IGNITE STEM

WHY THIS MATTERS

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WHY IGNITESTEM?

Join education thought leaders in New York City this spring to share ideas about new approaches to disrupt STEM learning environments in high school, university, nonprofit and corporate arenas. With significant backing by Princeton and Columbia universities, IgniteSTEM is a pioneering conference to provide participants with take-home skills and leading edge ideas through hands-on teaching methods such as hackathons, maker spaces and design thinking approaches.

NETWORK OF EDUCATION DISRUPTERS

This conference provides a unique opportunity to meet thought leaders in the STEM educational community. Develop relationships with people from your local neighborhoods and also across the nation from high schools, universities, and corporate spaces. Through smaller teams within the conference you will have a constant support staff in your endeavor to implement many of the ideas and concepts you will be exposed to even after the conference concludes.

ACTUALLY 'HACK' EDUCATION

The conference itself will be conducted (in part) like a "mini-hackathon" where attendees can experience "hacking education" in a non-traditional style. The hackathons will employ many of the strategies of design thinking and maker movements. Through these hands-on engaging workshops participants will be able to actually visualize what such disruption would look like within their own educational institutions and the impact it could have on the student body. Hackathons are not just for coders - they're powerful learning experiences for everyone, and you'll see why.

THE NEVER-ENDING EXPERIENCE

The conference is simply the seed to ignite the journey towards disrupting traditional educational models.

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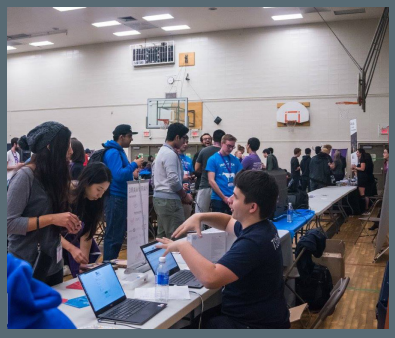
WHY WE NEED HANDS ON LEARNING TO CHANGE EDUCATION TODAY

Education disruption is a movement to incorporate many of the advances that have been made in pedagogy to develop students from simply just containers full of knowledge to actual leaders and thinkers that have the capabilities to tackle real world problems. Hands on learning and actively practicing "innovation" will allow children to set right expectations of themselves and actually learn "how to think".

HANDS ON LEARNING WORKS

For instance, there was a study conducted at Stanford University that measured the impact of design thinking upon students. Their results found that students developed a diverse understanding of the problem and created projects that actually addressed these problems in a myriad of ways. One of the biggest findings was that such a methodology of teaching significantly improved metacognition within students and instead of just rote problem solvers they were actually becoming thinkers.



Not only do these disruptive forms of thinking develop parts of students that have never been looked at before, but they are also more effective than the role of current teaching techniques. According to a study conducted at Purdue, when eighth graders were taught about water quality through hands on learning vs. conventional techniques, the students "showed higher comprehension of the concepts, particularly among those students where English was not their first language."

RELEVANCE TO IGNITESTEM

At this conference we present many of the cutting edge innovations in education and also help you design a strategy to actually implement these developments into your day-to-day school curriculum through active workshops. Participants will be able to decide for themselves on the effectiveness and usefulness of such techniques. Together, we hope to revolutionize education to develop the leaders that we need today.

HACKATHONS

Hackathons are innovation marathons. Students of all varieties come together to learn, build and share their creations. But there is a catch – hackathons provide a limited amount of time. The point is to solve a problem in a short amount of time by working with others. They are a vehicle for creativity and ingenuity. Hackathons are not just limited to students who can code. They are much broader in practice. They can be integrated into any curriculum or can be done in little chunks over a few months culminating in a hackathon event.

THE-PLAY-BY-PLAY

A typical hackathon starts with students forming a group and deciding to solve a problem. After collectively deciding on an idea to work on, students on the team spend a majority of the event transforming this idea from concept into reality. Whether the idea is a hoverboard or an app to teach you to drive, hackathon teams bring a project from epiphany to completion all within a short timeframe. Expert mentors from professional development backgrounds often come to help students with their projects.

Don't think hackathons are malicious! Not to be confused with illegal and unauthorized programming, "hacking" in this context means quickly and intelligently creating a real application that others can use. Although the term "hacking" has previously been associated with gaining access to a computer system with a evil intent, "hacking" has started to transition into a positive term describing the actions of innovators who are creating prototypes of their ideas. Students have rallied around the term "hacking", as a term to mean innovating ways to improve their lives and their efforts to build the future.

HACKATHON EXAMPLES

A school can host a hackathon where students review classes and offer advice to future students on how to study for certain things. An English class can host a hackathon where students can hack on top of an existing Shakespeare play and modernize it by adding videos, pictures, and music to make it come alive. A computer science class can spend a month to teach students the basics of a specific coding language and then have each student make a small project at the end of month like making hangman or checkers.

HACKATHON SUCCESSES

Hackathon projects like a service allowing individuals in third-world countries to connect to the internet through text messages (Cosmos) or an app that makes group chats more engaging (GroupMe) have gone on to be successful companies that are worth billions. The real success, though, are the over 100,000 innovations made by tens of thousands of students across the country - the business viability of these ideas is not important.

HOW HACKATHONS IMPROVE EDUCATION

Hackathons teach you to build, design, pitch, create and innovate. To work well under deadlines and to give it your best shot. Students have a chance to gain time management skills, along with technical expertise and new connections. In addition, students get to spend one-on-one time with expert mentors who spend the hackathon teaching students new technical skills and helping students with their projects. Hackathons help students build up their resumes and learn the latest and most popular technologies and techniques.

Hackathons allow students' intrinsic interests to drive their education. Every time a student encounters a new challenge at a hackathon, they must learn how to fix the problem through independent study. By giving students an opportunity to individually build a project from start to finish, students develop increased critical thinking skills and have a chance to become better prepared to enter the workforce. This in turn improves the education of the student themselves and helps drive better education in the future.

DESIGN THINKING

Design Thinking is a structured, team- based approach to innovation. The inspiration for design thinking originates from Thomas Edison. Edison is recognized not for inventing electricity, but recruiting a team of skilled individuals to develop a product that utilizes an existent technology to address a real world need. Design thinking is an embodiment of Edison's philosophy and actively teaches students to identify people's needs and leverage the numerous technological resources available to create innovative solutions to these needs. In other words, students are inculcated with a thought process of: inspiration, ideation, implementation.

Multiple schools have already implemented design thinking processes and have found great success. Through a combined effort led by IDEO and researchers at Stanford University, an active global network is maintained of such schools ranging from South Korea, Brazil, to New York City. All of these schools have incorporated design thinking techniques or workshops into their day-to-day activities and have found their students to be more adept problem solvers and innovators.

"Students are inculcated with a thought process of: inspiration, ideation, implementation."

TYPES OF PROJECTS

In more concrete terms, a sample design thinking process would look at a particular type of problem such as most effective way to improve word problem solving skills. Through design thinking, students would first learn to appreciate the problem and understand how it is applicable to the real world. Then utilizing the mathematical skills they have learned, develop potential approaches to the problem and test the different approaches. Through a process of iteration and modification students will eventually learn the best course of action and can then validate their results with the teacher. This is significantly different from simply being told a type of problem and the method to solve it. While the latter simply involves memorization and mindless practice, the first actually instills a thinking style to follow when faced with any problem that could be applicable in real life.

RELEVANCE TO IGNITESTEM

The purpose of education is to prepare the leaders of tomorrow. One of the core competencies of any leader is to be able to identify the needs of the people around and to be able develop a multi-faceted approaches to tackle these issues. Such a skillset can only be developed by actively practicing such a thinking pattern on a day-to-day basis. At this conference, you will have the ability to experience design thinking strategies first hand and learn how to incorporate these teaching styles into daily class activities.

MAKER MOVEMENT

The core tenet of the maker movement is the usage of technology and new developments that have been taking place in the world to make new inventions that could be used to address further world problems. A Maker Space is an environment in which students tinker with pieces of technology such as 3D printing and woodworking to design and create their own inventions. This movement is a result of shift in pedagogical practices where instead of focusing on research and developing more technology, it is shifting to actually employing the plethora of technology that is currently available to tackle real world issues. Furthermore, it abides by the principle that it is better to learn via doing rather than simply instruction.

THE MAKER SPACE

The most fundamental aspect of the maker movement is a physical space, the 'maker space', containing multiple tools and equipment that students utilize to make their imagination into reality. Furthermore, a maker space is quite versatile in regards to its size, complexity, and purpose. For instance, it is possible to have a 'maker space' solely dedicated to woodworking with a lot of machinery and materials. On the other end of the spectrum, one could also have a maker space about robotics and all they would need are simple circuit boards and Lego sets. Maker spaces are not limited to STEM fields either. It is possible to have a literary/art space where there are multimedia projects playing, art pieces displayed, basic materials such as notebooks, pencils, and pencils. Students could critique these pieces, generate their own pieces, use other works as inspiration, or simply brainstorm ideas with each other.

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EDUCATIONAL IMPACT

A natural question that may arise is over the purpose of the 'maker space' in the educational development of children. Through maker space workshops conducted in the past, teachers expressed overwhelming support and excitement behind the maker space. In their experience, the maker space generated an actual love and enthusiasm for 'tinkering' with available resources to innovate something that could potentially serve a purpose in the community. Additionally, it answers the question: what's the point? Often students find theoretical concepts learned to be a waste of time since they do not see their direct applications till much later in time. The maker space provides a natural environment for students to employ their learnings into pragmatic projects.

RELEVANCE TO IGNITESTEM

At the conference we provide participants an opportunity to experience and witness the power of the maker movement first hand. Participants will interact with leaders within the maker movement, hold discussions with individuals who have actually implemented maker spaces within their educational institutions, and partake in a workshop inside an actual maker space. Through these immersive experiences participants will be able to decide for themselves the potential impact that the maker movement could have.

RESILIENCE

Resilience—the ability of each of us to "bounce back stronger, wiser, and more personally powerful" (Nan Henderson); "not only survive, but also learn to thrive" (Bonnie Benard); or even to "bungy jump through the pitfalls of life" (Andrew Fuller)—is more than a trait: it's a process that can and should be taught, learned, and required. Being resilient helps youth navigate the world around them, and schools and classrooms are becoming more attuned to providing the cognitive, emotional, and developmental supports needed for resilience to prosper and grow in each of us.

In The Power of Resilience, Drs. Robert Brooks and Sam Goldstein explain:

Resilient individuals are those who have a set of assumptions or attitudes about themselves that influence their behaviors and the skills they develop.

Resilience is a key skill acquired through hands on learning - especially hackathons.

MENTORS ARE CRUCIAL FOR RESILIENCE

Children look up to the adults around them for guidance and, good or bad, accept those adult behaviors as the standard, and pattern their own speech and actions after those adult models.

Brooks and Goldstein refer to these models as charismatic adults. These people could be teachers, administrators, coaches, parents, older siblings or friends, but the important thing is that the student forms a meaningful relationship with the charismatic adult. When that happens, the student has a resource when questions arise. He or she has a support when work gets difficult or life presents challenges. At hackathons, schools can bring in dozens of eager and encouraging volunteers to help make a difference in students' experiences by augmenting their resilience by letting kids grow through partial failure and then ultimately success.

BUILDING RESILIENCE TAKES PERSONAL GROWTH

Another factor in supporting resilience in a student is the concept of personal control. As students develop an understanding of their own competence, they feel more in control. They feel like they can make more of their own decisions and take pride in their accomplishments. Students who are allowed to make significant choices regarding their own educations are more likely to feel some control or ownership of their own lives. This sense of control is powerful in supporting a resilient mindset. At hackathons, students come up with an appealing idea entirely on their own. The whole hackathon is there to help edit, tweak and improve on their idea.

Providing choice to students is critical. In Why We Do What We Do: Understanding Self-Motivation, author Edward Deci argues:

The main thing about meaningful choice is that it engenders willingness. It encourages people to fully endorse what they are doing; it pulls them into the activity and allows them to feel a greater sense of volition; it decreases their alienation.

A choice may be as simple as giving options on how to complete an assignment or letting students choose the topics of their writing assignments. That sense of autonomy helps them feel like they are involved.

In a classroom, there are many variables that a teacher cannot control, such as parental involvement, poverty, nutrition and chemical influences. However, within the classroom, a teacher can become a charismatic adult and model a resilient mindset, and give them a sense of autonomy and choice in the work they do. A teacher can instill this resilient mindset but facilitating hands on learning events for their students. Come join us at IgniteSTEM this April 8th to learn more!

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[from http://www.edutopia.org/blog/supporting-student-resilience-in-classroom-steve-gardiner]