Strengths and Opportunities in STEM
Autism in the School and the Workplace: Part I

Amy-Jane Griffiths, PhD, NCSP, BCBA-D

Agenda

- Importance of STEM education
- Needs in STEM
- Related strengths and struggles in ASD
- Essential skills
- Focusing on strengths and enhancing struggles
- What next?

Importance of STEM education

"STEM education will determine whether the United States will remain a leader among nations and whether we will be able to solve immense challenges in such areas as energy, health, environmental protection, and national security. It will help produce the capable and flexible workforce needed to compete in a global marketplace" (p. 1).

The President's Council of Advisors on Science and Technology (PCAST), in their Executive report to the President (2010)

Needs in STEM: An untapped resource

- Shortfall of workers in STEM-related fields
- Approximately 85% of individuals with ASD/related disabilities are unemployed or underemployed
- Filling the gap
  - Parents are more likely to be in STEM fields (Baron-Cohen et al., 1997).
  - More kids with ASD majoring in STEM

8, 650, 000 Jobs in STEM

Related strengths and struggles in ASD

- **Potential Strengths:**
  - Pattern finding and problem solving (e.g. puzzles)
  - Attention to detail
  - Learn topics exhaustively
  - Persistence (in areas of interest)
  - Algorithmic thinking
  - "Outside the box" thinking
  - Direct and honest communication
  - Affinity for technology

- **Potential Struggles:**
  - Uninterested in many "mainstream" topics
  - People and emotions are not algorithmic
  - Sometimes wayyyy "Outside the box"
  - Misses the forest for the trees
  - (Perceived) lack of empathy

We need more research!

Linstead, 2016
Baron-Cohen et al., 1997

Essential skills in STEM

Cognitive
- Critical Thinking
- Creativity
- Innovation
- Transfer of knowledge

Interpersonal
- Global awareness
- Oral/Written Communication
- Peer support
- Teamwork/Collaboration

Intrapersonal
- Empathy
- Optimism
- Persistence
- Self-Control

The Road Map Project (2014)
Soland, Hamilton, & Stecher (2013)

Essential skills & ASD

Focus on Strengths
Enhance Struggles

Focus on strengths

Cognitive
- Critical Thinking
- **Creativity**
- **Innovation**
- Transfer of knowledge

Interpersonal
- Global awareness
- **Oral/Written Communication**
- Peer support
- Teamwork/Collaboration

Intrapersonal
- Empathy
- Optimism
- **Persistence**
- Self-Control

Enhance areas of struggle

Cognitive

- Critical Thinking
- Creativity
- Innovation
- **Transfer of knowledge**

Interpersonal

- Global awareness
- Oral/Written Communication
- **Peer support**
- **Teamwork/Collaboration**

Intrapersonal

- **Empathy**
- **Optimism**
- Persistence
- **Self-Control**

What Next?

Where do we go from here?

- Find inspiration
- Focus on essential skills
- Mutually beneficial efforts
- More research!

- Creating inclusive environments
- Programs and schools specifically designed to support individuals with ASD

Creating inclusive environments

- Practices and perks in the field
  - Flex hours
  - Remote work
  - Casual dress
  - Multimodal communication
    - Slack
    - Trello

- Things to consider
  - Concrete directives
  - Supported social opportunities
  - Executive functioning support
  - Essential skills training
  - Making it work for everyone

Linstead, 2016

Hiring Programs
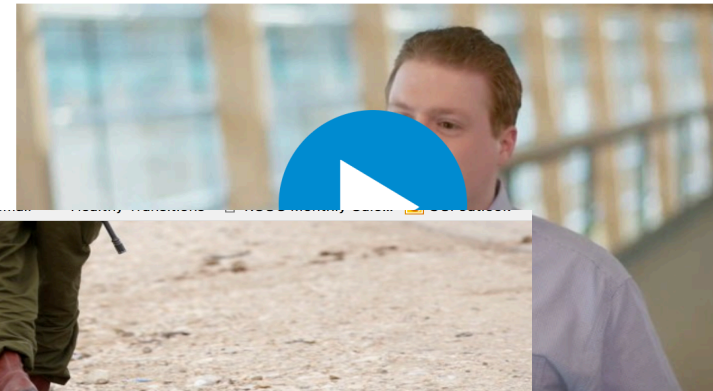
We focus on everyone's unique ability to contribute, rather than a person's perceived limitations. This view has helped us see new possibilities. SAP's internationally-recognized Autism at Work program is a shining example of this commitment, with nearly 120 colleagues on the autism spectrum on-boarded and the program in nine countries. By embracing differences, we help spark innovation — while challenging assumptions and inspiring change.

Microsoft / Story Labs / People

XBOX SOFTWARE ENGINEER

KYLE SCHWANEKE

Unique Microsoft hiring program opens more doors to people with autism
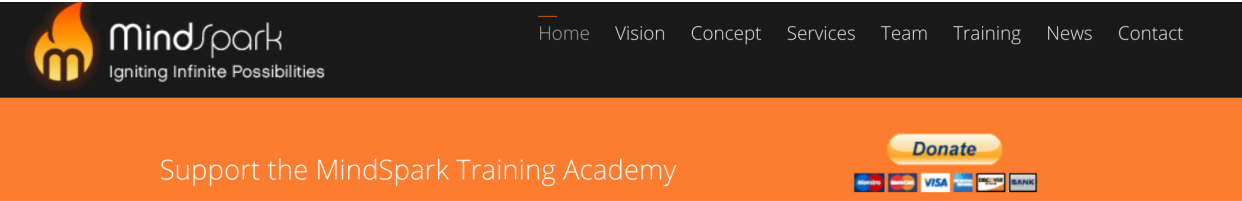
Jennifer Warnick

Autism at Work

SAP's groundbreaking Autism at Work program, launched in May 2013, integrates people with autism into the workforce. We have a corporate goal to employ 650 colleagues on the autism spectrum by 2020. The initiative currently includes nearly 120 colleagues filling over 20 different positions, and is active in nine countries

Contact us for more information

Ronen Zvulun / R

The Israeli Army Unit That Recruits Teens With Autism

Many autistic soldiers who would otherwise be exempt from military service have found a place in Unit 9900, a selective intelligence squad where their heightened perceptual skills are an asset.

Specifically Designed Businesses

MindSpark
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Home Vision Concept Services Team Training News Contact

Support the MindSpark Training Academy

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Our Mission:

To use free market forces to drive social change by creating careers in high tech for people with specialized abilitie[s] thereby increasing their independe[nce] and improving their quality of life.

MindSpark

"Charting the impact of employment on people on the autism spectrum within this unique program, as well as their families and coworkers, will be important in convincing other employers to offer similar opportunities to those with autism."

Professor Cheryl Dissanayake, who is overseeing the research program.

Structure

A defining feature of the Dandelion Program is the 'pod' structure used to manage Dandelion teams on client sites. Having this support structure in place allows for efficient management of the autism related needs of the Dandelion team members. Below is an example model that has been tailored for a team in a testing role.

'The Pod'

| Service delivery manager | Capability Manager | | Client test team interface |

AS support consultant Technical team

3-4 experienced Team Members

9-12 entry-level Members

'The Pod' team structure:
- The Capability Manager and client management determine work packages and scheduling of work
- Workflow into the Pod to be routed via experienced technical support team
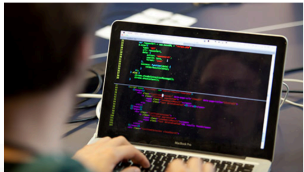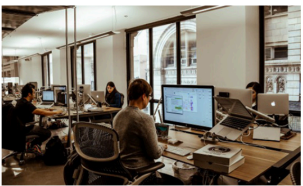

CODING/AUTISM

Welcome to Coding Autism!

Coding Autism is a full-service professional coaching and training company that trains adults on the autism spectrum in professional skills such as software engineering, quality assurance, and web development. We also assist our graduates in finding employment within the software and technology industries. We do so by providing services such as immersive programs and bootcamps, resume workshops, career counseling, interview preparation, and coaching/mentorship, all of which is designed around providing an environment where people on the spectrum can thrive.

Full-Stack Web Development Training

Employer Services

Schools or Specialized Programs

An Evaluation of a STEM Program for Middle School Students on Learning Disability Related IEPs

rspike, Julie Zhao, John Zhe and Craig Menzemer

STEM³ ACADEMY
Out of the Box. Students. Learning. Results.

ABOUT US   OUR SCHOOLS   HALLMARKS   ADMISSIONS   COMMUNITY   PROGRAMS   PORTAL   STEM^3 WEST

FOR BRIGHT, CURIOUS, TECHNOLOGY-DRIVEN STUDENTS WITH SOCIAL AND/OR LEARNING DIFFERENCES

and expression of information. In designing the academic workshops, it was our intent that the programs be aimed at those middle school students with specific learning disabilities. Operationally, we defined the potential students as being those students on an IEP as a result of a specific learning disability. We relied upon the schools to identify and recommend students. This requirement appeared to be interpreted liberally and some of the students reported that their IEP was also based on emotional or physical disabilities. The issues involved in obtaining accurate information on a specific diagnosis do not appear to be limited to this study, but ap-

Abstract

A year long Science, Technology, Engineering and Math (STEM) program was developed for middle schools students on Individualized Education Programs (IEPs) involving learning disabilities. The workshops were designed to encourage students both on IEPs and not on IEPs to explore STEM as a future career choice by building their knowledge and confidence. The participants in the workshops included 11 students on IEPs and 15 students not on IEPs. Parents also provided feedback regarding their

Email: agriffit@chapman.edu