STEM Action Center Board Meeting Minutes
February 4, 2015 • 3:00pm
The Leonardo: 209 East 500 South, Salt Lake City

Members Present:	Blair Carruth, Reza Jalili, Jeffery Nelson, Gene Levinzon, Robert Brems, Bert VanderHeiden, Rich Nelson, Mark Huntsman, Stan Lockhart, Val Hale
Members Absent:	Brad Smith, Tami Pyfer, Norm LeClair,
Staff:	Tami Goetz, Sue Redington, Gina Sanzenbacher, Sarah Young, Jenna Johnson, Kaitlin Felsted
Visitors:	Sarah Brasiel, Chadley Anderson, Brent Peterson, Connie Ronburt, Allison Nicholson, Ashley Nicholes

I.   Welcome and Related Business

Jeff Nelson, STEM Action Center Board Chairman, called the meeting to order, introduced and welcomed the group and thanked The Leonardo for hosting the meeting. The Board voted to approve the minutes.

APPROVE MINUTES
MOTION: BLAIR CARRUTH MOVED TO APPROVE THE MINUTES, SECONDED BY GENE LEVINZON. THE MOTION WAS UNANAMOUSLY APPROVED.

Chairman Nelson welcomed and introduced Mark Huntsman as the newest member of the STEM Action Center Board from the State Board of Education. Chairman Nelson thanked the previous Board Member, Jefferson Moss, for his service and contribution to the STEM Action Center Board. Mark Huntsman then took the Oath of Office.

II.   Presentation

i.   District Experiences with the Professional Learning Grant, Chadley Anderson and Sandra Hemmert

Chadley Anderson from Davis District began by discussing the need for professional development and how this STEM grant has benefited their district. Chadley stated that her administrators, educators and technology specialist have all joined forces to make the most of this software. For example, science teachers have been developing lead teachers in their district that have distinct focuses that solve real-world problems. These lead teachers will have digital meetings with other educators and film each other teaching one of the focus subjects. These groups can then collaborate and assess each other's teaching to see what works and what does not. While Davis District had already began a process similar to this, the Grant funding has made it possible to deepen the quality of experience, and the technology has allowed for better and more frequent collaboration and feedback than would have

been otherwise possible. While educators benefit from face-face interaction, Davis District plans to still have these types of meetings, but less often due to the costs associated with these meetings and the time involvement for the educators. This grant allows for a hybrid model of digital and in-person interaction. Chadley stated that 4,000 educators participate in this Grant program. These educators are excited that they can access help for their specific needs through this learning platform such as discipline or engaging discussion in the classroom, and that they receive instruction through watching other educators. Chadley also mentioned that Davis District is looking to create a STEM certificate for secondary teachers for the teachers within the district where they learn the strategies and concepts that work best with STEM teaching in a hands-on, exploratory way. Chadley again stressed the importance of these educators meeting together in-person, and how much they gain from seeing and talking with their colleagues. Through this Professional Learning Grant, educators can share best practices and gain individual help, which has never been offered before.

Dr. Tami Goetz asked if teachers are positive about the experience and are adapting to using the platform. Chadley replied that it has been very positive and that the educators have new ideas to share constantly, and this platform allows them to do that. Rich Nelson asked about the dollar amount awarded to Davis District and what the value has been. A Board Member then asked about usage and how that is being measured and communicated. It was made clear that there are many different factors and ways to track the usage data, some from the schools and districts and other data from the Utah State Office of Education.

Chadley then mentioned what the challenges of the grant have been. She mentioned that the timing of implementation was inconvenient and that it would be better to implement before the school year began. There was discussion on when to start the contract process since funding is not received from the legislature until July 1. Chadley also mentioned that training the number of teachers was also a challenge due to the language of the grant changing from STEM teachers only to all teachers being able to participate. It was also mentioned that there are still needs regarding better content instruction, guest specialist visits to excite educators, and the opportunity for teachers to experience industry.

Chairman Nelson then asked the STEM Action Center to share the success of Davis District with other education agencies as a case study.

Sandra Hemmert then presented on the experience Granite School District with the Professional Learning Grant. Granite District is using School Improvement Network and tailored the platform to fit their individual needs. Granite District is involving their administration as well as educators in this process of professional development. It is not forced upon the educators or administrators, but the District goal is to make it advantageous and help the educators reach their goals. Overall it has been a success for them, as are the other grant projects offered by the STEM Action Center. Challenges that the Granite District is seeing are the fear of the funding being taken away after working hard to change their processes and implement the grant software. Another challenge has been to learn the new online

platform and to train and research how to use the software. Another grant that Granite District is implementing is the STEM High School Certification Grant, but Sandra mentioned the largest challenge of this grant is that the majority of industry partners do not recognize a certification, so they cannot convince students to earn a certification since it seems to not be useful.

III.   **STEM Action Center Policies and Procedures**
Dr. Tami Goetz began by showing the Board Members the Sponsorship Policy for all STEM sponsorship requests. Board Members ask details about the amount of funding dedicated to sponsorshipsA request was made to change the language to require Board approval before contracting a sponsorship.
APPROVE SPONSORSHIP POLICY
MOTION: JEFF NELSON MOVED TO APPROVE THE POLICY AS WRITTEN WITH THE ADDITION OF FINAL BOARD APPROVAL BEFORE BEING AWARDED, SECONDED BY STAN LOCKHART. THE MOTION WAS UNANAMOUSLY APPROVED.

IV.   **Board Engagement Discussion**
Chairman Nelson gave a brief background on the expressed concern and desire from the Board Members to be more engaged. Dr. Geotz then presented four ideas to the Board to be more involved and knowledgeable of the details of the STEM Action Center. Workforce alignment is an important topic for future projects within the STEM Action Center, and there are needs for structuring that and using the expertise of the Board Members to develop this structure and involvement. Another key area is developing a strategy to engage higher education agencies and being able to rely on partnerships for projects. The third way to engage the Board is through mentoring and developing a network across the State. As Dr. Goetz has had discussion with other states that have a successful mentoring network, she has learned ways to strategize this but would like the support of the Board. The last way to engage Board Members is through preparing for the legislative session in 2016 and developing a strategy for what the Center's needs are for the future.

V.   **Presentation: Dr. Sarah Brasiel, Update on the Math Technology Data**
Dr. Sarah Brasiel updated the Board on the newest data from SAGE testing, state-wide student achievement data showing math achievement connected to the students using the math software. Please see the attached information on this presentation.
Dr. Brasiel explained that many of the products are helping students achieve math proficiency, however, there are some that are not, which could be that the products are not being used correctly. This is the very first time the STEM Action Center has been able to report on standardized student achievement from the SAGE assessment.

VI.   **Legislative Bills in Process**
Dr. Goetz then gave updates on two legislative bills in process, one being the Computer Science Bill (SB107) and the Physics Bill. It is advantageous that each of these bills get passed, and Board Members should reach out to their lobbyists in favor of them.

VII. Adjournment
MOTION: CHARIMAN JEFF NELSON MOTIONS TO CLOSE THE MEETING, SECONDED BY BERT VANDERHEIDEN. THE MOTION WAS UNANIMOUSLY APPROVED.

CURIOSITY UNLEASHED
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STEM Action Center Technology Pilot 2013-14
Student Performance on SAGE Mathematics Achievement Test

Dr. Taylor Martin and Dr. Sarah Brasiel, Department of Instructional Technology and Learning Sciences, Utah State University

What we know from prior research on mathematics education technology and impact on student achievement[1]

- Significant differences in outcomes were found depending on intensity of use (time per week).
- The mean effect sizes for low (<30 minutes/week), medium (30-75 min/wk), and high intensity (>75 min/wk) were +0.06, +0.20, and, +0.14, respectively. Average effect size of 74 technology programs was 0.16.

Effect of Digital Technology Product Usage on State SAGE Assessment Performance 2013-2014

Product	Number of Pilot Students in the Analysis	Effect Size	Scale Score Point Difference	Usage Intensity
ALEKS, McGraw-Hill				
Grade 7 & 8	977	**0.25**	**+ 6**	Low (29 min/week)
Grade 7	768	-0.56	- 5	Medium (32 min/week)
Grade 8	209	**0.59**	**+ 15**	Low (22 min/week)
Math 180, Scholastic				
Grade 7 & 8	64	- 0.10	- 8	
Grade 7	45	-0.37	-9	Intensity data not available
Grade 8	19	-0.36	-9	
ST Math, MIND Research				
Grade 6,7,8	264	-0.17	- 4	High (79 min/week)
Grade 6	26	-0.49	-19	High (105 min/week)
Grade 7	59	**0.11**	**+ 5**	High (101 min/week)
Grade 8	179	-0.36	- 12	Medium (65 min/week)
Think Through Math, Think Through Learning Inc.				
Grade 6,7,8	358	**0.41**	**+ 8**	39 problems/week
Grade 6	16	**0.20**	**+ 9**	134 problems/week
Grade 7	291	**0.41**	**+ 8**	33 problems/week
Grade 8	51	-0.20	- 5	43 problems/week
Ed-Ready, Monterey Institute for Technology and Education				
Grade 10	20	**0.99**	**+ 62**	Low (18 min/week)

Important Information about the Analysis and Findings

- Students using the products (Pilot) were matched to similar students in similar schools in the state using a process called propensity score matching that uses student demographics and two years of prior achievement.
- Where appropriate, a data analysis approach called linear mixed methods (hierarchical linear modeling) was used to account for the clustering of students within schools.
- A variety of covariates were included in the model to account for differences related to school locale, gender and other student demographics at both the student and school level.
- Once the students in the pilot are matched, the assumption is that there should be no real difference in their SAGE assessment scores. Any difference found we consider could be related to use of the technology.
- Effect Size is the size of the difference in performance between students using the product and similar students in similar schools not using the products. Effects were greatest on average across grades for *ALEKS, Think through Math,* and *Ed-Ready.*
- SAGE Scale Scores are reported on a scale from 100 to 900. The Scale Score Point difference is the difference between the average performance of students using the products compared to the comparison group in terms of Scale Score Units.
- The reason we do not emphasize p-values (statistical significance), is that *p*- values are considered to be confounded because of their dependence on sample size. An effect size is independent of sample size. There was no difference between pilot students and the comparison students that was statistically significant ($p<.05$).
- Most students did not use the products at the level of developer recommended intensity.
- Teachers reported that due to SAGE testing they lacked access to computers from February through May.
- Any negative effect should **not** be attributed to the product, since in general students were not able to experience full implementation across a year at the recommended level of usage. For example, a district mathematics coordinator expressed concern that teachers using *ST Math* were using it as a babysitter, while they spent time on grading or planning rather than utilizing the great teaching approaches they were taught during the training of using the data to work with students in small groups and using features of the program to model conceptual understanding. Feedback from teachers and administrators have been overwhelmingly positive about ST Math, so we need to learn more about how to improve implementation to see positive effects that this product has shown in other states on achievement.
- Most students implemented the program between October and February. Therefore intensity was approximated by dividing the total amount of time (or number of problems solved) by 16 to calculate the intensity per week.
- A complete technical report will be provided to the STEM Action Center at the end of February 2015.

Next Steps with Scaling-Up Digital Mathematics Products across the State

In the 2013 Utah Legislative session, HB 139 was passed which created the STEM Action Center for the State of Utah and authorized a pilot program to begin in the 2013-14 school year to include two components: educational technology to support mathematics instruction for students in grades 6-8 and prepare secondary students for college mathematics. Providers contributed over half a million dollars in product licenses for the pilot. Although 7,831 students were involved in the pilot, this analysis only included 1,660 students who were in the pilot during the whole year, had evidence of use of the product, and had state data for the past two years to include in the matching process of the analysis. During 2014-15 and 2015-16 academic years, over 150,000 K-12 students across the state of Utah will be using 11 digital mathematics technology products. We will be evaluating the effects of use of these products on student mathematics achievement on the SAGE assessment for each year. The 11 products being evaluated are as follows:

- *ALEKS,* McGraw-Hill
- *Catchup-Math,* Hot Math
- *Cognitive Tutor,* Carnegie Learning
- *EdReady,* Monterey Institute for Technology and Education
- *i-Ready,* Curriculum Associates
- *Math XL,* Pearson Education
- *Odyssey Math,* Compass Learning
- *Reflex,* Explore Learning
- *ST Math,* MIND Research Institute
- *Successmaker,* Pearson Education
- *Think Through Math,* Think Through Learning, Inc.

References

[1] Cheung, A. C., & Slavin, R. E. (2013). The effectiveness of educational technology applications for enhancing mathematics achievement in K-12 classrooms: A meta-analysis. *Educational Research Review, 9,* 88-113.