
KANSAS STATE
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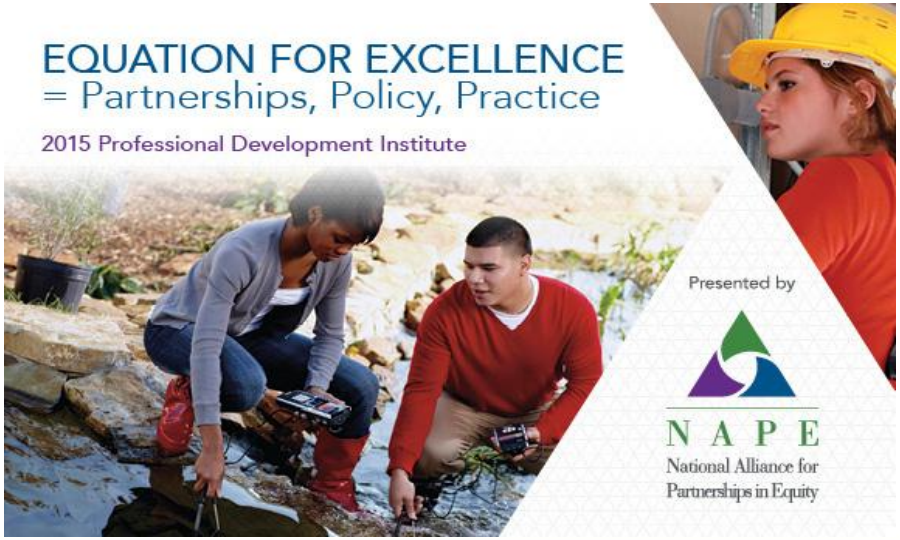
College of Education

Successful practices, solutions to common challenges and resources: Findings from 10 years of NSF funding for students with disabilities in STEM postsecondary education

Linda P. Thurston, Kansas State University



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Agenda

- Overview of students with disabilities in STEM postsecondary education
- Description of National Science Foundation program, Research in Disabilities Education
- Overview of RDE Synthesis project and sources of information for this presentation
- Common challenges and solutions
- Successful practices
- Resources

Disability Statistics

Percent of population with disability

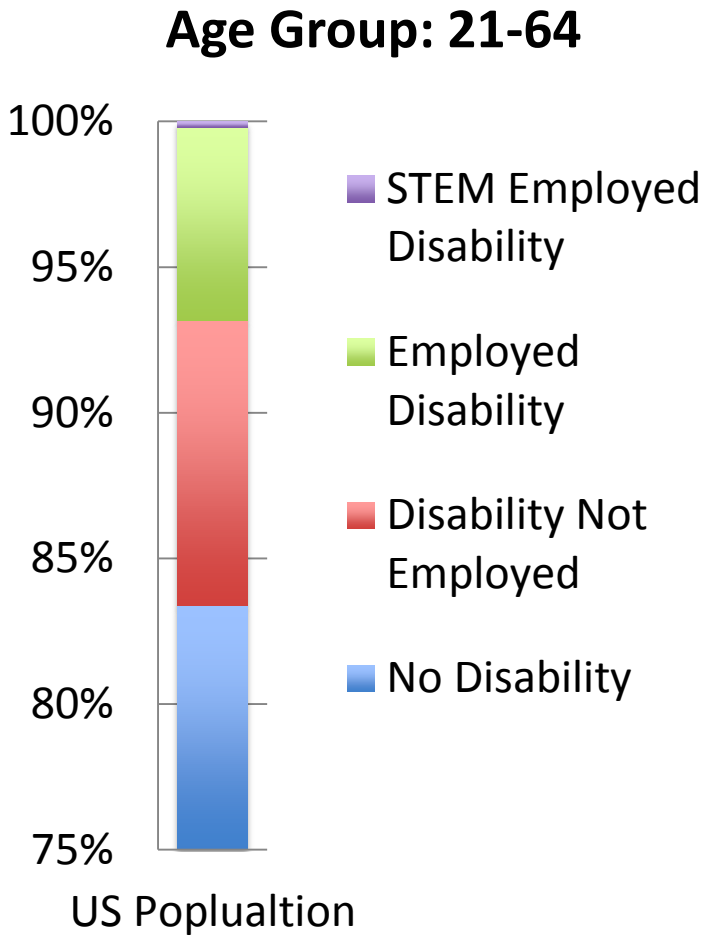
15 years and older 21%

STEM post-secondary education:

Undergraduate	8%
162,000 Master	6%
46,000 Doctoral	7%

Workforce (Ages 21-64)

With disability	17%
With disability, employed	7%
With disability, STEM workforce	3%



US Census Bureau, Disability 2010
NSF, SESTAT data system, Survey year 2010
NSF, S&E Indicators 2012

NSF's Research in Disabilities Education (RDE) Program

- By 2018, ten of the top thirty fastest growing occupations will be in STEM fields, requiring a bachelor's or higher degree.
- There is a need for larger, better, and more diverse STEM workforce.
- About 14% of the U.S. school-age population have a disability; this percent increases and the population ages.

Research in Disabilities Education Synthesis Project (RDE-SP)

HRD-1145541

PI: Cindy Shuman

Former PI: Jan Middendorf

Senior Scientist: Linda Thurston

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Challenges

- University/program policies and structures
- Assumptions and attitudes about disabilities
- Lack of understanding / cooperation
- Student programs not inclusive
- Lack of structural and pedagogical accommodations
- Identification of students
- Too few resources

Definition

Disability:

A physical or mental condition that causes functional limitations that substantially limit 1 or more major life activities, including mobility, communication and learning

NCES, 2011

Activity #1

- What challenges are there in your organization?
- Discuss within small groups

Solutions Start with a Cultural Shift

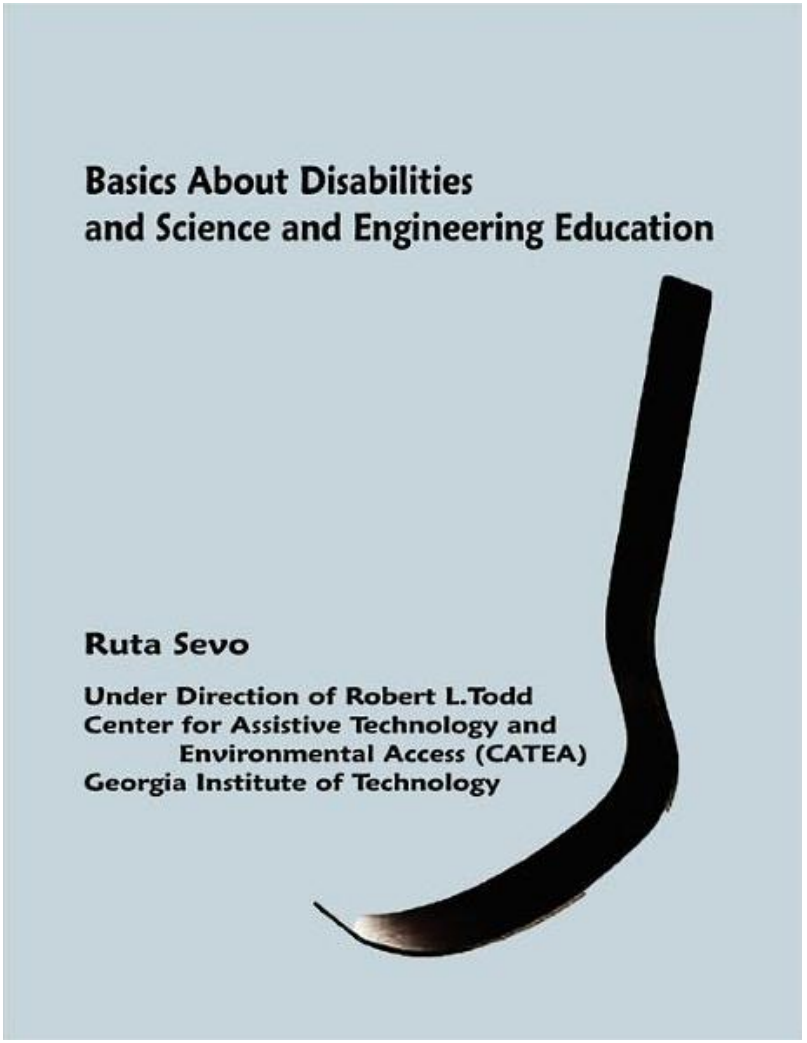
- Adopting the socio-cultural model of disability
- Examining our our language
- Adopting Universal Design

"This program has been a great resource not purely in terms of research funding but primarily in terms of creating a community of researchers focused on supporting the needs of students with disabilities." RDE PI

*"**We faced a surprising amount of discrimination because of the population that we were studying**. We treated disability status as a status group that may face discrimination or differential treatment. Our previous work was on other status groups, including women in STEM fields, high performing students of color and children of immigrants**. We have never been marginalized in the scientific arena before this study** of students with learning disabilities. The general population and the scientific community did not appear to understand that students with learning disabilities are capable of high levels of achievement if given the opportunity."*

RDE PI

Activity #2


Basics About Disabilities
and Science and Engineering Education
Ruta Sevo
Under Direction of Robert L.Todd
Center for Assistive Technology and
Environmental Access (CATEA)
Georgia Institute of Technology

Successful practices

1. **Actively engage campus disability services**
2. Use existing resources (don't develop new ones)
3. Use multi-faceted interventions / programs
4. Develop or adopt quality mentoring programs
5. Provide self-advocacy training for students
6. Provide professional development and support in UDL
7. Provide inclusive social support

Services offered by Access Centers (campus disability services)

- Extra exam time
- Alternative exam formats
- Provision of classroom note takers
- Adaptive equipment and technology
- Help with learning strategies or study skills
- Faculty-provided course notes or assignments

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Alliances for Students with Disabilities in STEM

- Stipends
- Tiered Mentoring
- Lab Internship
- STEM Peer Tutoring
- Learning Community

- Advocacy
- Faculty Support
- Industry Externship
- Job Shadowing
- Transition Support

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Quality mentoring programs

- Leake, D., Burgstahler, S., & Vreeburg Izzo, M. (2011). Promoting transition success for culturally and linguistically diverse students with disabilities: The value of mentors. *Creative Education, 2*(2), 121-129.

- Martin, J. K., Stumbo, N. J., Martin, L. G., Collins, K. D., Hedrick, B. N., Nordstrom, D., & Peterson, M. (2011). Recruitment of students with disabilities: Exploration of science, technology, engineering, and mathematics. *Journal of Postsecondary Education and Disability, 24*(4), 285-299.

- Stumbo, N. J., Martin, J. K., Nordstrom, D., Rolfe, T., Burgstahler, S., Whitney, J., . . . Misquez, E. (2011/2010). Evidence-based practices in mentoring students with disabilities: Four case Studies.. *Journal of Science Education for Students with Disabilities, 14*(1), 33-54.

Self-advocacy training for students

"Self-advocacy training is key. Students need to understand their disability, learning style and STEM interests and strengths." RDE PI

Jenson, R., Petri, A. N., Day, A. D., Truman, K. Z., & Duffy, K. (2011). Perceptions of self-efficacy among STEM students with disabilities. *Journal of Postsecondary Education and Disability, 24*(4)269-283.

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Universal Design makes things *safer*, *easier* and *more convenient* for everyone.

CLEARING A PATH
FOR PEOPLE WITH SPECIAL NEEDS
CLEARS THE PATH FOR EVERYONE!

Designed to be Usable by "ALL"

- Velcro
- Electric Toothbrush
- Single tap faucets
- Flexible drinking straws
- Audiobooks
- Electronic door option
- Icons on text labels

- Text manipulation
- Text to Speech
- Speech to Text
- Electronic lecture notes
- Adjustable computer and lab tables
- Multiple response options
- App: Dragon Dictionary

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Resources

- Association for Higher Education and Disabilities (AHEAD)
  - www.ahead.org
- *Beyond Rigor* Website
  - www.beyondrigour.org
- Campus Access Centers
- Council for Exceptional Children
  - www.cec.org
- DO-IT at the University of Washington
  - www.washington.edu/doit/RDE/
  - www.washington.edu/doit/Faculty
- Institute for Accessible Science
  - www.stemedhub.org/groups/iashub
- National Center on UDL
  - www.cast.org
- Special Education / disability studies faculty
- The Center for Assistive Technology and Environmental Access (CATEA)
  - http://catea.gatech.edu/
- University of Connecticut, Center on Postsecondary Education and Disability (2010)
  - www.facultyware.uconn.edu

Resources - publications

- Brown, Steven E. (2008). Breaking barriers: the pioneering disability students services program at the University of Illinois, 1948-1960. In Tamura, E. (Ed.), *The history of discrimination in U.S. education: marginality, agency, and power*. New York: Palgrave Macmillan, 165-192.
- Izzo, M. V., Murray, A., Priest, S., McArrell, B. (2011). Using student learning communities to recruit STEM students with disabilities. *Journal of Postsecondary Education and Disability, 24*(4), 301-316.
- *Journal of Postsecondary Education and Disabilities* (JPED)
- McGuire, J.M. & Scott, S.S. (2006). Universal design for instruction: extending the Universal Design paradigm to college instruction. *Journal of Postsecondary Education and Disability , 19*:2, 124-132.
- Scott, S., McGuire, J.M., & Embry, P. (2002). Universal design for instruction fact sheet. Storrs: University of Connecticut, Center on Postsecondary Education and Disability.
- Sevo, R. *Basics about Disabilities in Science and Engineering Education.* free at www.lulu.com
- Thompson, T. (2008). Universal design of computing labs. In S. Burgstahler & R. Cory (Eds.), *Universal design in higher education: From principles to practice* (pp. 235-244). Cambridge, MA: Harvard Education Press.

Thank you for your interest in STEM education and students with disabilities

Linda P. Thurston. Ph.D.
College of Education
Kansas State University
lpt@ksu.edu
http://oeie.ksu.edu/rde-sp

Cassandra Johnson, Graduate Research Assistant