MINUTES

MATH AND SCIENCE EDUCATION ADVISORY COMMITTEE

September 26, 2007
Room 526-S—Statehouse

Members Present

Senator Nick Jordan, Chairperson
Representative Shirley Palmer
Representative Sheryl Spalding
Representative Kenny Wilk
Dan Jacobsen, President, AT&T, Topeka
Richard Taylor, Plumbers and Pipefitters Local Union 441, Wichita
Paul Weida, Vice-President, Black and Veatch Corporation, Overland Park
Kenneth Clouse, President, Northwest Kansas Technical College
Dr. Edward Hammond, President, Fort Hays State University
Dr. Michael Lane, President, Emporia State University
Ms. Janis Lavriviere, Center for Science Education, University of Kansas

Members Absent

Senator Laura Kelly
Senator Ruth Teichman
Mitch Counce, General Manager, Servi-Tech, Dodge City

Staff Present

Sharon Wenger, Kansas Legislative Research Department
Michele Alishahi, Kansas Legislative Research Department
Theresa Kiernan, Revisor of Statutes Office
Rose Marie Glatt, Committee Assistant

Conferees

Alexa Posny, Commissioner, Kansas Department of Education
Reginald L. Robinson, President and Chief Executive Officer, Kansas Board of Regents
Jewel Scott, Executive Director, The Civic Council of Greater Kansas City
Stan Ahlerich, President, Kansas, Inc.
John Yochelson, President, Building Engineering and Science Talent

Morning Session

The meeting was called to order at 10:00 a.m. by Senator Jordan, Chairperson of the Committee. He welcomed everyone to the first meeting of the Math and Science Education Advisory Committee. He gave a brief background of the formation of this interim committee, which is unique, as it is comprised of legislators, educators, and business community members. He encouraged them to be visionaries, looking at things "outside the box" in order to improve the way math and science are taught today. Today's meeting was foundational in nature, and would apprise them of the current status of math and science education in Kansas. He expressed gratitude for their participation, as well as the Ewing Marion Kauffman Foundation, for partnering with the Legislature to pursue this topic. Committee members and staff introduced themselves.

Sharon Wenger, Kansas Legislative Research Department called attention to a memorandum in Committee members' folders—A Brief Overview of Math and Science Initiatives from Other States (Attachment 1). The memorandum described what other states are doing regarding:

- Recruitment of math and science teachers;
- Improving preparation and professional development for math and science teachers;
- Aligning high school math and science coursework content and requirements with college expectations;
- Strengthening math and science assessments, increasing schools for gifted and talented math/science students, and developing innovative math and science curriculum to engage students; and
- Developing broad statewide science, technology engineering, and math (STEM) initiatives.

Senator Jordan invited Dr. Alexa Posny, Commissioner, Kansas Department of Education to the podium. She gave a power point presentation on Kansas K-12 Mathematics and Science Education: Economic Development (Attachment 2). She described trends in workforce and education, strategies, and outcomes.

Trends

Workforce: 70 percent of future jobs will require education beyond high school and she explained the "gap" analysis occurring in Kansas. Kansas workforce employers identified four areas of deficiencies in new hires:

- Communication skills;
- Problem solving abilities;
- Mathematical analysis; and
- Scientific knowledge.

She talked about the qualifications of Kansas teachers and reasons they are leaving teaching, *i.e.*, low compensation, and opportunities in the business world.

Education: She compared National Assessment of Education Progress (NAEP) scores with Kansas assessment scores on achievement levels at the 4th and 8th grade levels.

Strategies

Dr. Posny suggested three major strategies at the K-12 level that would help improve economic development related to math and science:

- Align K-12 STEM standards and assessments with postsecondary and workforce expectations;
- Examine and increase the state's internal capacity to improve teaching and learning; and
- Support innovative models developed from best practices in STEM education and bring them to scale.

Outcomes

Dr. Posny outlined anticipated outcomes if changes are made:

- An increase in the number of students completing the Kansas Scholars' curriculum;
- An increase in the number of students declaring majors in STEM areas; and
- An increase in the number of higher education graduates in: (1) STEM areas; and (2) teaching STEM.

Discussion followed regarding: Kansas deficiencies in math, existing data collection systems, different compensation levels for various teachers, methodology of data collection, and development of world class "curriculum" versus world class "teachers."

Reginald L. Robinson, President and CEO, Kansas Board of Regents, provided the Committee with an update on Regents' initiatives in the areas of science, technology, engineering, and mathematics (Attachment 3).

He said that over the past several months the Board of Regents has embraced the following strategic questions that will guide the development of higher education agenda in Kansas.

- Alignment with K-12—Are high school graduation expectations aligned with college preparation expectations? Are those students moving into the system from the state's high schools prepared to meet postsecondary expectations?
- Participation—Are Regents' institutions satisfied with the levels of participation of high school graduates who go on to postsecondary education? Do the participation rates adequately reflect the demographic composition of Kansas?
- Persistence—Are Regents' institutions satisfied with their institutional retention and completion rates?

- Workforce Alignment—Are the offerings to which their students are exposed during their time in postsecondary institutions aligned with the workforce demands of the state's economy?

- Learner Outcomes—Do those completing educational programs possess the cross-cutting, non-disciplinary skills and competencies necessary for success?

He explained the key features of the Kansas Academy of Mathematics and Science (KAMS), established by 2006 legislation. He reviewed the time line and actions taken by a steering committee. KAMS represents an important opportunity for Kansas to nurture the best and brightest students in an environment that will encourage them to either stay in Kansas or return to Kansas upon completion of their studies. If funding is approved by the 2008 Legislature, personnel will be hired; students will be recruited; and KAMS should be open for business by fall 2010 academic semester.

He reviewed data collected by the United States Department of Education that identified math and science-related educational trends in Kansas from 2002 through 2006. A new Kansas Teacher Service Scholarship Program was reviewed. Legislation was enacted during the 2007 Legislative Session to streamline four existing teacher scholarships into one comprehensive teacher scholarship program. This merit-based, service obligation scholarship program provides financial assistance of up to $2,500 per semester to students and currently licensed teachers pursuing bachelor's or master's degree programs. For the 2007-08 academic years, there was $1.4 million available to award 463 students with scholarship assistance. They are hopeful that the revisions in the scholarship program will help address the critical teacher shortage.

In conclusion, Mr. Robinson called attention to a report from Public Agenda, by Alison Kadlec and Will Friedman, entitled "Important, but Not for Me." He urged the Committee to review the report, which stresses the urgency of the STEM challenge ahead and the public's complacency on the issue. This report is available for free download at www.publicagenda.org. Copies of the report were distributed (a copy of the report is on file at the Legislative Research Department).

A memorandum showing the number of degrees awarded in STEM categories statewide for academic years 2002–2006 was distributed (Attachment 4).

In response to a question on the methodology of data collection to ascertain the needs of the workforce, Mr. Robinson agreed to provide copies of the workforce study to the Committee, upon its completion.

Jewel Scott, Executive Director, The Civic Council of Greater Kansas City, gave a power point presentation entitled "Science and Math Education—The Business Case for Preparing Kansans for the 21st Century Workforce" (Attachment 5). She spoke of the role that innovation has played in the United States and how that trend is changing. STEM is important to the country because currently, the U.S. is 16th in production of STEM degrees among industrialized nations and the global talent pool is growing more rapidly in Asia and Europe than in North America.

Copies of data from "Building STEM Capacity in Kansas", regarding indicators for: K-12, higher education, science and engineering workforce, and new economics, were distributed and explained.

Ms. Scott suggested five ways to increase the number of STEM graduates:

- Increase STEM education and expectations in public schools and align expectations from secondary to college level;
- Increase quantity and quality of STEM teachers;
- Increase number of STEM master's and Ph.D.s produced by the state's institutions of higher education;
- Increase public awareness of the importance of math and science; and
- Provide incentives for new and expanding STEM jobs.

Afternoon Session

Stan Ahlerich, President, Kansas, Inc. said that Kansas, Inc. was created by the Legislature in 1986 as an independent, objective, and non-partisan organization designed to conduct economic development research and analysis with the goal of crafting policies and recommendations to ensure the state's ongoing competitiveness and economic growth.

While Kansas, Inc.'s primary focus is economic development strategic planning, research, and evaluation, the importance of increased STEM education is a very relevant topic; therefore, efforts were included to develop goals and initiatives for math and science education. He described the process in which Kansas, Inc. gathered information regarding the economic strengths and weaknesses of Kansas. One of the areas voiced as crucial was the lack of an educated and motivated workforce. Common concerns included feeling that the educational system was not meeting the needs of businesses and not preparing students for the workplace. Partnering between businesses and educational institutions was expressed as a solution to these issues.

Mr. Ahlerich reviewed a portion of the 2007 Kansas, Inc. Strategic Plan that related to the goals of the Math and Science Education Advisory Committee.

- Workforce Development Mission—Kansas will have a demand-driven workforce development system that meets the needs of the business community.
- Goal—Ensure that Kansas high school graduates are equipped with skills necessary to pursue post-high school options, encouraging postsecondary education where appropriate. More specific proposals included the following:
    - Promote statewide use of the Kansas Career Pipeline to encourage student exploration into careers and educational paths in Kansas (grades 5-16);
    - Encourage partnering between businesses and secondary education institutions to design curriculum that prepares students for jobs in Kansas (Olathe 21st Century High School model);
    - Encourage student contact with Kansas businesses through internships and job shadowing;
    - Incorporate entrepreneurial training into K-12 education;

- Develop a Leadership Kansas-type training program for high school students; and

- Encourage, promote, and fund technical education in high schools.

He elaborated on two programs currently being used in Kansas:

- Kansas Career Pipeline that promotes statewide use of the Kansas Career Pipeline to encourage student exploration into careers and education paths in Kansas; and

- Olathe 21st Century Schools that encourages partnering between businesses and secondary educational institutions to design curriculum that prepares students for jobs in Kansas.

He added that although these two programs do not explicitly target the math and science fields, they provide a conduit for businesses to attract Kansas students and engage them in Kansas businesses. The high demand for math and science professionals across Kansas can be met through partnerships created by these and similar programs. Discussion followed regarding issues of funding, the importance of the study of the “arts” in conjunction with math and science, and the driving force behind the Olathe 21st Century High School.

Included with his testimony were memorandums on: Kansas Career Pipeline, 21st Century High Schools, and a Kansas City, Kansas Community College Student Survey (Attachment 6)

John Yochelson, President, Building Engineering and Science Talent (BEST), gave a brief personal history on his work. His organization, located in San Diego, has concentrated on building up the capabilities in math and science technology in America for the past six years, with particular focus on women, and historically underrepresented groups. He distributed a report called "A Call to Action for Missouri", and the "Missouri Math Engineering Technology and Science Alliance" report that contained recommendations and a data book. (Copy on file in Legislative Research Department).

He noted that time constraints did not allow a detailed review of the booklet; however, he suggested it could serve as a template for Kansas in developing a plan for legislators, people in the field, and the public. They could include a section on today’s presentations that answered three important questions:

- Why does math and science matter;

- What are the indicators regarding math and science capabilities in the state; and

- What are other states doing?

Mr. Yochelson reviewed a report on "Building STEM Capacity in Kansas", (Attachment 7), comprised of data on:

- New economic indicators: knowledge jobs, economic dynamism, digital economy, and innovation capacity;

- Science and engineering workforce indicators: demographics and workforce distribution, and earnings;

- Higher education indicators: workforce preparation; and

- K-12 indicators: student achievement, demographics, resources, and math and science teacher corps.

In summary, he said that although his study was preliminary in nature, it appeared there is a crisis in teacher production in math and science. He said that his organization could illuminate the issues and present an informed picture of the actions needed to make Kansas a leader in education and build capacity in STEM education.

In response to questions on data from the METS Summary report (page 5), "Top Achieving Countries' Mathematics Curriculum", he suggested that Bill Schmidt, Michigan State University, be invited to make a presentation on the kind of curriculum that supports high achievement. He called attention to the fact that 17 states have adopted a program called "ACHIEVE" that aligns high school curriculum with workforce needs and university expectations.

Discussion followed regarding the difficulty of making great changes all at once, such as raising standards; changing curriculum, textbooks, and methods of teaching; and current barriers to necessary changes to increase STEM results. Innovative teaching methods were described.

Dr. Tom Foster, Director of Learning Services, Kansas Department of Education was invited to the podium to answer questions. He described the new way science testing is done this year and the changes that have occurred as a result of the federal No Child Left Behind law. He agreed to make a future presentation per the Committee's direction.

Future meeting dates were discussed. Sharon Wenger will contact Committee members to coordinate two days in October and November and a day meeting in early December. Suggested topics of interest included: presentation by Bill Schmidt, Michigan State University; presentation on understanding analysis of math curriculum; teachers' observations and recommendations; focused look at professional development of certified teachers; and John Yochelson's presentation on current data.

Committee members' email addresses will be made available. The meeting was adjourned at 3:15 p.m. The next meeting date in October will be determined at a later time.

Prepared by Rose Marie Glatt
Edited by Sharon Wenger

Approved by Committee on:

October 31, 2007
(Date)