CONNvene Comprehensive Plan - Draft

April 21, 2006

This third draft of CONN*vene's* Comprehensive Plan is intended to stimulate discussion, input, and collaboration. It is NOT a recommended final version.

A subcommittee of Committee One met three times and invested many hours developing the draft. The committee members include: Linda Froschauer, President National Science Teachers Association; Michael Hibbard, Ridgefield Public Schools; Greg Kane, CT State Department of Education; Lauren Kaufman, CT Business & Industry Association (CBIA); Robert Rader, CT Association of Boards of Education; Judy Resnick, CBIA; Bob Rosenbaum, PIMMS; Sheenu Srinivasan, Software Technologies; Rick Strauss, CT Academy for Science & Engineering; and Jonas Zdanys, CT Department of Higher Education.

CONN*vene's* national consultant, Dr. Daryl Chubin from American Association for the Advancement of Science (AAAS), recently stated, "In order to accomplish CONN*vene's* mission, the plan must be implemented over five or more years in which all of the State's assets are brought to bear on an agenda that may not please all of Connecticut's stake-holders perfectly, but will please them enough so they will collaborate, own, and help to sustain the plan because they will get some enduring benefit out of it. Fulfillment of the plan will require everyone with a stake in the outcomes to participate."

The subcommittee has established five categories under which CONN*vene's* Draft Plan was developed, they are:

1. Alignment of State and Local Policies;
2. Leadership Issues;
3. Impact on Teachers;
4. Student Interest and/or Engagement; and
5. Curriculum and Assessment.

Each category begins with a visioning statement, followed by specific action items. The final CONN*vene* recommendations will also include achievement targets, means to measure accomplishment, and projections for financial investments needed by various stake-holders to carry out the activities within each category. Attached to this draft is a listing of possible achievement targets to be considered by CONN*vene* reviewers.

This early draft of the CONN*vene* Comprehensive Plan highlights various Connecticut State Board of Education policy statements and the plan also relates to three of the five Touchstones of Comprehensive Educational Improvement championed by Dr. Betty Sternberg, Connecticut's Commissioner of Education. The three corresponding Touchstones include: High Quality Early Education for All, Excellence of Teaching of High Quality Curricula; and Assessment of Performance through Formative Evaluations.

1. **Align Local and or State Policies:**

VISION – Connecticut's State Board of Education, Board of Governors of Higher Education, local Boards of Education, and Trustees of Higher Education institutions must be committed to and ready to undertake the reform of STEM education across the educational continuum in Connecticut. Key issues include providing all our students with an appreciation of the significance of STEM in our culture, raising the achievement level of all students in these areas, closing the student achievement gaps between socioeconomic and racial/ethnic groups, preparing all children to contribute to Connecticut's economic competitiveness, and increasing the number of qualified candidates and subsequent college and university graduates prepared for STEM-related careers including teaching. *(CONNvene Education White Paper)*

A. Use existing State Statutes and Policies to improve student STEM performance.

1.1. Require local boards of education to include CT Academic Performance Test (CAPT) mathematics and science results to be part of students' graduation requirements as required in State Statute PA01-166.

1.1.1. Include authentic performance assessments in mathematics, science, and technology application and education as part of high school graduation requirements required by local boards of education.

1.2. Implement local boards of education policy that ensures student STEM performance expectations are being met and in compliance with Connecticut's:

- Mathematics, Science and Technology Curriculum Frameworks
- Common Core of Learning;
- Common Core of Teaching;
- Connecticut Code of Professional Responsibility for School Administrators;
- Connecticut Code of Professional Responsibility for Teachers;
- Connecticut's Commitment to Excellence;
- Standards for School Leaders;
- Continuing Educational Credit Program; and
- Beginning Educator Support Team (BEST) program.

1.3. Include financial and/or other incentives, tools, and encouragement in all State Statutes regarding STEM education directed at the local school district level.

B. New Legislative Actions:

1.4. Require Governor, Chairpersons of General Assembly Education Committee, Connecticut State Board of Education, Board of Governors of Higher Education, and Governor's Workforce Commission to meet at least once a year to review state STEM achievement data (as explicated in CONNvene Comprehensive Plan) as it pertains to State's economic development plans. *(Relates to Category Two as well)*

1.5. Require every CT school district to implement a "requisite" curriculum that fully prepares all students for continuing education and or immediate employment upon graduation. *(Relates to Category Five as well)*

1.6. Require every CT school district to implement STEM curricula that meet or exceed the State's mathematics, science, and technology Framework expectations. *(Relates to Category Five as well).*

2. Leadership Issues:

VISION – Every Local Education Agency (LEA) or Board of Education will adopt a policy that states: "Effective leadership is grounded in the belief that people in all positions with different responsibilities have a necessary and legitimate role to play in developing a common vision for their schools and working together to guide the school enterprise toward that vision. By sharing authority, effective school leaders empower, inspire and motivate others to work as a unified team toward a shared purpose—student achievement. Thus, the skills and talents of the staff and other educational stakeholders are applied toward a common end—student learning. This can best be accomplished in an environment of open communication, shared responsibilities, accountability and trust." *(Connecticut State Board of Education Leadership Position Statement.)*

2.1. Local Boards of Education and institutions of higher education will use the New England Association of Schools and Colleges (NEASC) process to develop and implement annual strategic STEM program improvement plans and to assess the degree to which the annual plans have been accomplished in elementary, secondary, and collegiate educational institutions.

2.1.1. Using the NEASC process does not necessarily include going through the full, formal accreditation process; although, most or all high schools will continue to fully implement the NEASC process. Elementary and middle schools can adopt the parts of the process which focus on connecting student performance to decisions about mission and learning expectations, curriculum, instruction, assessment, and the use of resources.

2.2. The Governor, co-chairs of the General Assembly's Education and Higher Education Committees, Commissioners of Education and Higher Education will hold local boards of education accountable for student achievement as represented in their annual strategic STEM program improvement plans.

2.3. Empower and fund a "coalition/entity"- (CT Academy for Education identified by subcommittee) – to facilitate and monitor the various STEM initiatives/actions/ programs that are established as a result of the CONNvene and other processes. The entity will also report on a continuing basis to the Governor, General Assembly, Departments of Education and Higher Education, Office of Workforce Competitiveness, business and industry, PreK-16 Councils and others on the

various STEM initiatives/actions/programs that are established as a result of CONNvene and other process.

2.3.1. Coalition also will be charged with recommending and developing new initiatives and programs to sustain the State's progress toward meeting the goals of CONNvene.

2.4. Each of the State's industry clusters will have representation from the PreK-16 STEM community.

2.5. The State's Commission on Children and After School Enrichment Programs will have representation from the PreK-16 STEM community.

3. <u>Impact on Teachers:</u>

VISION – Every school district board of education will adopt a policy that states: Educators will use the Connecticut's Common Core of Learning (CCL) and the Connecticut Mathematics, Science and Technology Frameworks to develop and implement curriculum standards, instructional strategies, and classroom assessments so all students have access to the same STEM knowledge and skills. Schools will offer challenging and rigorous programs of study to all students so they will have a greater likelihood of attaining gainful employment, higher earnings, as well as the skills and social competencies necessary to function responsibly and successfully in a global economy. In order to accomplish this goal, teachers and administrators will use a variety of student achievement data to ascertain and implement annual professional development activities to accomplish annual strategic STEM program improvement plan objectives – <see 2.1> *(Connecticut State Board of Education Position Statement on Principles Underlying Education-"Modified").*

3.1 Collaborate with teacher and administrator bargaining units, local school boards, CT State Board of Education, and General Assembly to identify an equitable resource base to ensure:

3.1.1 Connecticut middle and high school STEM teachers receive at least 60 hours of annual compensated, rigorous content-based professional development derived from a variety of student achievement data; and

3.1.2 Connecticut elementary teachers receive at least 30 hours of annual compensated, rigorous STEM content-based professional development resulting from a variety of student achievement data.

3.2 Encourage local boards of education to adopt policies and schedules that encourage and allow for discipline-based staff development with common planning time, peer observations, team teaching, videotaping instruction with subsequent viewing and critique, issue-focused faculty discussions, an individualized professional development program, cross-district grade-level meetings, research teams, course committees and multidisciplinary instruction;

3.3 Require/encourage every CT school district to provide STEM-qualified master teachers to help guide newly graduated or Alternate Route to Certification teachers of STEM during the first three years of their service.

3.4 Encourage every school with K-6 classes to have a least two STEM-trained resource teacher-leaders.

3.5 Provide State financial support for STEM-related teacher professional development at least equal to last four years for language arts.

3.6 Develop facilitated mechanism to increase the number of individuals from STEM fields that serve as professional development instructors, as mentors to interested students, and as demonstrators in classrooms and labs.

3.6.1 ENCOURAGE INSTITUTIONS OF HIGHER ED TO DEVELOP A NURTURING ENVIRONMENT FOR STUDENTS MAJORING IN STEM OR STUDYING STEM SUBJECTS FOR THE PURPOSE OF INCREASING RETENTION AND IMPROVING GRADUATION RATES. PROVIDE INCENTIVES (GRANT PROGRAMS, ETC) TO INSTITUTIONS OF HIGHER ED TO CREATE/PILOT/IMPLEMENT PROGRAMS THAT WILL AGGRESSIVELY SEEK TO ACCOMPLISH THIS GOAL.

3.7 Require every Connecticut-based higher education institution with a teacher education initiative to have a written articulation agreement with selected community colleges to serve as an educational preparation pathway. *(Relates to Category 2 as well)*

3.8 Create a reward system for faculty members at Connecticut institutions of higher education who teach freshman and sophomore STEM-related courses.

3.9 Create a professional development program where professors from CT Schools of Education co-teach with K-12 teachers in both the college and public school environments.

3.10 Expand to other CT State University campuses and Regional Education Service Centers the Teaching in the Twenty-first Century initiative.

3.10.1 A collaborative joining Capital Region Education Council (CREC) and Eastern CT State University offers a summer teacher recruitment program for high school juniors and seniors that encourage students to enter STEM-related disciplines or teaching profession in urban school districts.

- Provide two years free or reduced tuition at any CT community college with a formal written articulation agreement with a CT-based baccalaureate institution for any ERG I high school graduate that scores at mastery on the CAPT mathematics and science tests and that majors in STEM-related disciplines. (Relates to Category Four as well)

- CT businesses to provide paid summer employment for those students enrolled in this CT-based scholarship program. (Relates to Category Four as well)

3.11 Collaborate with United States Department of Education to provide increased State-supported incentives for teachers of STEM-related disciplines to teachers in districts where durational shortages have been problematic for two or more years, such as ERG I districts that had 128 unfilled positions in 2005, or 15.3% of total positions to fill.

- Enable 20% per year for five years of educational loan "Forgiveness" for Stafford and Supplemental Loans for Students, as well as Perkins loan holders, who teach in one of the STEM-related durational shortage areas.
- Expand Connecticut Housing Finance Authority (CHFA) program. This program enables teachers who teach in a priority or transitional school district, or who teach in a state-identified subject-matter shortage area, to qualify for mortgage assistance.

4. Student Interest and Engagement in STEM:

VISION – "For STEM-related courses to become a study of demand and interest, it is imperative that Connecticut stimulate widespread, grass roots understanding of the importance of these subjects to the quality of life of individuals and the state as a whole. Connecticut's effort to improve STEM education must include a program to get families, parents and their children excited, interested, and involved in science and technology activities so as to create a demand for rigorous studies in schools." (*CT Academy for Science & Engineering).*

4.1 Form a public/private coalition to develop local science councils to be operated through local science centers throughout the state to encourage interest and participation of the general public, as well as the youth of CT in science activities – out-of-school, after school, etc.

4.2 Create a Celebration of Student Excellence program that celebrates student excellence in science, math, engineering, and technology. School districts, etc. would nominate students who not only excel in these subjects, but also commit to community service to encourage interest in these topics within their communities.

4.2.1 Ideally, high school students would be recognized in a statewide event (held in conjunction with the Alliance for Connecticut Technology Innovation Day and Award Dinner) by the Governor in the fall of each year.

4.3 Provide 25% State matching with corporate support for annual CT Science Fair budget and other science and/or mathematics competitions held annually in the state.

4.4 Schedule STEM classes with consideration of research that indicates that different age groups learn best at different times of the day. While adolescents are more alert later in the day, younger children typically are more alert in the early morning.

5. Curriculum and Assessment:

VISION – "The most critical set of responsibilities for a local board of education is to articulate clearly what success means in its district; establish standards of performance; measure performance against those standards; regularly make this information available to the public; and ensure that this information is used to make good decisions which support student success. Defining standards for success and continually monitoring progress enable schools and school districts to make informed decisions about allocation of resources, curricular priorities and new initiatives that will directly enhance the success of all their students. Schools must constantly build on their accomplishments, while also addressing areas in need of improvement. (*CT State Board of Education Policy Statement).*

5.1 Require every CT school district to implement a "requisite" curriculum that fully prepares all students for continuing education and or immediate employment upon graduation. (Relates to Category One as well)

5.2 Require every CT school district to implement STEM curricula that meet or exceed the State's mathematics, science, and technology Framework expectations. (Relates to Category One as well)

5.3 Require 4 years of science for high-school graduation, including at least one year of laboratory experience.

5.4 Require 4 years of mathematics for high school graduation, with verification of proficiency of at least Algebra II as determined by attaining mastery of mathematics on the CAPT and or equivalent district assessment.

5.4.1 Quantitative reasoning, data analysis, and statistics and probability should either be taught in connection with Algebra II or as a free-standing course in grade 11 or 12.

5.5 Reduce by 50% within four years the percentage of students that must take remediated college entry-level classes when they matriculate directly for CT high schools into CT two-year and four-year institutions of higher education, as a result of alignment of CT mathematics graduation requirements with higher education entry requirements.

5.5.1 Work conducted through an expanded Math Alignment and Transition Council being facilitated through the CT State University System Office.

5.6 Provide competitive State grants - administered through the CT State Department of Education - for one-third of the expenditure for initial, one-year program start up

and teacher training costs to implement high school engineering curricula such as, but not limited to, Project Lead the Way. State funding to be matched by school district and corporate financial support.

5.7 With State and federal funding, establish Promising Results in Mathematics Excellence (PRIME) a collaboration of institutions of higher education, mathematics professional development groups, Connecticut State Department of Education, an independent non-profit facilitator and nationally recognized researchers and evaluators to establish a multiyear action research and student achievement improvement initiative with four objectives, which are to:

5.7.1 Identify, from existing student performance data, the teachers who are most successful in advancing all students, with specific attention to those who work with low performing districts and students. Once identified, work with these teachers to ascertain the mathematics teaching strategies, practices, and materials that best meet the differentiated learning needs of low performing students at the elementary-, middle-, and early high school-levels and are aligned to Connecticut's curriculum framework standards;

5.7.2 Create a virtual ***PRIME* Academy** consisting of the state's most effective teachers and administrators who will work with research, technical assistance, and professional development learning community teams to identify cause/effect factors that result in the higher student achievement and reduction in performance gaps. The ***PRIME* Academy** will become the nexus from which the collection, development, and organization of the best teaching and learning practices can be disseminated through a cadre of best practices specialists. Create incentives for teachers of STEM subjects from outside the urban area to teach these subjects in the inner city schools to help the urban districts;

5.7.3 Disseminate throughout Connecticut school districts and teacher preparation institutions the "authenticated" most promising teaching and learning strategies for each mathematical strand at each grade level, specifically targeting schools that are not meeting No Child Left Behind-mandated Adequate Yearly Progress in mathematics for all student subgroups; and

5.7.4 Measure ***PRIME 's*** effectiveness through qualitative and quantitative data collection, making programmatic and delivery modifications as required.

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