

SOUTH CAROLINA

*Personal Pathways for STEM Success:
A Statewide partnership for Curriculum Innovation, Best Practice,
Articulation Design, and Data Collection,*

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A. PROJECT DESIGN

The South Carolina Department of Education (SCDE) and statewide and local workforce and institutions of higher education have developed a formal partnership designed to improve the education of Science, Technology, Engineering, and Mathematics (STEM) cluster engineers, technicians, and other STEM professionals in our state. The project, *Personal Pathways for STEM Success: A Statewide partnership for Curriculum Innovation, Best Practice, Articulation Design, and Data Collection*, will yield a replicable methodology built on research-based strategies that will form a sustainable capacity to produce a trained workforce for this high-wage, high-skill, and high-demand cluster. This project will impact 39 career and technology centers, 100 traditional high schools, 102 comprehensive high schools, 8 charter schools, and 81 alternative schools, serving more than 192,000 students in grades nine through twelve. It will also impact 634 elementary and 233 middle schools.

The goal for *Personal Pathways for STEM Success* is to increase the number and diversity of students who enter and complete associate and baccalaureate degrees in existing and emerging STEM cluster disciplines through the implementation of a Statewide Articulation Agreement for rigorous parallel Programs of Study (POS). To attain this goal, we have established the following **objectives**:

1. Establish a formal partnership to facilitate the development of both engineers and engineering technicians by implementing parallel rigorous K-16 STEM POS in a coordinated non-duplicative progression of courses.
2. Increase opportunities for secondary students to participate in concurrent enrollment, dual credit coursework, or otherwise acquire postsecondary education credits through the development of a Statewide Articulation Agreement.

3. Increase opportunities for transferability of credit among two-year and four-year colleges and universities through the Statewide Articulation agreement.
4. Provide written documentation of all steps of POS development and implementation for use by other states and state-level consortia.
5. Disseminate project materials and documentation through web site development (including guest domains and log-ins for state-developed on-line systems) and OVAE-sponsored technical assistance conferences and meetings.

(1) Identification of Partners

Partners committed to achieving these objectives include

- the South Carolina Department of Education (SCDE)—Office of Career and Technology Education
- the South Carolina State Board for Technical and Comprehensive Education and the South Carolina Technical Education System (SBTCE), which includes all 16 of South Carolina's two-year technical colleges
- the South Carolina Department of Commerce, which is responsible for the state's workforce development system
- the South Carolina Chamber of Commerce
- the four South Carolina four-year, baccalaureate degree-granting engineering colleges and universities—The University of South Carolina (USC), Clemson University, The Citadel, and South Carolina State University (SCSU), the state's only publicly funded Historically Black College and University (HBCU), the nation's only HBCU nuclear engineering program, and the only state-supported institution in South Carolina that awards both the engineering and the engineering technology degree

- Orangeburg-Calhoun Technical College (OCtech), a Predominately Minority Institution (PMI) with a statewide Instrumentation Technology program
- premier industry partners, SCANA Corporation and Duke Power.

USC's College of Engineering currently acts as the statewide Project Lead the Way (PLTW) training and certification entity. Through PLTW, a nationally recognized pre-engineering course sequence that includes the opportunity to earn college credit, USC serves middle schools, high schools, and technical colleges who are pursuing the PLTW Community College Affiliate designation. Two technical colleges, Piedmont Tech and OCtech, assist the SCDE with PLTW and Gateway to Technology implementation by hosting professional development opportunities during the school year. USC has also announced a statewide bridge program with the 16 colleges that comprise the South Carolina Technical College system.

The partnership includes industry representatives who know the importance of embedding industry standards and national certifications in each POS. The two multi-state energy providers (SCANA Corporation and Duke Power) are actively committed to STEM education and preparation. Duke Power has provided funding (\$2.4 million) for the AdvanceSC postsecondary Mechatronics. SCANA Corporation's SCE&G's statewide Hydro- and Fossil Fuel Training Center is located on the OCtech campus.

(2) Effective Use of the Partnership to Advance STEM education

Personal Pathways for STEM Success will be based on national and industry standards and will be easily transferable to other states and to state consortia. Procedures used to develop the K-16 STEM strategy will be replicable to other states and will provide best practices in preparing technicians and engineers for manufacturing, energy, and other related economic development concerns essential to the state's and nation's competitiveness.

The model will include existing and emerging professions, including nontraditional fields, in a state where professional scientific and technical services are projected to increase 31% by 2016, exclusive of Manufacturing. The state's largest major industry sector is Manufacturing, with 20% of the state's employment. In fact, the Manufacturing sector is responsible for three of every five jobs created in South Carolina in 2007. These jobs are heavily and increasingly populated by STEM technicians and engineers, especially in the automated manufacturing, process control, mechatronics, and industrial maintenance technology disciplines.

A diversified energy sector, including fossil fuel, nuclear, hydrogen cell, and biomass, in South Carolina is expected to add dramatically to the need for STEM technicians. South Carolina already supplies more than 50% of its power from nuclear energy, making it among the nation's top nuclear energy power producers. With four current nuclear power facilities and four more nuclear reactors expected to be operational in the state by 2015, the demand for computer operators, instrumentation technicians, chemical process technicians, and programmers in the energy sector is predicted to grow by 18%, the need for nuclear technicians by 31%.

When the need for advanced manufacturing and energy-related technicians is considered, the STEM cluster emerges as one of two career clusters (the other being Health Sciences) most important to the state's economic well-being. The systematic analysis of data available through the South Carolina Department of Commerce and the South Carolina Chamber of Commerce bolsters the STEM cluster's potential for high wage, high skill, and high demand employment.

Based on historical data, the demand for these technicians will exceed the current capability of South Carolina to attract, retain, and graduate qualified STEM technicians unless an aggressive recruitment, retention, and advancement plan is initiated across the state's education and workforce development agencies. Such a plan will also need to address aggressive strategies

for assisting and supporting under-prepared students as evidenced by state education and employment data. The SCDE and its existing, experienced partners in the project have developed this proposal to address the state's critical need for STEM technicians and leverage its already large financial and educational commitments to the STEM Program of Study (POS).

The two parallel POS pathways will include (1) the adaptation of the nationally recognized pre-engineering Project Lead the Way (PLTW) curriculum to include increased dual credit and articulation opportunities through South Carolina's 16 technical colleges and PLTW's new Community College Affiliate program and (2) the completion of a South Carolina parallel STEM pathway called Mechatronics that will include national standards and industry certifications and will prepare high school students to pursue STEM disciplines in an automated manufacturing pathway and create access through technical college STEM programs, dual credit, and articulation to four-year degree opportunities in engineering or engineering technology.

Activities will increase the number and diversity of students who are prepared to enter STEM pathways at the secondary and postsecondary levels and who are able to earn dual credit, participate in concurrent enrollment programs, or acquire postsecondary credits in high school.

A **Statewide Articulation Agreement** which can serve as a replicable model for other states will further enhance the POS pathways by increasing opportunity for transferability of credit between two-year and four-year programs. Not only will the agreement increase the ability to transfer credit, but it will also enable postsecondary to ensure re-entry options from the technical college/industry to the four-year university through the development of a well-articulated STEM pathway. The participation of all public associate and baccalaureate degree granting institutions in the partnership will provide expanded articulation possibilities for students, broaden the project's impact, and increase its ability to serve as a national model.

The STEM POS in South Carolina is substantially defined with implementation underway at the elementary, middle, and secondary levels. In fact, we rank 5th of all the states in its number of middle and high school installations for PLTW and Gateway to Technology, a middle-school PLTW program designed to interest students in mathematics and science with an emphasis on engineering. The comprehensive nature of the state's STEM commitment is seen in the sharp contrast by South Carolina's rank of 25th in the nation for total population and 12th in the nation for total population change.

The development and roll-out in South Carolina of a parallel secondary four-course Mechatronics curriculum sequence, based on a series of national industry certifications, further demonstrates the state's commitment to the STEM cluster. As hardware, equipment, transport, machinery, and appliances incorporate more diverse, sophisticated and convergent technologies, the skills required to build, maintain, and repair these systems must match their complexity.

Mechatronics is a new way of teaching and learning these highly complex integrated skill sets and typically combines electronics, mechanics, pneumatics, and hydraulics as applied to robotics, and automation information technology. While Mechatronics has been funded as a K-12 initiative by the SCDE's Office of Career and Technology, the multi-state utility company Duke Power has funded a \$2.5 million public/private partnership, AdvanceSC, with the state's technical colleges to develop further the Mechatronics pathway at postsecondary, to include certificates and even an Associate of Occupational Technology degree, with an emphasis in Mechatronics. Both Clemson University and Otech have received National Science Foundation grants to further refine Mechatronics for two-year, four-year, and bridge implementations.

(3) Not applicable

(4) Roles and Responsibilities of partners

The partnership will build on South Carolina's already substantial commitment to the STEM cluster and will create two parallel standards-based STEM Programs of Study (POS) with well-defined K-16 articulation models that will include 100% of the state's two-year technical colleges and 100% of the state's four-year colleges and universities with engineering or engineering technology programs. The Department of Commerce will provide data and online systems that will support the flow of workforce data to strategic partners. The partners will provide technical assistance and ensure sustainability of the project model beyond the life of the grant. The SCDE will be the fiscal agent for the project.

While this project focuses primarily on students who are prepared to enter STEM pathways through the rigorous STEM Program of Study, it will also leverage a recently funded National Science Foundation Advanced Technological Education (ATE) grant to OCtech to design and implement a STEM Transition Bridge for students and adults who desire to enter a STEM pathway but who are under-prepared in math and science. The inclusion of an entry pathway for these students will broaden the Project's impact and provide additional best practice.

Please see Section B (Technical Approach), letters of commitment (Appendix B), and the budget narrative for detailed information on the contributions and roles of each partner.

(5) Experience and Authority of Partners

All partners and partner representatives have the ability to provide answers and influence decisions, have excellent knowledge of the POS, and have the ability to communicate within or across agencies and organizations. In addition, the partnership includes the active participation of other institutions and industries familiar with elements of the POS.

The partners are also active in other formal POS-related structures, including the K-16

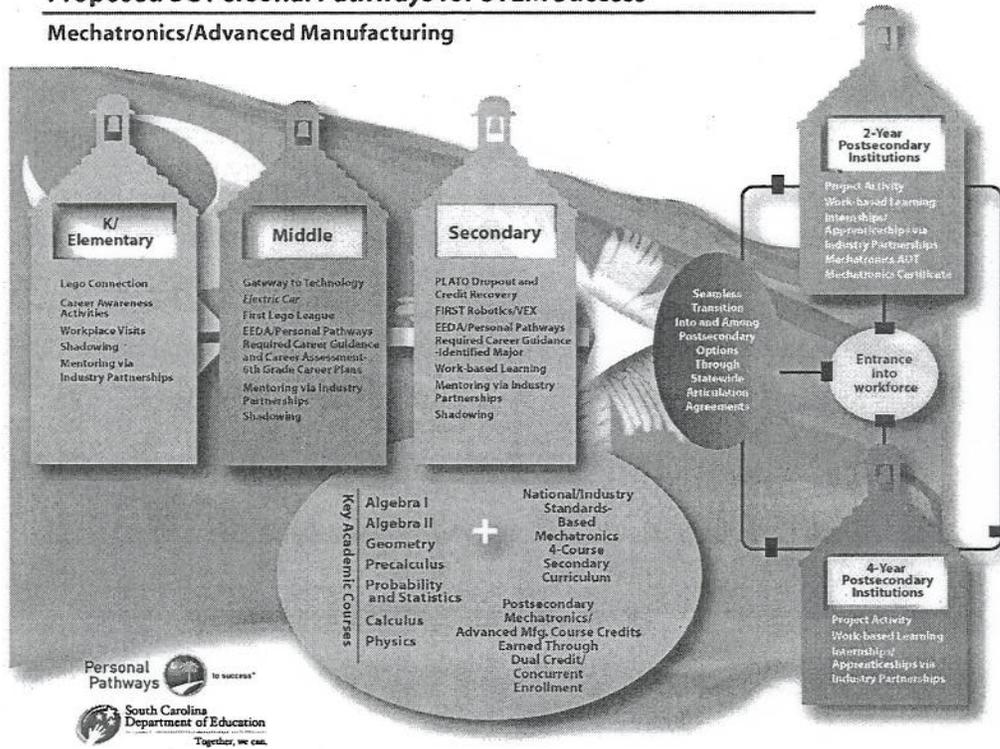
Coordinating Council for the South Carolina Education and Economic Development Act (EEDA) of 2005 (list of members in Appendix C), the state IT committee that structures all IT solutions relative to Perkins and EEDA, such as the South Carolina Career Development Electronic System, the Personal Pathways Electronic Individual Graduation Plan System, the statewide higher education electronic articulation system, the WIN Strategic COMPASS system for job outlook, and the Kuder Connect2Business and the Kuder4Adults electronic systems for connection to business and industry across K-16 and into the workplace.

The commitment of the major partners and the existence of the EEDA state legislation (see discussion of EEDA in next section) that is mirrored in the federal Perkins legislation places South Carolina in the unique position to ensure project sustainability. The unique provision of EEDA among the 50 states designates responsibility for program sustainability to formally reside with the SCDE after the sunset of the EEDA K-16 Coordinating Council. Sustainability will include all aspects of the POS, including maintenance of electronic systems, professional development, and connections to industry. Existing block grants at both the secondary and postsecondary levels will continue to be leveraged for program success; but most importantly, South Carolina's EEDA will ensure program sustainability since it mandates articulation pathways between secondary and post secondary and mirrors federal mandates.

The comprehensive design for the Mechatronics portion of the Personal Pathways for STEM Success is illustrated below, including at-risk strategies. A similar graphic for Project Lead the Way is included in the appendices:

Proposed SC Personal Pathways for STEM Success

Mechatronics/Advanced Manufacturing



B.

TECHNICAL APPROACH

Personal Pathways for STEM Success will focus specifically on faculty development, curriculum innovation, national and industry standards, and research-based strategies designed to improve success in program entry, dual credit, and transfer rates for STEM pathway participants.

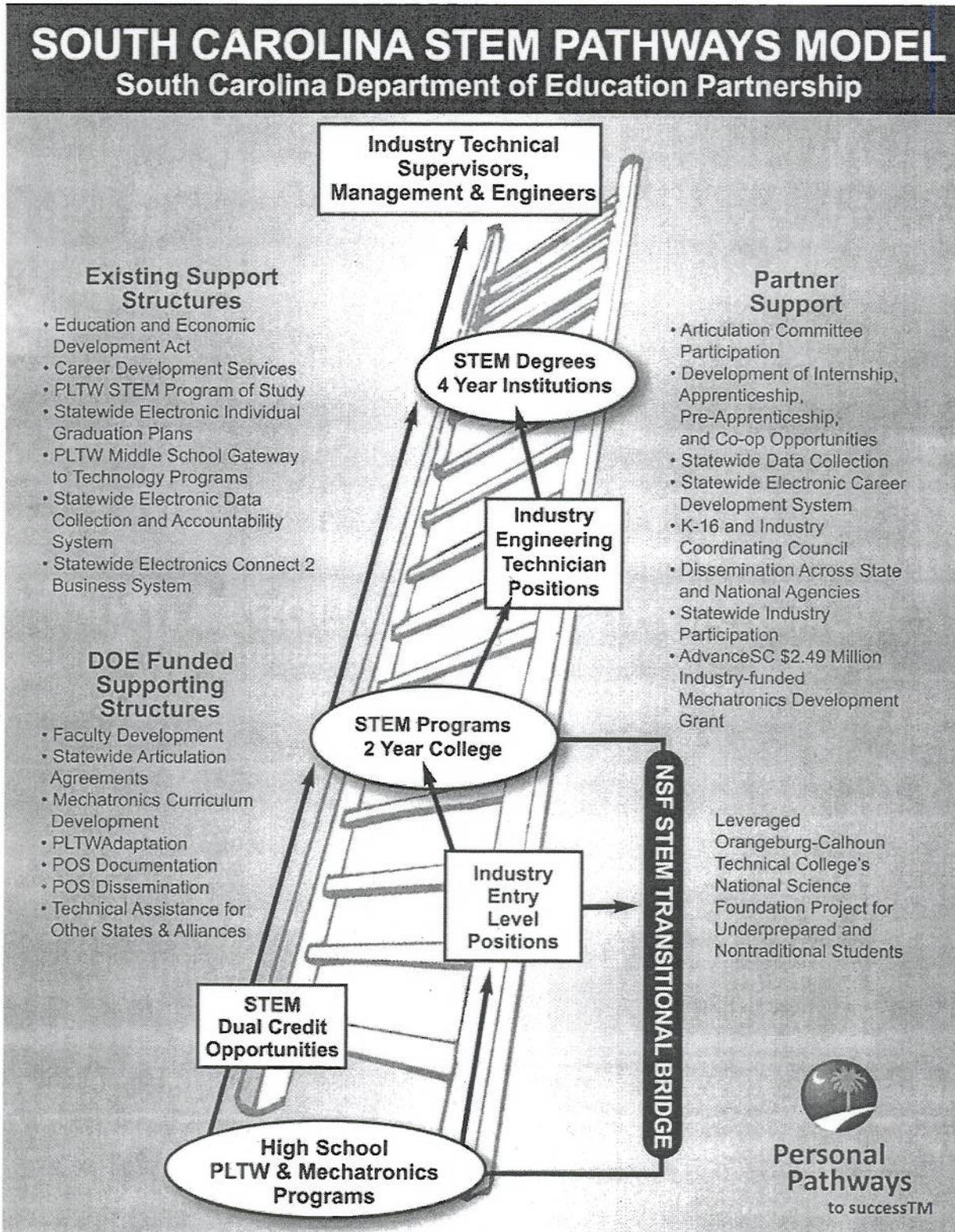
This Project leverages three years of STEM career pathway advancement fostered by the passage of the EEDA, including new electronic tools implemented statewide to support seamless K-16 articulation. These electronic tools include a web-based, dynamic career development system (called Personal Pathways) that interacts with each district's student information system. The system, implemented this year in all of the state's school districts, serves as a new state-level, data-collection system surrounding the electronic Individual Graduation Plans (IGPs)

required for all South Carolina students. The e-IGP will follow students into college as required by the EEDA and the state's response to the mandates of Perkins IV legislation. Other state-level electronic initiatives in support of this system and EEDA and Perkins IV include:

- A joint transcript system that will serve all public K-16 institutions
- A course-to-course articulation transfer system to serve the needs of postsecondary, dual credit, and high school students, parents, and counselors
- The South Carolina Career Planning System which provides career inventories and career exploration, college search, and college financial planning tools
- An electronic Connect2Business System that functions as a module to the e-IGP system and provides a way for students and business and industry to connect for extended learning opportunities, such as internships, apprenticeships, cooperative learning, shadowing, mentoring, etc. (see sample screens in Appendix C)
- An electronic job projection system funded by the South Carolina Department of Commerce called WIN Strategic Compass
- A statewide data warehouse to store, analyze, and provide accountability for both state and federal career legislation.

Accessed through a common portal presence, these systems will combine to enhance not only the interaction of K-16 education professionals, workforce development, K-16 students, parents, and business and industry, but also the advancement of STEM cluster (and other federal cluster) development and implementation. As part of the Statewide Articulation Agreement, South Carolina will complete a Memorandum of Agreement that will define the acceptable transfer of electronic student data across educational K-16 systems as needed to strengthen the STEM career pathway. The following [Figure 2](#) illustrates project design components:

Figure 2: SC STEM Pathways Model



(1) and (3) Comprehensive, Sequential Project Activities

Partners have designed project activities to accomplish the outcomes of each objective as well as to meet the overall performance measures for the program to determine the project’s overall effectiveness. The partnership commits to ensuring that the proper collection mechanisms are in place to provide data for the accurate calculation of the stated performance measures. Project activities have also been designed to provide necessary documentation for technical assistance and project replication. The chart below details not only the strategies and supporting activities of the Project, but it also delineates the partner responsibilities, start dates and specific outcome(s) needed for each strategy. This chart will be used to manage the grant’s progress and ensure data collection for both evaluation and decision-making.

Objective 1: Establish a formal partnership to facilitate the development of both engineers and engineering technicians by implementing parallel rigorous K-16 STEM POS in a coordinated non-duplicative progression of courses. **Outcomes:** *100% of public two-year and four year institutions offering the career cluster will commit to the implementation of the Statewide Articulation Agreement*

Activities and Outcomes	Initiate	Responsibility
1.1 Establish partnership Memorandum of Agreement and project methodology	10.1.08	SCDE, OCtech; SCBTCE, 4 YR
1.2 Determine and align academic and technical content standards for POS pathways (PLTW and Mechatronics)	10.1.08	SCDE, OCtech; SCBTCE, 4 YR; Industry
1.3 Validate standards with higher education, industry and national agencies/boards to ensure rigor	11.1.08	SCDE, OCtech; SCBTCE, 4 YR; Industry

1.4 Establish appropriate credentials, certifications, and/or degree sequences for associate or baccalaureate degree; <i>Seamless Pathway, G9-16</i>	11.1.08	SCDE, OCtech; 4 YR, SCBTCE
1.5 Develop and align course sequences and equivalent courses for rigor	1.1.09	SCDE, OCtech; 4 YR, SCBTCE
1.6 Align postsecondary and secondary coursework to eliminate duplication an/or gaps in required standards acquisition	11.1.08	SCDE, OCtech; 4 YR, SCBTCE
1.7 Determine and agree upon faculty qualifications/credentials for secondary and postsecondary; <i>Highly Qualified Teachers</i>	11.1.08	SCDE, OCtech; SCBTCE, 4 YR
1.8 Provide professional development for awareness and adoption of STEM program participation; <i>STEM Statewide implementation</i>	12.1.08	SCDE, OCtech
1.9 Determine and define any options or incentives for school/college participation	12.1.08	SCDE, OCtech
1.10 Implement the POS	1.1.09	SCDE, OCtech; 4 YR, SCBTCE
1.11 Collect, analyze, and report data	6.1.09	SCDE, OCtech

Objective 2: Increase opportunities for secondary students to participate in concurrent enrollment, dual credit coursework, or otherwise acquire postsecondary education credits through the development of a Statewide Articulation Agreement. **Outcomes:** 60% of students

participating in the STEM POS can participate in dual or concurrent enrollment opportunities or other options to earn postsecondary credits

Activities and Outcomes	Initiate	Responsibility
2.1 Review state/local policies to identify and eliminate barriers to STEM participation	11.1.08	SCDE, OCtech SCBTCE, 4 YR
2.2 Identify dual credit and dual enrollment POS opportunities	12.1.08	SCDE, OCtech; SCBTCE, 4 YR; Industry
2.3 Leverage resources and increase access to dual credit opportunities through technical college participation in PLTW Community College Affiliate program and postsecondary courses aligned to NCCER national certifications; <i>Courses aligned</i>	3.1.09	SCDE, OCtech, SCBTCE, Industry
2.4 Identify any other appropriate mechanisms for the awarding of postsecondary credit	3.1.09	SCDE, OCtech
2.5 Determine necessary placement criteria	1.1.09	SCDE, OCtech
2.6 Provide career counseling and IGP development; <i>eIGP's completed</i>	1.1.09	SCDE, OCtech
2.7 Include dual enrollment in IGP development; develop MOA for data	1.1.09	SCDE, OCtech; SCBTCE
2.8 Provide remediation model for STEM bridge in math and science	1.1.09	SCDE, OCtech
2.9 Develop and finalize articulation agreement with all signatures of participating colleges, agencies, or	5.1.09	SCDE, OCtech

schools; load into electronic IGP system; <i>Agreement Completed</i>		
2.10 Provide professional development	12.1.08	SCDE, OCtech
2.11 Publicize articulation agreement and student and faculty STEM opportunities; <i>Awareness campaign developed</i>	6.1.09	SCDE, OCtech
2.12 Collect, analyze, and report Year 1 data	6.30.09	SCDE, OCtech
2.13 Recommend tuition options to appropriate funding agencies	9.1.09	SCDE, OCtech

Objective 3: Increase opportunities for transferability of credit among two-year and four-year colleges and universities through the Statewide Articulation agreement. Outcomes: *100% of the state's postsecondary STEM POS students can transfer to another technical college or four year university without losing credit for courses already completed.*

Activities and Outcomes	Initiate	Responsibility
3.1 Align two-year and four-year STEM programs and determine availability; <i>Courses aligned</i>	1.1.09	SCDE; 4 YR, SCSU, OCtech; SCBTCE
3.2 Review state and local policies to identify and eliminate barriers to transfer of STEM courses; <i>Barriers eliminated</i>	1.1.09	SCDE, OCtech; 4 YR SCBTCE
3.3 Establish POS general education postsecondary course options for maximum transferability (Statewide Articulation Agreement); <i>Courses established</i>	4.1.09	SCDE, OCtech; 4 YR SCBTCE
3.4 Revise existing program structures to incorporate POS	3.1.09	SCDE, OCtech; 4 YR

course sequences; <i>Revision completed</i>		SCBTCE
3.5 Determine specific coursework requirements and prerequisites; <i>Requirements completed</i>	3.1.09	SCDE, OCtech; 4 YR SCBTCE
3.6 Review admissions criteria to smooth transitions when possible; <i>Admissions criteria established</i>	4.1.09	SCDE, OCtech; 4 YR SCBTCE
3.7 Jointly develop courses as needed	Ongoing	SCDE, OCtech; 4 YR SCBTCE
3.8 Develop options for credit transfer; <i>Options identified</i>	7.1.09	SCDE, OCtech; 4 YR SCBTCE
3.9 Develop and finalize articulation agreement with all signatures of participating colleges and universities and statewide agencies; load into electronic articulation system; <i>Agreement completed</i>	6.30.09	SCDE, OCtech; 4 YR SCBTCE
3.10 Provide professional development	Ongoing	SCDE, OCtech; 4 YR SCBTCE
3.11 Determine options for bridge courses from two- to four- year institutions or advanced math and science; <i>Courses identified</i>	6.30.09	SCDE, OCtech; 4 YR SCBTCE
3.12 Publicize articulation agreement and student/faculty STEM opportunities, including pathway reentry points; <i>Marketing plan completed</i>	7.1.09	SCDE, OCtech; 4 YR SCBTCE
3.13 Collect, analyze, and report data	6.30.09	SCDE, OCtech

Objective 4: Provide written documentation of all steps of POS development and implementation for use by other states and state-level consortia. **Outcomes:** *Statewide Articulation Agreement will be completed and in place for use by September 1, 2009.*

Activities and Outcomes	Initiate	Responsibility
4.1. Document the process to design, adapt, and or adopt and reach agreement on the POS and all aspects of Articulation Agreement; <i>Requirements completed</i>	1.1.09	SCDE, OCtech
4.2 Provide access to formal articulation documents for review; <i>Documents reviewed</i>	12.1.09	SCDE, OCtech
4.3 Document third-party validation of rigor for academic and technical content standards; Validation completed	3.1.09	SCDE, OCtech
4.4 Document necessary state/local policy changes and provide access to policies; Documentation completed	1.1.09	SCDE, OCtech
4.5 Document the process for inclusion of POS into the electronic systems at each educational level; <i>Process completed</i>	6.1.09	SCDE, OCtech
4.6 Document the data flow between electronic systems	6.1.09	SCDE, OCtech
4.7 Document the process used to address obstacles in funding, assessments and other options for documenting technical content skills, faculty certification, tracking student transitions, awarding credit, and POS availability; <i>Documentation completed</i>	12.1.08	SCDE, OCtech
4.8 Document types of reports for accountability and program	2.1.09	SCDE, OCtech

efficacy		
4.9 Prepare documentation for professional review and dissemination; <i>Documentation and dissemination completed</i>	3.1.09	SCDE, OCtech

Objective 5: Disseminate project materials and documentation through web site development (including guest domains and log-ins for state-developed on-line systems) and OVAE-sponsored technical assistance conferences and meetings. **Outcomes:** *100% of the States' K-16 systems will have access to materials by January 1, 2010.*

Activities and Outcomes	Initiate	Responsibility
5.1 Provide grant website containing all documentation, including guest log-in to sample IGP domain; <i>site complete</i>	1.1.10	SCDE, OCtech
5.2 Include sample IGP report access; <i>Reports Accessible</i>	1.1.10	SCDE, OCtech
5.3 Provide guest log-in to articulation system; <i>Availability complete</i>	7.1.09	SCDE, OCtech
5.4 Provide electronic copies of program-specific materials	1.1.10	SCDE, OCtech
5.5 Host STEM POS Symposium for states, consortia, schools, colleges/ universities, or state agencies;	6.1.10	SCDE, OCtech; 4 YR SCBTCE
5.6 Provide technical assistance to OVAE, including 2 meetings TBA; <i>Present during the two meetings</i>	6.1.09	SCDE, OCtech; 4 YR SCBTCE
5.7 Present at other professional meetings and national conferences; <i>Completed/documentated presentations</i>	6.1.09	SCDE, OCtech; 4 YR SCBTCE

(2) Effective Practices in Developing Articulation Agreements and CTE POS

South Carolina has worked aggressively in recent years to address its formidable educational challenges, increasing academic rigor and improving achievement dramatically at all grade levels including high school. The state began its reform effort by establishing substantive academic standards for all subject areas and grade levels, creating a rigorous assessment system, and setting a standard for student proficiency that is widely considered to be among the toughest in the nation. Accompanying these changes is the stringent statewide school and district accountability system established in 1998, which also is frequently cited as a national model.

Reform efforts have also focused intensively on enriching, as well as adding rigor to, the career and technology education curriculum. In 1992, with grant funding from the United States Department of Education, South Carolina eliminated the “general track” and implemented Tech Prep—a systemic career and technology education reform effort built around comprehensive career guidance, the integration of rigorous and challenging academic and occupational education, and the close collaboration of secondary and postsecondary institutions. In 1994, Tech Prep was expanded to include school-to-work transition initiatives such as youth apprenticeships, mentoring, cooperative education, shadowing, internships, and service learning to help students bridge the gap between school and the workplace.

The Education and Economic Development Act (EEDA) of 2005 further sharpened South Carolina’s focus on developing the skills students need for success in the twenty-first-century workplace. The product of an intensive four-year study of workplace needs, the EEDA personalizes high school course work to match each student’s career interests, provides intensive guidance and counseling for all students, enhances opportunities for real-world learning experiences, and creates structures to ease the student’s transition from high school to college or

career. Approved by the South Carolina General Assembly in 2005, the EEDA is an important step forward for South Carolina in its effort to address the three *Rs*—Rigor, Relevance, and Relationships—that are seen by researchers as key to transforming high schools into places that prepare students effectively for today’s economy.

The EEDA lays the groundwork for a system of public education based on the concept of “personal pathways to success.” The “pathways” system tailors the high school experience to fit the individual and sets up for every student a seamless transition into life after graduation, whether his or her pathway leads to a two-year college, to a four-year college or university, to military service, or directly into the workplace. Under the EEDA, high academic standards are combined with intensive counseling and opportunities for students to build real-life working skills that are directly related to their individual aspirations. The EEDA organizes the high school curriculum into the sixteen federal clusters of study or career clusters (S.C. Code Ann. § 59-59-50(A)). The “pathways” system provides for programs of career awareness and exploration beginning in elementary grades. In the eighth grade, students, their parents or guardians, and skilled counselors begin meeting to create each student’s individual graduation plan (IGP), outlining personal education and career strategies. IGPs, which are revisited at least once a year, specify each student’s choice of cluster and major, postsecondary goals, high school course work, and out-of-class learning experiences, among other elements. The system also enables students to replace some general high school elective courses with courses specifically geared toward particular areas of career interest. Partnerships with businesses and local institutions are set up to give students the opportunities for hands-on working experience in the field of their choice, connecting essential academic learning with real-world job skills that make learning relevant to students and improve their chances for career success.

The EEDA recognizes that most students will need further schooling beyond high school and specifically addresses the goal of preparing students “to successfully transition into . . . postsecondary education” (S.C. Code Ann. § 59-59-140). The Act calls for *articulation agreements* among high schools, two-year colleges, and four-year colleges to ensure a seamless transition and authorizes dual credit agreements allowing students to earn college credit for equivalent courses taken in high school (S.C. Code Ann. § 59-59-210). It further establishes a committee to oversee the process. Under the EEDA, this committee has removed many barriers to student’s pursuing a seamless pathway. For the 2007-08 school year, the following policy breakthroughs have occurred:

- Regulations were promulgated that ensures that three hours of college credit in a program that leads to an accredited associate or baccalaureate degree will be the equivalent of one Carnegie high school unit.
- The “Tech Prep” weighting for high school Grade Point Average (GPA) calculation was removed; only four kinds of weightings are now recognized in South Carolina: College Preparatory, Honors, Advanced Placement, and Dual Credit. Dual Credit and Advanced Placement now carry the same GPA weighting.
- At the request of the Committee and the Commission on Higher Education, all technical colleges and engineering degree-granting four-year institutions indicate how they will articulate the PLTW courses based on the end-of-course testing mechanisms in the PLTW design.

C. PROJECT MANAGEMENT

(1) Project Director

Dr. James Couch, director of the SCDE's Office of Career and Technology Education since 1998, will serve as Project Director. He has served as state support for workforce groups for Governors Campbell, Beasley, and Hodges and works with Governor Sanford's staff on educational and workforce development initiatives. Dr. Couch has served on various national workforce and educational boards, including Project Lead the Way, *High Schools That Work*, and VTECS. Key SCDE staff (see resumes in Appendix A) include Mr. B.T. Martin and Mr. James Spencer, program officers working under the direction of Dr. Couch in the STEM and Manufacturing clusters. Resumes are also included for key staff members at the South Carolina Technical College System.

(2) Management Structure

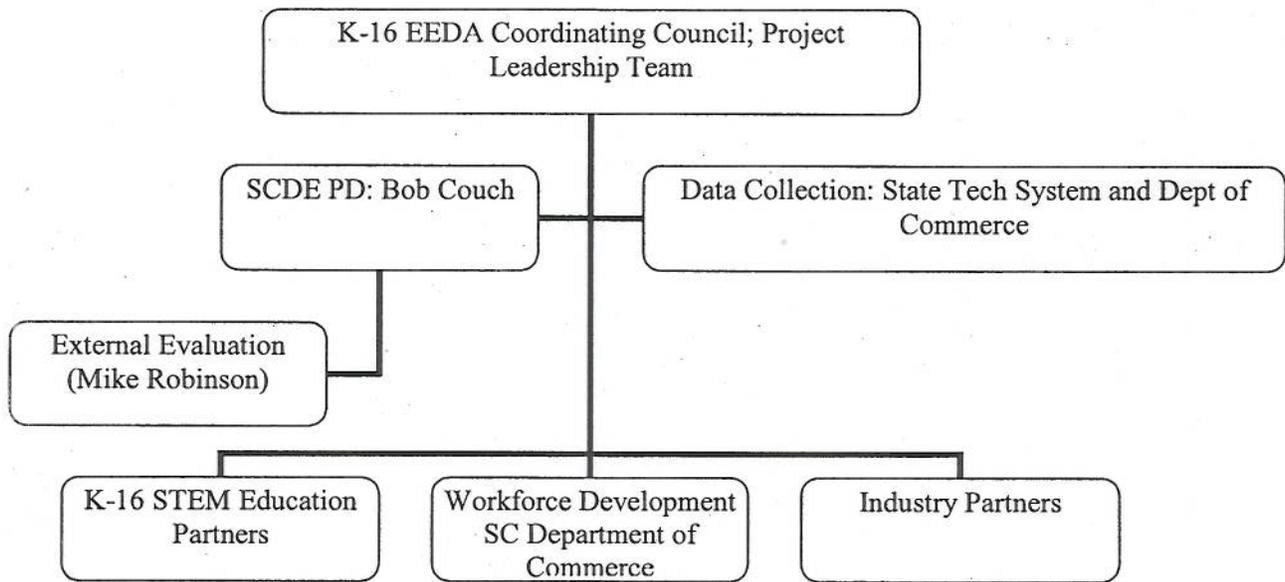
The Project will be managed using a policy-level K-16 Coordinating Committee established by South Carolina law in the passage of the EEDA; a management-level Leadership Team comprised of representatives of each state agency responsible for articulation of credit or STEM POS development and implementation. The Leadership Team will consist of designated representatives of the SCDE, the South Carolina Technical College System, the South Carolina Chamber of Commerce, the South Carolina Commission on Higher Education, and curriculum and skill level staff and faculty and industry representatives. Oversight will be provided through monthly meetings of the Leadership Team.

Management Timeline:

- Form partnership committee, September 2008
- Begin increasing secondary opportunities to participate in dual credit and articulation, September 2008

- Begin increasing opportunities for transferability of credit among two-year and four-year institutions, September 2008
- Provide written documentation of all steps of program of study development and implementation for all by either state and state level consortia, July 2009
- Facilitate dissemination of project materials and documentation through web-site development, state and national conference, and OVAE-sponsored technical assistance, July 2009

Management Graphic



(3) Time commitments of Project Director, Key Personnel, and Partners

Time commitments are as follows: Dr. James Couch, Director of the SCDOE Office of Career and Technology Education and Project Director (20%); Jim Spencer, CTE Education Associate for Mechatronics (20%); B.T. Martin, CTE Education Associate for PLTW (20%); Clint Mullins, Commission on Higher Education (10%); William Bradberry, Senior Manager for Instructional Technology and Career Programs for the South Carolina Technical College System (20%); University of South Carolina Dean of Education designee Donn Griffith, Engineering

Recruitment Associate (20%); Dean Kenneth Lewis or his designee, South Carolina State University Dean of Engineering 20%; and Technical Affiliates: OCtech: Donna Elmore, Associate Vice President of Education (15%); Dr. James Payne, NSF Project Director (10%); and Piedmont Tech: Keith Lasure, Dean of Engineering, Piedmont Tech (15%). Dr. Peggy Torrey, deputy secretary for Workforce with the SC Department of Commerce, (10%).

D. DISSEMINATION

The SCDE, the State Board for Technical and Comprehensive Education, the South Carolina Chamber, South Carolina Department of Commerce, and colleges and universities granting STEM degrees will participate in dissemination efforts. In addition to OVAE technical assistance meetings, the partnership will promote the project through Association of Career and Technical Education (ACTE), Project Lead the Way, League of Innovation, the College and Careers Transition Initiative (CCTI), the National Association of State Directors of Technical Education (NASDCTEc) and other Career Cluster and Career Counseling professional opportunities. The Project will also be featured at the South Carolina Education and Business Summit, the South Carolina Technical Education Association, the NSF National ATE Conference, and the American Association of Community and Junior Colleges.

Results will also be disseminated through a web site facilitated by the SCDE. All project documentation will be available on the web site for downloading. Due to South Carolina's extensive preparation for online tools to support EEDA and Perkins, a guest domain will be incorporated into the website for visitors to experience the Individual Graduation Plan System and its ability to facilitate multiple and distinct Statewide Articulation Agreements and pathways. Finally, the partnership will host a STEM Cluster symposium POS Symposium for interested states, consortia, schools, colleges, universities, or state agencies.

E. ADEQUACY OF RESOURCES

The commitment by the major partners indicates their willingness and ability to sustain the project after the grant period is completed. Regular federal, state, and local CTE funding will continue to absorb the costs of faculty, professional development, and student support services for POS delivery at the conclusion of the project. Increased STEM enrollment will sustain the POS, and Lottery Tuition Assistance may assist in dual enrollment and postsecondary access for South Carolinians. Existing block grants at both the secondary and postsecondary levels will continue to be leveraged for program success; but most importantly, South Carolina's EEDA (2005) will ensure program sustainability as it mandates articulation pathways between secondary and post secondary and provides electronic tools designed to facilitate transitions and provide data collection and analysis for accountability.

The SCDE is designated to assume responsibility for the EEDA once fully implemented. The Office of Career and Technology will monitor the program annually and be responsible for revisiting the Statewide Articulation Agreement as needed to maintain viability and foster the spirit of Perkins legislation. Industry partners will continue to provide technical assistance and Workforce and Commerce will provide data as needed for trend analysis and/or policy change.

Progress will be measured by such indicators as (1) accountability indicators will assess and document the initiation and completion of project ; (2) effectiveness indicators will assess how key stakeholders view the value, usefulness and quality of processes, products and activities; (3) OVAE GPRA performance indicators will measure outcomes as dictated by the RFP; and (4) efficiency indicators will provide as part of documentation how resources were used to produce a change (impact), illustrating how the partners use their experience and infrastructure to provide resources that improved STEM education and technician preparation.