MATH STEERING COMMITTEE
MARCH 10, 2009
UTAH STATE OFFICE OF EDUCATION
BOARD ROOMS

- Welcome and Introduction
  - Lynne welcomed everyone and expressed her appreciation for their continued participation in the important project.
  - Round-table introductions were made for all those in attendance.
  - Lynne met with the school board. Members are looking forward to this committee's recommendations. Lynne hopes to have a working draft by June, 2009.

- Math Ready Update – Website
  - The Math Ready website is under construction. More information will follow as available.

- Utah's High School Redesign Initiative
  - Mary Shumway, USOE, said the math piece is an important and critical part of the high school redesign. Members of the Board would like a tentative plan by summer.
  - Please see Lynne's power point presentations on "High School Redesign" and "Utah State Office of Education Mathematics Steering Committee."
  - Lynne and Mary Shumway recently attended a High School Redesign conference in Indiana. Following are some highlights and points from Lynne and her power points:
  - ***Indiana Report - Lynne***
    Participants at the recent conference in Indiana included teams from Hawaii, Minnesota, Colorado, Washington, D.C., and Utah. These are seen as states on the cutting edge of education and moving forward on the high school redesign.
    Specifics regarding Indiana and education:
    Indiana's curriculum is comprehensive, rigorous, and driven by higher ed.
    Because their economy is slowing at this time, they intend to use the entire stimulus package for education.
    Legislation is passed in support of education.
    Their common agenda focuses on all students being college ready.
    Transcripts are viewed on-line.
    Businesses are very involved.
    If a person becomes unemployed for any reason, they go right back into the system for re-training, thus keeping a low rate of unemployment.
    The state provides free transportation to any school.
    There is a common message, state-wide, regarding education. "We are about learning."
    Lynne and Mary visited a small, focused high school with an enrollment of 500 or less.
    Students in these schools can graduate with both a high school diploma and an Associate's degree.
    Many computers are available for student use and study areas can be found throughout the schools.
    There are a number of counselors that support each school.
    Indiana has certified teachers who are available for extended hours from 7 a.m. to 8 p.m. These counselors are also able to help with academic subjects.
    Some schools do not offer arts or physical education. Students at these schools have to complete class work in these subjects by the end of 9th grade. Other interests are met through after-school clubs.
    All students take a content reading class and Spanish.
    This school also had a HE staff member on campus, helping daily with student advisement.
    Lynne and Mary also visited a large school with an enrollment of about 3500 students.
    The school was immaculate.
    These schools have choirs, bands, and etc. for all grades.
    Assemblies are held by grade level and not school-wide.
    They have high numbers of students in AP classes and dual enrollment.

Community leaders in business and industry come into the school in the evening to act as mentors to the students.
You don't see junk cars, or couches, and etc. sitting in these yards in proximity to schools.
The whole mindset of the community is focused on learning. "We are about learning. We are about well-educated people." It is a total commitment from every person. There is a single vision of achievement.
Life Skills are modeled and taught in every class and every subject.

- ***Regarding Utah***
  Utah's Core Curriculum is as rigorous as Indiana's. We need to provide for our students to exit and enter our "education freeway." Many students periodically exit and reenter the education system in pursuit of higher education. Professionals in all career choices need to have skills in literacy, finance, life, mathematics, computers, and etc.
- Discussion points:
  High schools in Utah look the same as they did 30 years ago.
  The bell-to-bell lecture-and-homework blocks are not effective.
  Our resources lack a state-wide focus.
  We have ongoing programs spending millions of dollars that don't really address the issues.
  We need to continue our K-16 efforts.
  The legislature needs to have an aligned focus with state-wide education goals.
  Reading has been the top focus for years; we need to elevate the need for math skills.
  We need to change the attitude of "how little math can I get away with" to "how much math can I take?"
  Hill Field is going to "move the fences back" to build a community of support services for their employees to include florists, laundry services, and etc. Since 9-11, the U.S. cannot hire foreign engineers. STEM education has become critical. We need to define the necessary skills.
  Students have 2 million minutes at their disposal over a 4-year period. How do they spend these precious minutes? What do they need to do? Students in China and India allocate incredible amounts of time, including weekends, for academics. They prepare their children for the future.

➢ Math Ready Recommendations – Provided by the Utah State Office of Education Mathematics Steering Committee

a. Examination of the current reality
b. Current successful programs and initiatives supporting students' mathematics achievement
c. Areas requiring attention
    1. Defining expectations
    2. Leadership
    3. Teacher & Administrative Expertise
    4. Curriculum and Instructional Practices
    5. Student Support System
    6. Assessment
    7. Culture of Support

Discussion and comments:
There is a need to connect higher education and public education with the legislature.
Leadership needs to state a vision. What is our vision? How does the legislature support this vision?
Highly qualified teachers are needed to provide quality instruction.
There are good things going on right now. What is working well?
Our core is rigorous and comprehensive enough to provide sufficient learning and motivation for students.
It was stated that as concurrent enrollment increases, advanced placement decreases. AP is seen as the more rigorous path whereas concurrent is a sure deal.
Students intending to pursue a higher math degree are on the AP path.
Counseling is an issue for Utah. Elementary, middle, and secondary schools have different issues. What is needed for each level? Is education at each level adequate to prepare a student for the next level?
What is our vision? Indiana has chosen to reduce welfare through education.
What is the Utah vision for education?
Tom Lund from Zion's Bank stated that this committee's work is critical. The need for STEM individuals has grown. We need a well-educated, highly-trained workforce.

Administrators need to be leaders and not just facility managers.
The ratio of engineers to supporting careers is 1:5. Algebra 2 appears to be the gatekeeper, the minimum requirement. Algebra 2 teaches young adults to think through problems. Math courses need to have rigor and relevance in applying to today's problems. Appropriate Math literacy needs to be taught at every level.
The group was cautioned to provide access to the same quality instruction to ALL students.
The ability to problem-solve permeates all areas and is an important skill.
What do we need to support all these issues? What do we need from higher ed.? What on-line resources, media, 3-Tier?
CTE and Curriculum and Instruction should plan to have a joint meeting for discussion.
We need to do a better job of keeping students up-to-date. They need to know about their education and what they need to do to accomplish their short and long-term goals. "Indiana kids knew what they needed. Everybody knew." We need to work with administrators. Everyone needs to buy into the "vision." Think outside the box.
We need improvements in assessments. Help teachers to be more informed. Find student strengths and weaknesses. Help them. Students with strong math backgrounds need to be recruited to become teachers. We need to create a culture for change. We need to motivate our young adults.
High school redesign can address these issues in recommendations to the Board. What do we need? What is our vision and does it align to high school redesign?

- What does a quality, effective Mathematics classroom look like?
  Please see Diana Suddreth's power point presentation.
  In brief, Diana poses the questions:
  a. What should students be doing in Mathematics classrooms?
  b. What should teachers be doing in Mathematics classrooms?
  c. What should we never see in Mathematics classrooms?
  d. What do we know about specific aspects of instruction?

- Group Work: Participants divided into small groups to read, discuss, and present on excerpts from the *National Math Panel Report.* Sections discussed and summaries follow.
  a. Teacher-directed vs. Student-centered delivery
     One would probably recognize teacher-directed instructional delivery as the traditional style of teaching. There is no problem solving, no creativity, and is very procedural in strategy. The teacher models everything, assesses, and re-teaches as needed.
     Defining student-centered delivery is difficult at best. One can surmise that the teacher would select a task and orchestrate the solution; there could be multiple solutions. This takes a very skilled teacher and classroom instruction could appear chaotic.
     It was felt that a combination of teacher-directed, student-centered delivery is best.
     BYU has piloted student-centered delivery in 2 elementary schools. It appears there is a significant decline in proficiency rates. Further research and comparative studies need to be conducted.
  b. Cooperative and collaborative group work
     Research supports the cooperative model. Activities have individual and team responsibilities. Everyone has an incentive to contribute. In peer tutoring, both the tutor and the recipient learn.
     Math teachers need to teach to a mathematical goal. Five percent of students who do well in math actually attain a math degree. Teaching strategies need to motivate more students to pursue math at higher levels.
  c. Instructional strategies for low-achieving, low-ability students
     Low-achieving, low-ability students need explicit instruction. They need many opportunities for question-and-answer sessions in small groups. More accurate referrals and small group instruction with think-alouds and visual representations can have a positive effect on student learning at this level.
  d. Instructional strategies for gifted students
     It is felt that teacher attitudes differ towards high and low-achieving students. We need increased differentiation for both ends of the spectrum. There is no harm in accelerated learning beyond a students' chronological age. If a student is ready to learn, they are ready to learn. Any grouping can be controversial. For example, groups divided according to ability can appear racial. We don't necessarily have good measures and tests.

e. Real-world problem solving
f. Real-world problems are more meaningful to the student audience. However, teacher knowledge in this arena can vary greatly. If this is an important tool and has added value in instruction, use real world examples; otherwise, don't do it. When students leave school, they need to be able to apply knowledge to problems where they don't have the preconceived answers or answers in the back of the book. Students need to be able to convert concrete knowledge to abstract and apply to their world.
g. Technology
We don't have enough data. Nothing conclusive.
h. Formative assessment
Formative assessment relates to a teacher teaching vs. summative assessment which often leads to a grade for a student. Summative assessment is an evaluation of a student's knowledge. The conclusion regarding formative assessment is that it is often beneficial and provides additional information to teachers for improvement which, in turn, will boost student achievement. However, this is not known to be valid. Trustworthy tests of all kinds, still need to be developed. (Consider reading evaluations which have been tested over time.)

- Summary and Next Steps
  - The morning discussion will be led by Mary Shumway, USOE, CTE, and Collette Mercier, Ogden-Weber Applied Technology College, who will talk about broad industry and business needs.
  - The afternoon hours will focus on developing a vision from all presented information and discussions.
  - Finally, the group will develop recommendations regarding instruction, assessment, and etc.

NEXT MEETINGS

March 31	**USOE**	**9:00 – 2:00**
May 5	**USOE**	**9:00 – 2:00**

Our desired outcome: A plan to support the opportunity for all Utah citizens to reach their academic and career potential while increasing Utah's economy by providing graduates who are mathematically well prepared to compete in today's high-tech, complex, and competitive world.