# GSTEM

## Global STEM Education: What Progress Are We Making?
## May 6, 2016
## Harvard Graduate School of Education
## Proceedings

### Keynote (1): Alan November

*"What the single most important skill you wish you could buy more of? … I wanted to know what he was missing, what he needed most of. He said 'global empathy'… What quality do you look for in an interview? 'Passion'."*

Alan started off talking about the Harvard Business school study (https://hbr.org/2015/11/2015-empathy-index) on the value of global empathy. He pointed out that it's no surprise that the top 10 companies listed grow faster than the bottom 10. In addition, he concurred that these same two elements are missing from curriculum in the United States. Alan argued that these efforts should start as young as first grade since addressing the issue in middle school or high school is too late.

Then, he shared a class website (http://mscassidysclass.edublogs.org/) showcasing the innovative use of traditionally blocked social media sites such as Twitter. This particular teacher created jobs in her classroom such as Twitter publishing team and Twitter reading team – where discussion focuses on what the world wants to know and what to share. He pointed out the hypocrisy of schools stating that they want to prepare global citizens yet disconnect their users from interacting with people around the world. According to Alan, prior to Twitter, teachers needed to figure out their lesson plans.

Now Alan argued teachers should create conditions where students can learn from children around the world.

Alan shared a website ([http://mathtrain.tv/)](http://mathtrain.tv/)) where children created tutorials for an entire curriculum. He demonstrated the cluster maps which are used to show how these videos are affecting students in other countries. Through this example, Alan emphasized that children can and should feel needed and valued – as if they are making a contribution to the world.

Finally, he demonstrated how a Google search can greatly affect what a student learns and sees on something such as the Iranian Hostage Crisis where most students would end up only seeing one perspective. Alan concluded by stating, "everyday we reinforce skills that are against global empathy. We are not leveraging the Internet because we are not teaching the mechanics of googling/the search that would give you a different point of view. " We are not taking advantage of the Internet because we do not know how to access the information.

## Keynote (2): Dr. Maria Uhle

*"Education from University to Pre-K… really needs to engage with society… International collaboration key to science and engineering globalization."*

Dr. Uhle's presentation revolved around the work being done at the Belmont Forum ([https://www.belmontforum.org/)](https://www.belmontforum.org/)). The talk focused on the fact that future jobs are dependent on STEM. Two prominent challenges have emerged statistically: (1) minorities are still struggling in the field and (2) the international component tends to be

an afterthought. She also spotlighted the environment as the poster child for STEM because it incorporates social, natural sciences, and even citizen science.

Dr. Uhle proceeded to talk about INFEWS – a project focused on innovations at the nexus of food, energy, and water systems – and the EPIC-N* Model (stemming from the University of Oregon) where a system was created to foster partnerships between the city and students. When the city has a challenge, students are recruited and have the opportunity to participate in a real challenge incorporating a learning based approach at zero cost to the community. For those students, the outcome matters more than a grade and it helps engage students with societal issues.

## Panel: Industry/Government

*David Bau* focused his discussion on the idea that people need to take initiative and have the confidence to push back. He highlighted that the challenge is to figure out how to make STEM more learnable and approachable for everyone.

*"Our field isn't diverse enough. It's very important for us to understand hat the real problems are in the world. We see the lack of diversity in our field as not just a moral and equity problem but also a business problem as it blinds us."*

*Dan November* addressed the global approach to problem solving by sharing an example when hiring a programmer to solve a technical problem. In a global market there is incredibly easy access to become connected with STEM skills. He also referred to his personal experience taking CS50 (Harvard and Yale's most popular course –

Computer Science 50) where 80% of the students enrolled have no previous programming experience.

M.L. Mackey spoke about teaching STEM to solve problems and dilemmas. She focused on the idea that business is global and that critical thinking is crucial in today's economy. Her ideal situation is to have all students thinking like engineers. During her presentation, M.L. included a suggestion to visit Primary Source – a place with content about how teachers teach STEM to students. The biggest worry for her is the possibility of computer science becoming heavily tested as she is more concerned with making it approachable. *"We're teaching STEM in a less than ideal manner. Teaching people about tech isn't about reading books, memorizing code, or programming appropriately – its about getting something done."*

Gary Beach spoke about the importance of computer science's being considered a core subject in the United States. He pointed towards the website **IFTF.org** to find information regarding the workforce in 2020. As Gary elaborated on his statement, he made clear that one of the main problems is the fact that in the United States teacher recruitment strategies are poor in comparison to other countries such as Finland which have proactive measures that recruit graduates from the top 20% of their class to pursue the field.

*"Never ask a kid 'What do you want to be when you grow up. Ask, 'What problem do you want to solve.'"*

John Hodgman concluded the panel by thoughtfully laying out the tough challenge ahead of trying to  understand better how the movement to global is will

change given the current sentiments in the United States (particularly with this election season.)

## Panel: PreK-16

*Kim Frumin* relayed that as a researcher, she is quiet optimistic about the outlook on STEM education. During her presentation, she identified three important and positive reasons why there has been progress: (1) Sounding the alarm bells of the importance of STEM (primarily for grades 6-12), (2) Strong initiatives that have been created for girls (Operation S.M.A.R.T., Girls Who Code), (3) Adoption of STEAM – extending the umbrella to include the arts. Kim was asked to share her new book, co-edited with Chris Dede, about professional development in STEM ([http://www.amazon.com/Teacher-Learning-Digital-Age-Professional/dp/1612508979)](http://www.amazon.com/Teacher-Learning-Digital-Age-Professional/dp/1612508979)). Towards the end of the panel, Kim emphasized that for her, the greatest challenges to progress in STEM are time and unlearning existing teaching methods.

Jake Foster spoke about his frustration that things to happen very slow in policy. At the state level in MA, he mentioned the unique challenge that it is so locally defined – mainly problematic when grappling with access for all and equity. At the same time this pace enables different types approaches to flourish. Jake stressed that the tension between competition and collaboration is often a hindrance and is something that needs to be unlearned as well. He named "getting into the mindset of collaboration" as the greatest challenge moving forward.

*Dr. Helen Soule* contended that the STEM movement is in fact quite similar to the Partnership for 21st Century as they are at the same stage of progress. She discussed how many of the Exemplary Schools identified were often STEM focused. Her conclusion was that progress was being made – as there are many more programs and a great deal of focus on both P21 and STEM (which often go hand-in-hand). She pointed towards P21.org to find case studies of exemplary schools and artifacts. Dr. Soule shared her thoughts that state leaders and some communities are often reluctant to talk about "global".  Overall, she strongly emphasized the four Cs highlighting the benefits of STEM: (1) communication, (2) creativity, (3) collaboration, (4) critical thinking. The challenge she identified moving forward is changing the mindset of how classrooms should look.

*Elizabeth Stevenson* talked about the importance of continuing to push boundaries and seeing where the exploration will go. She envisioned a goal of ensuring that all students have the opportunity to be curious, and fostering an environment where students can tinker.  Elizabeth echoed previous speakers that there are other types of STEM to be considered (sewing, cooking, etc.) and recognized. She also spoke about collaboration and partnerships being extremely important to progress,

*Collected by Audrey Tsaima*
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