STEM and Special Needs

A Revolution in Special Education

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Between 80% and 90% of individuals with special needs are unemployed or underemployed.

The cost of raising a child with autism over her lifetime is $2.3 million dollars (Autism Speaks—reported on Money online 2014), much of it borne by the family, the state or federal government.
The pie chart shows the distribution of employment status with 85% employed and 15% unemployed or underemployed.
Every once in a while opportunities come along that change everything
Opportunity in the Marketplace

- Much has been done to isolate the physical, biological, and psychological underpinnings of autism and those with special needs.

- Little has been done to explore the opportunities our students might have based on their strengths and interests.
Huge demand for technically trained workers in all fields—Burning Glass (labor market analytics) there are 40,000 computer science bachelor’s degrees awarded each year, but 4 million job vacancies
Conference Board—for every 1 computer worker, there are 3 available jobs; for every 6 construction workers, there is only 1 available job
According to a 2015 BLS report, data scientists are in huge demand—some estimates are that perhaps 20% of industry needs can be met by qualified applicants.
Our population has a natural affinity for STEM pursuits
They can persevere at a problem, topic long after others would have given up.

They can narrow their focus, honing in on the particular problem to the exclusion of all else.

They often have a strong visual memory and recall, helpful in bringing knowledge to apply in areas previously unrelated.

They can be precocious in math or languages.
Commerce and industry are specifically interested in hiring and training those with special needs who have the aptitude and the motivation.
Although those on the spectrum enroll in college to a far lesser degree than their peers, they register for STEM classes to a much higher degree (34% vs. 22%)
5.7 million job openings in STEM fields for BA and entry level with less than 2 years experience

80-90% unemployed
Opportunity in Education

Revolution in Education
The Help Group’s Response to these two Opportunities
STEM³ Academy

Goal is to improve the bad employment statistic by changing how we educate students with special needs resulting in a pipeline of students ready to capture marketplace opportunities.
STEM³ Building Blocks

- Language
- Start at the End
- Approach to Learning
- Non cognitive
- Extended Programs
Language
The Language of Inability

- Traditionally special education has been about weakness rather than strengths—about where students need support and what they don’t do well

- The language itself: special needs, students with disabilities, student weaknesses, learning difficulties, problems, challenges all contribute to the image of ‘less capable than’—neuro-typical peers
A New Language

Many of our students have natural skills and abilities that go unrecognized

- Visual discrimination
- Fixed focus
- Math focus
- Language focus
- Perseverance
- Repetition
- Logic
Start At The End
Start at the End

65 percent of children in grade school today are predicted to work in jobs that have yet to be invented.
What does commerce and industry look for in an employee?

- Ability to collaborate on a team
- Decisive and being a problem solver
- Ability to plan and organize
- Ability to communicate
Technology has infused every aspect of our lives and livelihoods—lasers in medicine; cyclotron in physics; GPS navigation; CAD for set design; holographic paint, virtual reality and augmented reality displays

Not all STEM-related jobs require a Bachelor’s degree—experience in an internship, a certification program, extracurricular projects are all valuable experience. Looking for those who can perform
Approach to learning
Our Approach

- Traditionally education has been teacher centered and involved passive learning, rather than student centered and involving active, applied or experiential learning.

- Traditional education has a focus on rote learning, which is passive—we want to encourage independent learners and critical thinkers, learning by exploration and discovery.
Our Approach

● We want students collaborating and engaging as a matter of habit, not just at special times of the day

● Have them engage in project based learning, interactive and collaborative projects rather than learn in isolation
Our Approach

- Engage in Socratic seminars and group competition builds (FIRST, VEX, Odyssey of the Mind)

- Anywhere learning—one doesn’t only learn at a desk in the classroom; interactive learning; interdisciplinary projects; digital portfolios and senior projects

- Students are more committed and involved when they can participate actively
for(int d=0;d<maxd;d++){
    float n=map(d,0,maxd,0,1);
    color newc=lerpColor(c1,c2,n);
    stroke(random(0,255),random(0,255),random(0,255),random(0,255));
    triangle(x,y,d,x,y,x);
    ellipse(x,y,d,x,y,x);
    rect(x,y,d,d);
    strokeWeight(0);
    strokeWeight(50);
    line(x,y,d,d);
}
  //end for loop
}  //end void draw_circ

void draw()
{
    draw_circ_grad(mouseX,mouseY,200);
    //filter(GRAY);
    filter(INVERT);
    //filter(POSTERIZE,2);
    filter(ERODE);
    //filter(THRESHOLD);
    filter(BLUR,3);
    filter(DILATE);
}  //end void draw
Non-Cognitive Approach
Essential Skills
Embed social emotional skills in the curriculum
Extended Programs
Extended Programs

- After school classes
- Robotics Team
- Summer camps
- Internships
- Mentorships
- Career day
- College tours
- Community Innovation Fair
- Corporate Sponsorships
Outcomes

- Last year at STEM³ Academy, we graduated 5 students, 4 to 4 year colleges, 3 to computer science, one to veterinary science, and 1 to Dramatic Arts—60% to computer science, 80% to the sciences

- Last year we had 4 students who scored 4s on their AP exams. This year, we have 32 students enrolled in AP classes. That’s almost 50% of the entire school, and 75% of the high school! We’re moving towards requiring every student to take at least 1 AP class in high school

- Last year 4 students interned in Information Technology in their senior year. This year, all 14 of our seniors will intern as a way of gaining valuable on the job training in their field of interest
Conclusion

● Build a pipeline to meet market demand for qualified workers
● Change the language we use
● Create more STEM educational opportunities
● Broaden the definition of success

What might you do?