooks, and then tested on multiple-choice exams, but as a method of thinking, formulating and solving problems.
- Science must be taught as inquiry-based learning, with hands-on, problem-solving exercises and laboratory experiments.
- Relationships among scientific disciplines should be constantly emphasized.
- Vertical teaming within the school (elementary to middle to high) should be stressed to ensure course and content alignment.
- Vertical teaming in higher education (high school to community college, and high school to university) to ensure a seamless transition from the high school level to entry-level college courses.

The final product from this project was an "Academic Roadmap" for students, parents, teachers, counselors and administrators that will map the routes to access, participation and success in higher education for all Texans while increasing the number of teacher education applicants and graduates. The roadmap will guide students through each stage of their education with specific information about requirements and performance expectations, along with the various metrics.

The roadmap defines a strategy that will ensure that talented people are attracted to teaching as a career, especially in the fields of science and technology education. The strategy should also identify the skills and support needed by teachers to build a culture of continuous innovation in Texas' schools. The figure below is a schematic of the Project and its implementation.

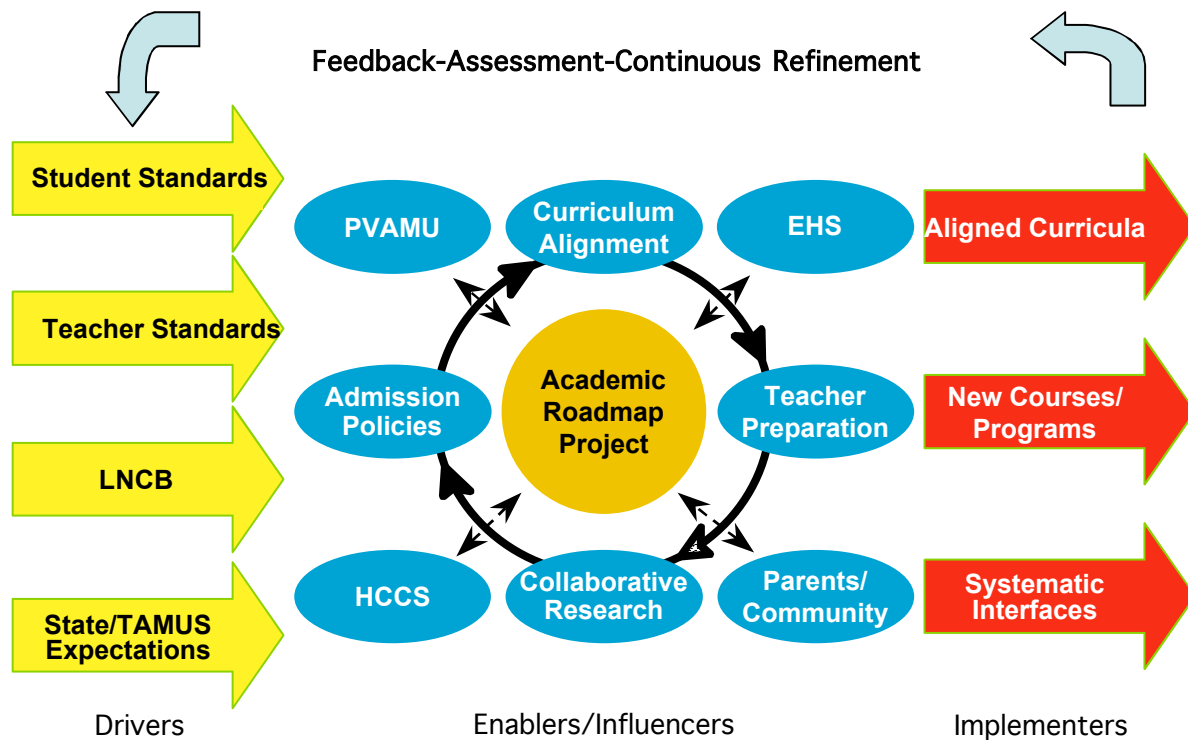


Figure – A schematic of the proposed Academic Roadmap implementation

CHANGES MADE/PROPOSED IN THE PHYSICS PROGRAM

The experience from the Academic Roadmap Project has in some ways initiated and in other ways accelerated the Physics Department's attempts at modernizing the physics curriculum. The following is a selected list of activities and accomplishments.

- Introduced a new course - PHSC 2103: Quantitative Physical and Biological Sciences - to provide a more extensive and in-depth content for science teachers teaching Integrated Physics and Chemistry (IPC) courses.
- Introduced a new Online Weather Course that may be used as an excellent forum for bringing together elements of fundamental science in an applied setting.
- During fall 2002 the department's Curriculum and Assessment Committee initiated a comprehensive effort (to be completed by May 2003) on assessing the content of all the courses taught in the department towards ensuring that students – majors in physics and in other disciplines – have the appropriate preparation after completing these courses.

- A portion of the newly acquired Title III funding was set aside for designing and proving in a Science Education Laboratory (SEL), to be in place by May 2003. The SEL will be a learning environment for school teachers and students.
- A curriculum modernization effort, initiated in spring 2002, has been approved by the University Academic Council, is being forwarded to the TAMUS Board of Regents and the Texas Higher Education Coordinating Board. The new four-track degree program – Traditional Physics, Computational Physics, Applied Physics and Medical Physics – is an innovative approach with a potential to attract more students to physics.
- A preproposal was submitted in February 2003 to FIPSE on a new approach to teacher retention in schools.
- A collaborative research proposal was submitted to the Academy for Educator Development in March 2003.
- A new Physics Education Track is being discussed with the College of Education for possible implementation towards producing physics teachers. In particular, proposing several new courses: Physics of Everyday Life, Teaching of Physics, and Science-Based Project Management.
- Initiated discussions with Waller, Royal, Hempstead, Eisenhower, Elkins and Elsik High Schools to enhance the existing field-based teacher preparation in science disciplines.

PROPOSED/PLANNED ACTIONS

- PVAMU and Houston Community College System Faculty to evaluate objectives and sequencing of courses required for teacher education programs.
- Science and mathematics departments, and the College of Education at PVAMU, and the Houston Community College System design a new specific science education curriculum.
- A mechanism and a schedule for periodic school and community college faculty collaboration be set in place.
- Prepare and publish papers on specific efforts by the Science Curriculum Partners, especially in the Institute's on-line electronic journal.