

**Group 1:**

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**1. What are the countries and cities in Asia that can hold GSEE Summits in the next three years?**

Hong Ding in Beijing is expected to host GSEE/Beijing in 2016.

TK Ng in Hong Kong will also host a meeting on education in December 2016. The meeting to be held is “Hotung Conference on STEM and Gifted Education”. TK has mentioned to invite many of us to the meeting, maybe we can combine it with GSEE to make a smaller regional meeting.

After that, Se-Jung Oh in Seoul will host GSEE in Korea in 2017.

Let’s see how David Pines weighs in.

**2. Will we support small regional meetings of GSEE related activities besides GSEE Summits?**

Yes – some of the meetings will be more local, but addressing global GSEE issues. These have been going on in Japan.

**3. Which challenges should be given priority and what should be GSEE’s strategy for creating partnerships involving universities, the private sector, government, and/or foundations to address these challenges?**

Warning: This is where the boundaries even between education and engagement (without even outreach separating them) get blurred even more – is that telling us something? Can we meld them – we think so, but it will take time!

Engaging and educating the public that fundamental and applied research in a broad range of fields is crucial for attacking the problems of the 21<sup>st</sup> century.

A lot if this is being accomplished by web sites (e.g., what Becky Thompson showed and Emergentuniverse.org) and it would help to have some of these translated into local languages.

A common theme was about the entrance exams: That the Eastern countries teach toward the exam and it was stated ingenuity was lacking. Western students do not do as well on the exams but it was said that they exhibit more creativity. It was stated that Japan has Nobel laureates as that was due to their OLD educational system where the students were trained in all fields – not educated for the entrance exam. So maybe we can say that the Eastern countries damaged their educational system by teaching to the exam, and that was now going on in the US with “no child left behind.” There were innovative educational ideas discussed here and we need to figure out how to implement them in our home countries.

Laura wants to include Cuba in future Summits, and maybe other countries.

Se-Jung Oh suggests to include Singapore in future Summits, since Singapore students get fairly high marks in PISA and TIMMS math and science tests, but unlike students of other east Asian countries with high average scores they also seem to like learning science and math according to the questionnaires.

#### **4. What can be done to encourage the best young research scientists to join the global GSEE community? Edutainment? Contributing to the EiE Journal?**

We have to give them incentives.

How do we change attitudes so GSEE is respected? All countries require a “broader impact” and to do public engagement and be great educators, but if we do too much then we are considered “non-scholarly.” So what is the delicate balance required now and how do we get this more respected? FOEP helped and maybe more prizes would help. AAAS and APS have increased their public engagement but it still needs more respect (e.g., Carl Sagan was kept out of NAS and we hear rumors that Neil de Grass Tyson is barred from NAS). The EIE journal should help.

#### **5. Streamline Math and Science Curriculum in K-12 education**

We need to avoid the political agendas – how do we do that? How about Kazuo Kitahara’s point about designing College education and then that would dictate what would be taught in the high and middle schools? But we have to avoid the trap of teaching to an exam.

What about Kazuo Nishimura’s “self teaching” plan? He says it is not possible to improve teachers on a short-term basis, but maybe we can improve textbooks? Again, the government controls textbooks, but we are talking about “sub text books!” Scientists feel we do not have any control over K-12 textbooks.

GSEE proposes a popularized curriculum – and send that to our education ministries. We agreed that this was too dangerous a direction to go in all of our countries and worse than ineffective. Now CK Lee can influence but maybe not the rest of us. How do we go about changing this? Maybe we do not suggest any detail but recommend some approach like “inquiry based” and present that to the societies. Maybe an International (not local) proposal involving many countries will be noticed more?

From Laura: IUPAP runs a Women in Physics Conference every few years (IUPAP WIP). There is a lot of physics discussed but there are also breakout groups where “best practices” are discussed. An example is parental leave. The delegates from the different countries discuss what they have and recommendations are given to IUPAP, who then distributes this information to physical societies all over the world, and it is hoped that the physical societies send this information to physics departments in universities, companies, and laboratories. This is a slow process but we expect to have an evolution in best practices. Perhaps our GSEE Summits can do the same – send best practices in Education, Outreach, and Engagement to professional scientific societies and recommend the information is sent to departments. Also, when we establish our journal EiE, we can write up our GSEE Summit Conference Proceedings that not only have short articles from the speakers, but also articles about our breakouts and “best practices.” When we start to use a repository for information (probably Trellis), we could also place things there for open access.

#### **6. Allow students sufficient time in K-12 education to explore their curiosity on subjects of their interest**

We are worried about schools cutting back on humanities the arts and even basic science. These are all needed to work together to inspire the kids. Kazuo “seems like teachers enjoy but not the kids.” We all agree we need more hand on experience.

Kids need time “on their own” to develop curiosity?

Laura: Freeman Dyson has stated that formal education is dangerous for creativity and the best scientists did not have formal education and learned more from museums.

Make sure the extra time is not spent on entrance exams!

More science museums to schools and have more famous scientists go to schools to motivate?

Why don't we develop our museums so kids can learn at their own rate with minimal supervision?

Can we have professors come to the schools to work with the high schools or even all K-12?

These are wide ranged ideas – and that goes back to each student learns differently. We need to address how each student learns.

Remember, learning is not only determined by formal education but we need to help the students or at least allow them, to explore and develop their own curiosity.

**7. Modify College Entrance Exam System to Emphasize Math and Science, especially for students majoring in science and engineering fields**

How do we design these to not just be a test of memorization? How do we design these tests to measure aptitude?

We probably can't get directly involved in writing entrance exams, but we could offer to help the governmental exam body as exam consultants.