

## **MINUTES**

### **MATH AND SCIENCE EDUCATION ADVISORY COMMITTEE**

November 26-27, 2007  
Room 123-S—Statehouse

#### **Members Present**

Senator Nick Jordan Chairman  
Senator Laura Kelly  
Senator Ruth Teichman  
Representative Shirley Palmer  
Representative Sheryl Spalding  
Representative Kenny Wilk (November 27)  
Richard Taylor, Plumbers and Pipefitters Local Union 441, Wichita  
Paul Weida, Vice President, Black and Veatch Corp., Overland Park  
Kenneth Clouse, President, Northwest Kansas Technical College  
Dr. Michael Lane, President, Emporia State University  
Ms. Janis Lariviere, Center for Science Education, University of Kansas  
Dr. Edward Hammond, President, Fort Hays State University  
Dan Jacobsen, President, AT&T, Topeka

#### **Members Absent**

Mitch Counce, General Manager, Servi-Tech, Dodge City

#### **Staff Present**

Dale Dennis, Deputy Commissioner, Department of Education  
Sharon Wenger, Kansas Legislative Research Department  
Michele Alishahi, Kansas Legislative Research Department  
Theresa Kiernan, Office of the Revisor of Statutes  
Matt Todd, Office of the Revisor of Statutes  
Rose Marie Glatt, Committee Assistant

#### **Conferees**

Nicole Riegel, Project Manager, Kansas City Area Life Sciences Institute, Inc.  
Keith A. Gary, Ph.D., Director, Program Development, KC Life Sciences Institute  
Brigadier General Deborah Rose, STARBASE Program  
John Yochelson, President, Building Engineering and Science Talent (BEST)

Laura Norris, Executive Vice-President, YouthFriends in Greater Kansas City  
Joan Friend, Superintendent of Schools, USD 494, Syracuse, KS

## **Monday, November 26 Morning Session**

The meeting was called to order at 10:00 a.m. by Senator Jordan, Chairman of the Committee. He welcomed everyone to the third Math and Science Education Advisory Committee meeting. He noted Representative Wilk's absence and said Dr. Hammond, Dr. Lane, and Ken Clouse were attending a Regents' meeting and would join the Committee later.

Nicole Riegel, Project Manager, Kansas City Life Sciences Institute, Inc., spoke to the Committee about a new program, started in 2003 at the Bayer Corporation. With a grant from the Bayer Corporation in 2006, Ms. Riegel moved to the Life Science Institute, which had been partnering with Bayer since 2005 on a project to provide all K-5 teachers with a rigorous science curriculum aligned with local, state, and national standards. She introduced Keith A. Gary, Ph.D. Director, Program Development, KC Life Sciences Institute. Ms. Riegel currently is working with the Kansas City, Missouri, school district, and has implemented the Project in all of its 46 elementary schools.

She explained a kit-based science program (a kit includes all resources to carry out science projects in classrooms) and the five elements of education reform:

- **Curriculum** – A combination of nationally-researched and nationally-recognized curriculum programs. In Kansas, they are working with the Center for Science and Education, at Kansas University to provide a menu of kits that would be offered for elementary school, potentially K-5<sup>th</sup> grade.
- **Teacher Training** – Kits are never provided to teachers that have not been trained on that kit. She explained there are several comprehensive levels of training offered according to a teacher's experience and background.
- **Material Resource Center** – A key piece is the material provided. A Lenexa company, Smart Warehousing, maintains the inventory and packages and ships the kits to schools. They also arrange to have the used kits picked-up, re-furbished and stored until they are needed the following year.
- **Assessment** – They provide pre- and post-assessments for both students and teachers to go along with the Project. They are attitudinal and content assessments. Ms. Riegel said the Institute currently is gathering data on 18,000 students (largest study in the United States) to determine the efficacy of kit-based education.
- **Community and Administrative Support** – The Institute offers an Administrator Institute, to help administrators understand the teaching concepts for kit-based education and provide them hands-on experience. The Project also involves developing relationships and partnerships in a community to help provide funds for ongoing programs.

In conclusion, Ms. Riegel said the Institute is looking at expansion into other school districts. At a request of the Chairman, she agreed to send a written description of the kit-based education program.

Keith A. Gary, Director, Program Development, joined Nicole Riegel for a period of questions and answers.

Brigadier General Deborah Rose, STARBASE Program, gave a power point presentation on Kansas Starbase, an award-winning youth program offered by the Kansas Air and Army National Guard. A STARBASE workbook and a descriptive brochure were distributed (**Attachment 1**). She introduced Jeff Gabriel, Executive Director of Kansas STARBASE. The program is funded by the U.S. Department of Defense.

General Rose explained that most scientists today became interested in science at a young age; thus the importance of offering programs such as STARBASE during the 5-6 grades. She said that women still believe that it is much harder to succeed in the science field than men; and to counter that myth, she described one STARBASE summer program for girls, called "Amelia's Academy."

The national motto for the STARBASE program is "*To raise interest and improve knowledge*"; however, in Kansas the motto would include "*add value and personal growth*." Kansas has the largest STARBASE program in the United States and has served almost 31,000 children since 1993. General Rose said the Program started, nationally, in 1989 and currently there are STARBASE programs in 23, plus Washington D.C. and Puerto Rico.

Kansas' STARBASE Program has an annual budget of \$570,000 that is dispersed through the Adjutant General's office, at the discretion of an advisory board, made up of members of the National Guard. The STARBASE Foundation, which is made up of civilians from academia, businesses, and schools, also act as advisors as well.

The STARBASE Program exists in four communities: Wichita, Topeka, Salina and Kansas City. They also indirectly affect Kansas students through teachers who have attended the Academy, learned new hands-on math and science projects, and duplicated those projects in the classroom. A STARBASE goal is to improve science comprehension; however, at this time, there is no way to track the effectiveness of the program.

She spoke of the demographic of the students, and said they target Title One school districts, underserved regions in the state, as well as mentally challenged children through their various programs. They have a 501(c)3 status that dictates that they cannot actively solicit additional funds for the program.

During the school year, an entire class of students attend STARBASE one day a week, for five weeks. She voiced concern that rising transportation costs will deter many rural communities from participation in the program. During the summer, individual students attend week-long camps.

*Senator Teichman made a motion to approve the minutes of the October 31, 2007, Math and Science Education Advisory Committee meeting. Ken Clouse seconded the motion. The motion passed (Attachment 2).*

## Afternoon Session

John Yochelson, President, Building Engineering and Science Talent (BEST), returned to the podium for a review of the draft copy of “The Tech Talent Imperative” ([Attachment 3](#)). He reminded the Committee that the purpose of this data book, under the sponsorship of the Kauffman Foundation, was to support the work of the Committee. Due to the time constraints, he said the draft before them was an attempt to pull all the data together for the Committee’s perusal. It will be the Committee’s deliverable and used to help educate legislators, public and private enterprises, as well as the general public on the importance of math and science today. Each page was reviewed and the following key points were made only when change was indicated:

The title “tech talent” will be changed to the METS acronym, Math, Engineering, Technology and Science.

### Section 1 - Why Tech Talent Matters ([Attachment 3](#), pages 2-13)

- Page 8 - He explained the headline of “narrowing lead” across all categories. It was noted that 60 percent of the 52 percent of Science and Engineering Doctorates are international students. That statistic will be added as a footnote.
- Page 11. The absence of China was noted. Mr. Yochelson explained that the table may be the countries that are members of the Organization for Economic Cooperation and Development (OECD), which does not include China. A footnote to identify the OECD membership, and clarify that a number of key emerging economies are not included in this group will be added. He explained “return of investment” and how the data was gathered through the Program for International Assessment (PISA), derived from OECD tests of 15-year olds on their capacity to apply mathematical reasoning in practical situations. It was agreed that an explanation should be included as a footnote.

### Section 2 – Why Math, Science, and Innovation (METS) Matter to Kansas ([Attachment 3](#), pages 14- 25)

- Page 14 - It was noted that the trend line in Kansas has crossed the national average in the last few years in both categories - services-providing and goods-producing. It was suggested that the chart on page 14 be divided into two charts showing the difference in variables more clearly. A key point is the Kansas trend is moving in a different direction than the national average and the chart(s) should reflect that.
- Page 16 - it was noted that the information is poorly aligned and needs descriptive narrative.
- Page 17 - Stan Ahlerich, President, Kansas, Inc., would be a resource for additional information. Discussion followed regarding which cluster includes agriculture. The term high-value was discussed and perhaps should be changed to high-growth. It was suggested that somewhere in the charts, emerging businesses in agriculture should be listed. Additional categories such as pharmacology should be added. The phrase “highly-skilled” worker needs to be defined. Discussion followed regarding the category of agriculture and the implication that highly-skilled workers are needed in Kansas.

- Page 19 – There is a discrepancy in weighting figures. The headline sentence needs to reflect that although Kansas is a little above average, it must come up to meet growth sectors.
- Page 20 – Color modification needed on the chart to make it clearer.
- Page 21 – There was confusion over the need for more engineers and how that is reflected in the data.
- Page 22 – Chart reflects two different sources and it was agreed to delete the EPSCoR map for clarification purposes. Discussion followed regarding pros and cons of EPSCoR status.
- Page 23 – Need to use footnote to explain that “new economy” indicators are not educational indicators, but are more general economic indicators.
- Page 24 – Delete chart from the 2007 Workforce Alignment Study and use the five-year projection data from the Department of Labor, highlighting the need for METS skills.
- Page 25 – Where should this chart (Kansas and Missouri data) be placed? How can it emphasize the fact that although leadership acknowledges the need for METS skills, the public still does not understand the core problem. There was a suggestion that the headline needs to be reworded, to change the word “complacent.”

### **Section 3 – K-12 Indicators (Attachment 3, pages 26 – 55)**

- Page 26 – Chart unclear and hard to determine data. Eliminate this chart and replace with a paragraph combining pages 26-27.
- Page 27 – Map is confusing and chart includes military bases and extended communities. Mr. Yochelson agreed to eliminate both map and chart and include a paragraph that sets the stage for indicators, which includes demographics and diversity of districts.
- Page 29 – The top graph is difficult to read (numbers too small). Will adjust page, making headlines more accurate. The word “levels” will be changed to “gains.”
- Page 31 – Eliminate top three indicators: Nation-(public), District of Columbia, and DoDEA for page. Difficulty of changing blue color of Kansas was explained.
- Page 33 – Change verbiage to “Despite its high National rankings, about half the Kansas student sample scores are below NAEP levels.”
- Page 34 – Will update data.
- Page 44 – Chart will be changed to position Classroom Teacher Total at top of graph and number in headline changed to 5,500 from 4,500.
- Page 46 - Is there a comparable chart on data on the national level?

Dale Dennis distributed and explained a memorandum on the results of a survey sent to school superintendents regarding anticipated math and science teacher vacancies (Attachment 4). Mr. Yochelson questioned whether this data could be expanded for five years reflecting the projected cumulative gap. The Committee agreed to use the five-year projection in the document.

- Page 49 – This page needs to be expanded to clarify what is required to become a licensed math and science teacher as well as listing alternative programs to teaching, such as people changing professions, retirees returning to teaching and certification programs.
- Page 50 – License should be changed to endorsement. The accuracy of data was questioned. The term “fully licensed” is misleading and should be deleted. After discussion it was agreed to eliminate the chart and handle the information in the introduction to the section.
- Page 52 – List only math and science and eliminate all other categories. Updated data will be used.
- Page 53 – Restate information to reflect the data from projected five-year teacher vacancy rates. Use all numbers or all percentages, not both. Use Institute of Higher Education instead of IHE.

### **Post-Secondary Indicators (Attachment 3, pages 56-67)**

- Page 56 - It was decided not to lead with the issue of expenditures for K-12, the information that currently is listed will be added to the information in the introductory statement.
- Page 59 – Haskell misspelled.
- Page 60 – Question on definitions. Data should reflect the same time frame.
- Page 61 – Needs a footnote to call attention to the year when classification was changed from “specific majors” to a “general account” to be able to understand the trend.
- Page 62 - Haskell misspelled. Discussion followed regarding the possibility of listing Baccalaureate degrees in addition to associates’ degrees.
- Page 63 – This would be the vehicle to convey to legislators what the pipeline looks like. The challenge is to determine which indicator matters most. There will be new information from Dale Dennis on the number of people that got licenses compared to the number of people that took jobs.
- Page 64 – Use acronym for METS.
- Page 66 – Question on rankings was raised. Footnote: BioScience Authority began in 2005 and national data is not yet available, therefore the impact is not reflected in the above.

- Page 67 – Data will be reviewed.

John Yochelson said he would refine the document and would be available at the December meeting for further discussion. The meeting was recessed until, November 27, at 9:00 a.m.

## **Tuesday, November 27 Morning Session**

Laura Norris, Executive Vice-President, YouthFriends in Greater Kansas City, gave a power point presentation on a one-year old pilot program called UpLink ([Attachment 5](#)). Its purpose is to connect area students with dynamic mentors, progressive teachers and real-world learning opportunities. The vision behind UpLink was to create a community hub that could facilitate the interaction between the classrooms.

Ms. Norris explained YouthFriends has been in operation for 12 years and has 4,000 volunteers actively working in schools across Greater Kansas City and Kansas in approximately 100 school districts. They create a network within the school district and the business community.

Ms. Norris said the YouthFriends Model is a turnkey system for a school-based mentoring program. Any school district, regardless of size or location, could implement the program to begin or grow its school-based mentoring efforts. An important element for the Kauffman Foundation, the provider of the grant for the Program, is its risk management system. It utilizes technology that helps facilitate risk management so all volunteers are screened and trained properly before being placed in classrooms.

She explained three UpLink Opportunities:

- YouthFriends – Under the UpLink umbrella, this portion of YouthFriends has a greater emphasis on recruitment of volunteers from the mathematics, engineering, technology and science (METS) fields. Volunteers spend one hour a week to encourage and inspire students (K-12) to explore, study and seek careers in those fields.
- Teacher Tech – This is an eight-week program for teachers, through paid summer externships, that challenge teachers to enhance their skills and inspire students through real-world application of METS skills. They hope to have 50 teachers involved in 2008.
- Launch Pad – This program provides:
  - Career speakers (K-12);
  - Opportunities for Job shadowing (middle-high school); and
  - Internships (11<sup>th</sup> & 12<sup>th</sup>).

Discussions followed on the Kauffman Foundation three-year grant of \$5.4 million and the new tax credit program for businesses employing teachers for the summer. Ms. Norris discussed one obstacle that businesses do not understand, the urgency of the shortage of qualified future workers and the part they can play to alleviate the problem. The issue of where leaders come from and how do they ramp up the good programs available was discussed.

Joan Friend, Superintendent of Schools, USD 494, Syracuse, KS, communicated by telephone and gave testimony on the challenges they face in rural school districts (Attachment 6). The following are key points of her presentation:

- A major obstacle to the recruitment of qualified teachers is the location of the Syracuse USD.
- One solution to the recruitment challenge is to provide housing for new teachers. The school district owns nine houses, newly renovated, which are offered at deeply discounted rental rates to new teachers.
- Ms. Friend asked for support of the state universities in helping supply teachers in Western Kansas. She said it is particularly difficult when the teaching staff encourage new teachers to keep an “open mind” when they attend career fairs. The rural communities need to move quickly in order to fill all their open positions.
- Her written testimony gave detailed descriptions of what is happening at USD 494 in the areas of math and science in the elementary and secondary Programs. She explained the curriculum for fast track and regular track students in math and science in grades 7 through 12.
- In conclusion, she said the goal for USD 494 is always to meet the state standards when aligning and teaching curriculum and to prepare all staff to do this by expending the necessary resources for staff professional development.

She answered the following Committee questions:

- Demographics - Located 48 miles west of Garden City, with 43 percent Hispanic students - 20-22 percent require English as a Second Language classes.
- Southwest Plains Regional Service Center – It provides numerous programs for study, as well as a program called “Score Analyzer” that provides data on student achievement.
- Teacher’s compensation - Their second biggest challenge, after recruitment, is teacher’s low compensation and additional equipment needs. Lack of local businesses available for students interested in technology based skills is another challenge.
- Realignment of curriculum - In response to a question regarding curriculum changes, she expressed concern over lack of multiple labs in many of the rural schools, which would make compliance difficult.
- Grow our own teachers program – They currently have one teacher that graduated from their school district and returned to teach. They currently are offering incentives for promising students from their district.
- It was noted that the base teacher’s salary of \$31,000 would qualify for a federally-funded subsidy program offered by all telephone companies for deeply discounted telephone service for low-income families.

## **Committee Suggestions and Recommendations**



There were two memorandums distributed regarding Committee recommendations from Dr. Edward Hammond (Attachment 7) and Jan Lariviere (Attachment 8). The Chairman opened discussion on the Committee's Vision Statement.

After discussions regarding the competitive global economy, need for innovation and entrepreneur thinking, and availability of education access in Kansas, there was consensus on a vision statement. ***Kansas will build on its success in educating its citizens to prepare Kansans to be innovators in mathematics, science, and engineering so that the Kansas workforce will be a leader in the global economy.*** The statement will be reviewed at the December meeting.

Concern was voiced that although the data book being developed by the Committee via Mr. Yochelson provided important data, it did not address the entire picture of educational needs. Sixty-five percent of tomorrow's workforce will be non-degreed, and data from technical institutions should be included. Many members agreed that the data within the category of general studies is confusing and needs to be reviewed. Ken Clouse agreed to speak to John Yochelson regarding this issue.

Dr. Hammond made the following suggestions as possible Committee recommendations.

### **Public Awareness**

- Establish a special grant program of \$1.0 million. Grants would be given to pursue marketing initiatives that highlight the benefits of science and math careers for students.
- Expand after-school or summer program opportunities for elementary through high school students to nurture skills, interests, and appreciation for science and mathematics.
- Support the Kansas Academy of Math and Science.

### **Teacher Preparation Strategies**

- Apply as a statewide consortium for Noyce Foundation grants for universities in developing a cooperative teacher preparation program.
- Establish a joint master's program for teachers offered collaboratively by Regents' institutions for preparation and professional development.

## **Teacher Retention Strategies**

- Provide Science, Technology, Engineering, and Math (STEM) teachers differential pay breaks (\$3,000 for summer months).
- Develop a set of regional consortiums through science and mathematics educational centers to provide on-going professional development at Regents' institutions.
- Use mentor teachers and residence programs for the consortium to provide mentoring, teaching, and professional development.

## **Alignment Strategies**

- Establish a state council to coordinate and align the curriculum with necessary assessment checks.
- Expand the academic competition and award opportunities that promote research in the classroom at the secondary level.
- Increase the rigor in curriculum and advance the STEM learning timeline.

Dr. Hammond agreed to send his revised recommendations and strategies to Sharon Wenger for distribution.

Dr. Lane said that he agreed with Dr. Hammond's recommendations; however, adding the following key points:

- There is a need for a strong marketing strategy to educate students, parents and voters of the fact that there is a need and that we are not meeting that need at this time.
- Encourage support for the Kansas Academy of Math and Science (KAMS).
- Dr. Lane agreed with suggestions on additional teacher compensation, but added that public or private funding be available to pay the interest on teacher's mortgages, with the caveat that they stay in their district for a pre-set time in order to receive the title to the house.
- Districts should pay for alternate teacher certification.
- Develop a center for innovation in METS disciplines to work grades P-16. Share the programs, training, and material for the best practices.
- Finish off the aid on the teacher's grants going to Regents' universities.

The Chairman asked for Ms. Lariviere's comments. She said that many of her recommendations had been included in previous discussions; however she would add the following:

- Bring pay for Kansas teachers up to the national average.
- Promote teacher job sharing.
- Increase infrastructure funding for STEM in universities in Kansas.

The Chairman advised members that a list of recommendations will be sent to members for their perusal and any corrections or additions should be sent to Sharon Wenger.

Representative Wilk recommended they use PPP, the acronym for Public, Private Proposals and asked who was going to oversee this program. He suggested that perhaps a new entity would be necessary to assure the success of the program through implementation of the goals set by the Committee.

After discussion about different models that could be used for such entities, Chairman Jordan said a letter would be drafted to the universities soliciting their input. A copy of the National Institute of Aviation Research (NIAR) model will be sent to all Committee members. Ms. Lariviere invited members to look through a "kit" used in a kit-based science education program that she had brought to the meeting.

The meeting was adjourned at 12:00 noon. The next meeting is December 13, 2007.

Prepared by Rose Marie Glatt  
Edited by Sharon Wenger

Approved by Committee on:

December 13, 2007  
(Date)