



Research Implications for AT and Transition to Post- Secondary Settings

Ben Satterfield Ed.D.
Georgia Tools for Life
www.gatfl.org

Ben Satterfield, Ed.D.



AT Specialist/ Trainer/
Research Consultant
GA Tools for Life/AMAC
Georgia Institute of Technology
Ben@gatfl.org

Assistant Professor
Communication Sciences & Special
Education
bsatt@uga.edu

Research Consultant
Center for AT Excellence
Ben@center4ATexcellence.com



AMAC - Introduction



What is AMAC?

AMAC works with colleges and universities to provide students with textbooks in formats that best meet their needs, including:
E-Text, Audiobooks, and Braille.

How does AMAC work?

Students meet with their disability services office to place an order for their textbooks in the preferred format.



AMAC Accessibility



AMAC Accessibility, a research and service center that is part of the Georgia Tech College of Design.

Mission has evolved to improve the human condition through equal access to technology-based and research-driven information, services, and products for individuals with disabilities in 35 states, territories as well as 3 countries.

Accessibility Made Smart



AMAC creates practical solutions that work, with a focus on utility, ease of use, and high quality.

- **Accessibility Consulting** focuses on organizational accessibility needs with evaluation, technical assistance, customer support, and website accessibility solutions.
- **Braille Services** produces customized projects from both print materials and electronic text including partial books and chapters or graphics only using cutting-edge technology.
- **Captioning Services** makes classrooms, meetings, labs and other audio environments fully accessible for deaf or hard-of-hearing.
- **Professional E-Text Producers** provide high-quality e-text in many formats such as PDF, DOC, DAISY, and HTML.
- **Certified Assistive Technology team** provides on-site and remote assessments, demonstrations, training and technical assistance for education, work, and daily living environments.

For more information, please visit our website at www.amacusg.org

What is Assistive Technology?

Assistive Technology (AT) is any item or piece of equipment that is used to increase, maintain or improve the functional capabilities of individuals with disabilities in all aspects of life, including at school, at work, at home and in the community.

Assistive technology service – “Any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device.”



What do we know about AT and Students with Disabilities?



AT promotes greater independence, self-confidence, productivity, and overall quality of life to students with disabilities by enabling them to learn and perform tasks that otherwise would have been difficult or, at times, impossible to accomplish.

(Craddock, 2006; Englert, Manalo, & Zhao, 2004; Fichten, Asuncion, Barile, Fossey, & Robillard, 2001; Higgins & Raskind, 2004; Jutai, Rigby, Ryan, & Stickel, 2000; Macarthur, 1999; Mazzotti, Test, Wood, & Richter, 2010; Mechling, 2007; Riffel et al., 2005; Wehmeyer et al., 2006).

What do we know about AT and Students with Disabilities? ⁽²⁾



- AT improves students' academic learning and performance (Brackenreed, 2008; Geary, 2004; Hasselbring & Glaser, 2000; Hetzroni & Shrieber, 2004; MacArthur & Cavalier, 2004; MacArthur, 2009; Mazzotti et al., 2010; Raskind & Higgins, 1998; 1999).
- AT facilitates successful transition to college (Anderson-Inman et al., 1999; Mitchem et al., 2007; Stodden, Conway, & Chang, 2003), and employment (Gamble, Dowler, & Orslene, 2006; Luecking & Certo, 2003; Wehmeyer et al., 2006).
- Continued use of AT is also likely to empower students for better transition and post-school outcomes (Anderson-Inman et al., 1999; Mazzotti et al., 2010; Mull & Sitlington, 2003; Riffel et al., 2005; Sharpe, Johnson, Izzo, & Murray, 2005).
- Students who use AT are more likely to be proficient in using AT in college (Parker & Banerjee, 2007; Raskind & Higgins, 1998).

What do we know about AT and Students with Disabilities? ⁽³⁾



- There is limited research on AT and high incidence disabilities with regard to secondary and post-secondary educations (Alper & Raharinirina, 2006)
- Lack of attention by researchers is curious in light of documented post school outcomes for students with high incidence disabilities (SWHID):
 - Low participation in postsecondary education (Garza, 2005)
 - High rates of unemployment (Curtis, Rabren & Reilly, 2009)
 - Lower rates of independent living (Wagner, et.al., 2005)

Assistive Technology and Students with High-Incidence Disabilities



- High-incidence disabilities include:
 - learning disabilities,
 - emotional-behavior disorders,
 - mild intellectual disabilities, and
 - attention deficit/hyperactivity disorder
 - Sometimes high functioning autism

(Murray & Pianta, 2007).
- Many students with high-incidence disabilities face challenges associated with literacy (i.e., reading and writing) as well as mathematics (Murray, 2002).

Assistive Technology and Students with High-Incidence Disabilities (2)



Disadvantages of AT for Students with high-incidence disabilities

- stigmatization
- cost
- lack of connection to student's use of everyday technology
 - (Parette & Scherer, 2004).

Problems associated with AT use for students with high-incidence disabilities include

- availability of resources
- lack of knowledge
- abandonment
 - (Brown, 2005; Parette & Scherer, 2004).

Assistive Technology and Students with High-Incidence Disabilities (3)



- Students with high incidence disabilities represent about 70% of all students' with disabilities (Aud et al., 2011).
- Students with high incidence disabilities have low rates of AT use (Kaye, Yeager, & Reed, 2008; Woodward & Reith, 1997).
- Low rates of AT use and high rates of abandonment are persistent issues (Kaye et al., 2008; La Plante, Hendershot, & Moss, 1992; Ofiesh, Rice, Long, Merchant, & Gajar, 2002; Phillips & Zhao, 1993; Woodward & Reith, 1997).

National Longitudinal Transition Study (NLTS2)



National Longitudinal Transition Study (NLTS2) - 2012:

Compared post-secondary outcomes of students with high incidence disabilities who reported receiving Assistive Technology (AT) in high school to those who reported not receiving AT.

Study included 305,000+ students.

The results focused on understanding issues of AT for secondary (i.e., high school) students with Disabilities).

- suggest low rates of self-reported and educator-reported AT access and/or use for secondary students with disabilities
- higher rates of AT for secondary students with more low-incidence disabilities than students with more high-incidence disabilities.

National Longitudinal Transition Study (NLTS2)



National Longitudinal Transition Study (NLTS2) - 2012:

- Students with high-incidence disabilities who reported receiving assistive technology in school had more positive post-school outcomes in terms of a paid job, wages, and participation in postsecondary education.
- Although positive implications for receipt of assistive technology in school were suggested, receipt was not a predictor for positive post-school outcomes.

- Bouck, E., Maeda, Y., & Flanagan, S., (2012). Assistive Technology and Students With High-incidence Disabilities: Understanding the Relationship Through the NLTS2, *Remedial and Special Education*, 33(5) 298–308.

Research: AT and Transition



According to the National Longitudinal Transition Study(NLTS2) - 2012:

- 99.8% of the students who received AT graduated
 - Only 79.6% of those who did not receive AT graduated.
- 80.9% of students who received AT attended a post-secondary institution
 - Only 40.1% of students who did not receive AT attended a post-secondary institution.
- 80% of those who received AT had a paying job after high school
 - Only 50.8% of those who did not receive AT had a paying job.

National Longitudinal Transition Study (NLTS2) - 2012:

- Only 7.8% of students with high-incidence disabilities reported receiving AT in high school (NLTS2).
- Most frequently recommended AT: calculator – followed (distantly) by laptop and audible books (NLTS2).

Last Six Years: Has AT Use Increased?



Since the Longitudinal Study ended (2010) we have the sense that there has been an increase in use of:

- Technology for Reading
 - Screen Reading Software (Text-to-Speech)
 - Speech Recognition (Speech-to-Text)
 - Electronic Dictionaries
- Technology for Writing
 - Talking Word Processors
 - Talking spell-checkers
 - Word Prediction
 - Digital graphic organizers

Poudel Study (2014)



Poudel (2014) studied 17 students with high incidence disabilities (LD, ADHD, etc.) in HS and college to discover acceptance and use of AT.

Importance of earlier exploration and start of AT to support academic learning:

After being in college, the students found college course loads and professors' expectations to be more demanding compared to their high school.

Due to the increased course load, more time was required to learn the subject matter, and thus, they perceived a need to use possible technology.

Poudel, B. (2014) Acceptance and use of assistive technology: perspectives of high school and college students with high-incidence disabilities. (Doctoral Dissertation) Retrieved from University of Delaware Library Database.

Poudel Study (2014) (2)



Experienced users of AT reported:

- Immense improvements in their academic performance
 - getting better grades over time
 - comprehending the subjects at the depth that they would have never been able to if they were not using AT
 - AT positively influenced their sense of competence in other areas of learning
- Students who were more reluctant about using AT to support their learning did not express any improved competence
- AT use over time supports Independence:
 - The use of AT over the years also seemed to improve some of their academic skills
 - Students indicated that they did not have to be as dependent on AT as they used

to.

Impact of AT on Unaided Reading



Univ. Hawaii controlled study (Park, Takahashi, Roberts & Delise, 2017)

134 struggling 9th grade readers

10 weeks of screen reading (TTS with highlighted reading) yielded significant, positive impacts upon:

- Reading vocabulary (unaided)
- Reading comprehension (unaided)

Impact of AT on Unaided Reading (2)



Stodden, et.al., (2012) 2 pilot studies:

High school students with High-incidence Disabilities

Reading at/below 6th grade GLE

1 semester of screen reading (40 mins per week) yielded significant, positive impacts upon:

- Reading vocabulary (unaided)
- Reading comprehension (unaided)
- Reading rates (unaided)

Average total reading scores increased by 1.99 GLE

...compared to baseline scores

Background

Assistive technology (AT) is proving to be a staple tool that students with disabilities are using to achieve success in post-secondary settings.

Students who qualify have access to textbooks in electronic format. Students use computer and tablet-based software to help them read their textbooks and gain comprehension.

It has been assumed that students who have learned to use these AT tools while still in high school may have a distinct advantage over students who come to college without having experience with these tools.

However there is little evidence to confirm this assumption.

Research Questions

In order to examine this assumption and to gain insight into the use of AT by college students, we propose to invite students who have made use of the AMAC services since 2014 to take part in a survey to determine the following:

What percentage of students with disabilities who are referred to AMAC are coming prepared to use AT?

How successful are these students in college?

How does the success of these students who come prepared to use AT compare to the success level of students who are not prepared to use AT?

Have the AT services provided by AMAC been effective and helpful to these students?

AMAC Study (3)



Participants:

The participants located primarily in the State of Georgia, but may include students who reside in other states.

Participants came from list of students who were

- referred to AMAC by their local college Office of Disability Services
- and who received classroom materials in alternative media.

The number of students invited was approximately 1570.

The pool of participants included both male and female, and ranged in ages from 19 to 25.

Participants represented a broad range of ethnic backgrounds including: African-American, Asian, Caucasian, and Hispanic.

The students in this pool will included individuals with learning disabilities (dyslexia, dysgraphia, etc), autism, adhd, visual impairments, and mobility and orthopedic impairments.

AMAC Study (4)



The survey:

was conducted online.

employed a web-based survey tool (Qualtrics).

consisted of 27 questions.

Was divided into three parts:

1. high school experiences,
2. post-secondary experiences, and
3. personal reflections on their use of AT

questions were in one of 3 forms:

1. Likert Scale with 5 choices
2. check-off lists
3. short-answer

Participants by Disability



Learning Disability 37%

Mobility 16%

ADHD 10%

Vision 10%

Autism 4%

Deaf and Hard of Hearing 4%

Psychological 4%

Other/no answer 17%

What percentage of students referred to AMAC are coming prepared to use AT?

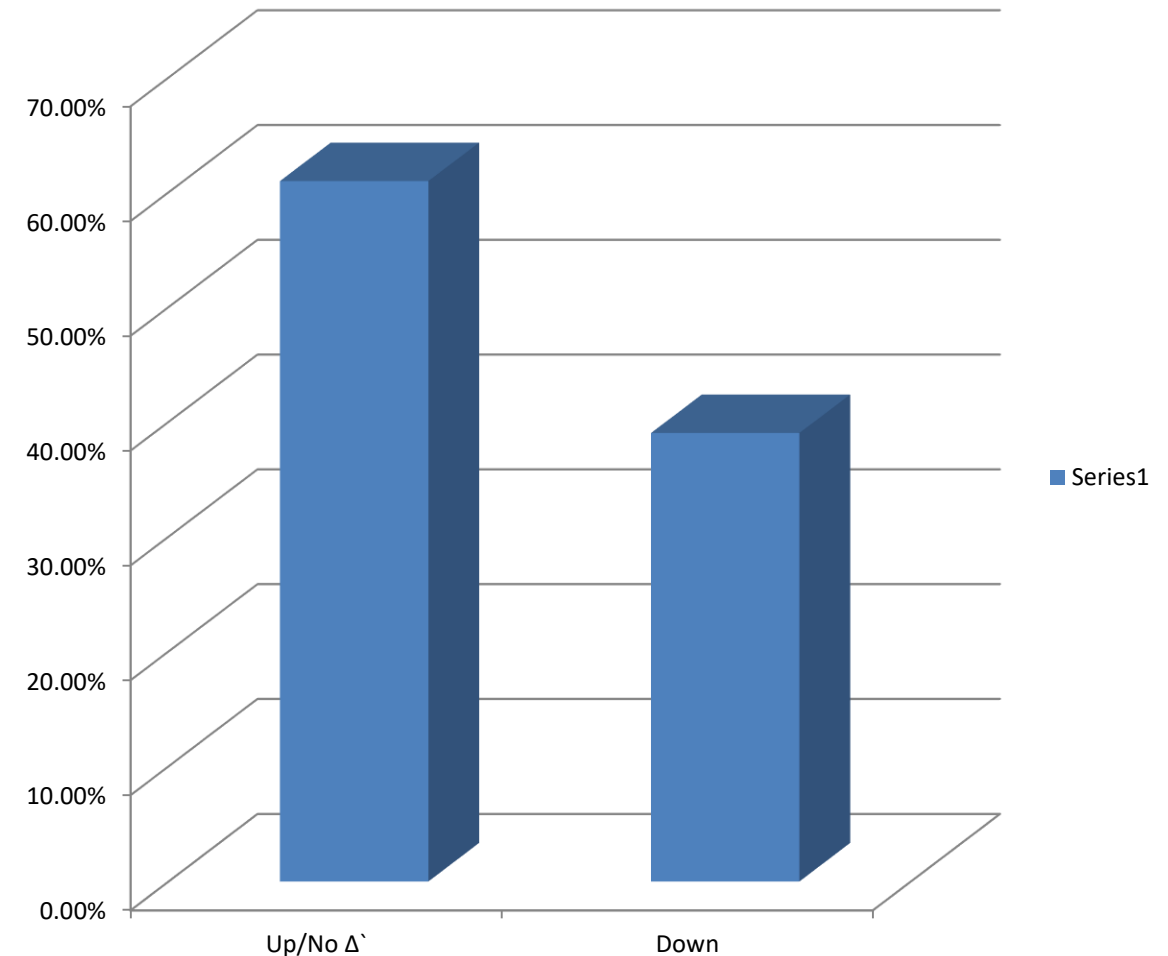


- 57% coming expressed a level of being comfortable with their AT
- 43% coming did not express comfort with their AT

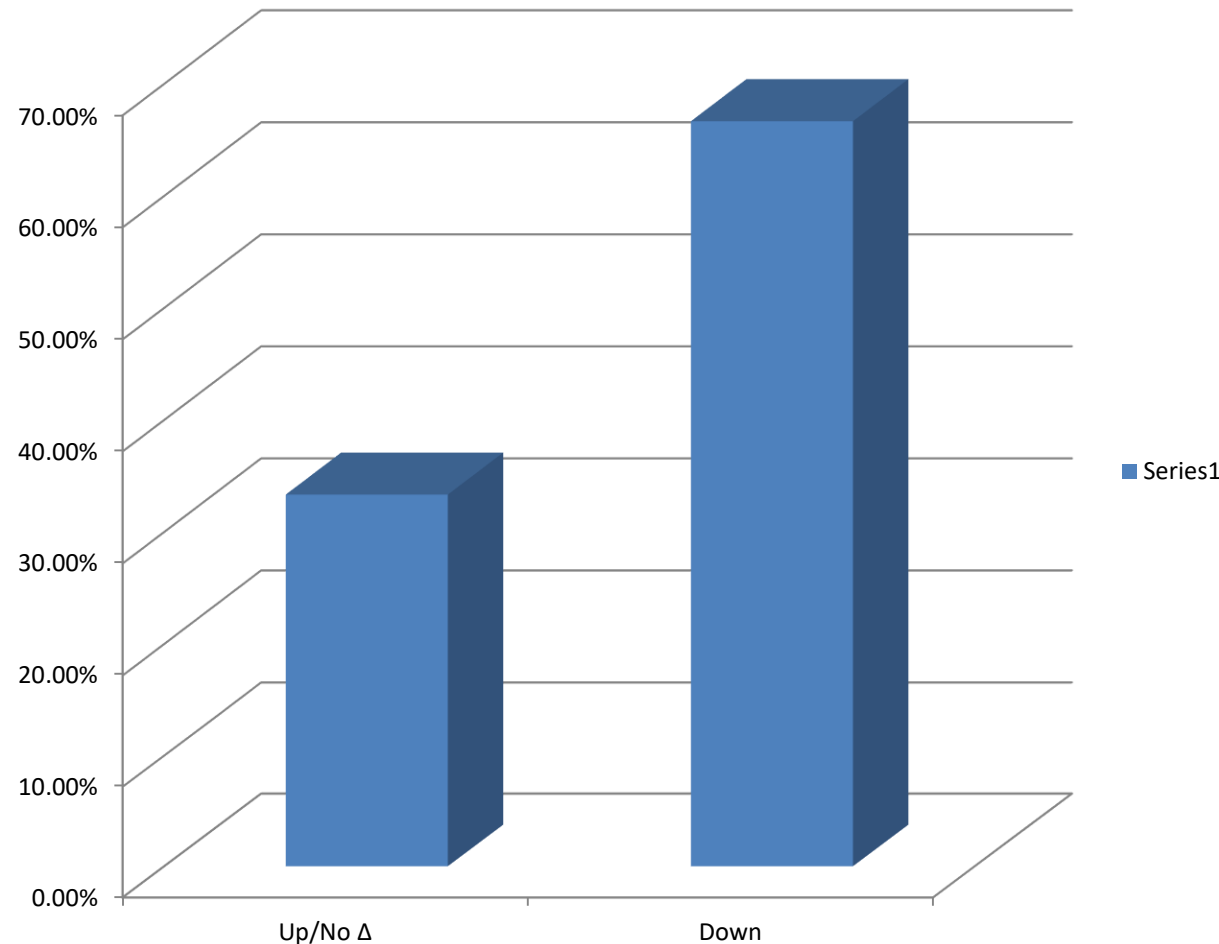
Research: Mastery of AT in High School

Change in grade point average from High School to Post-Secondary among students who mastered AT in high school:

GPA went up/ no change 61%,
GPA went down 39%



Research: Mastery of AT in High School ⁽²⁾



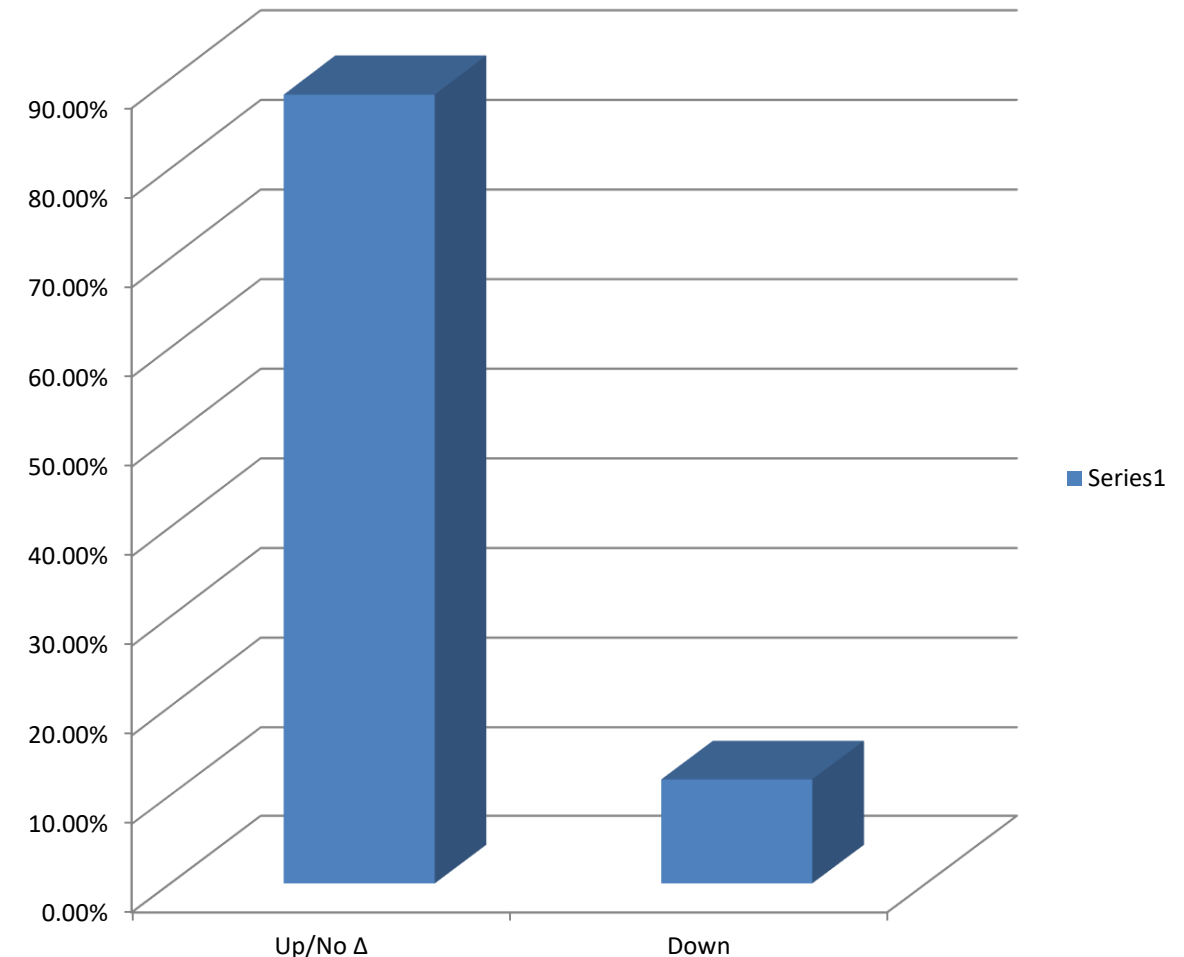
Change in grade point average from High School to Post-Secondary among students who had not mastered AT in high school:

GPA went up/ no change 33%,
GPA went down 67%

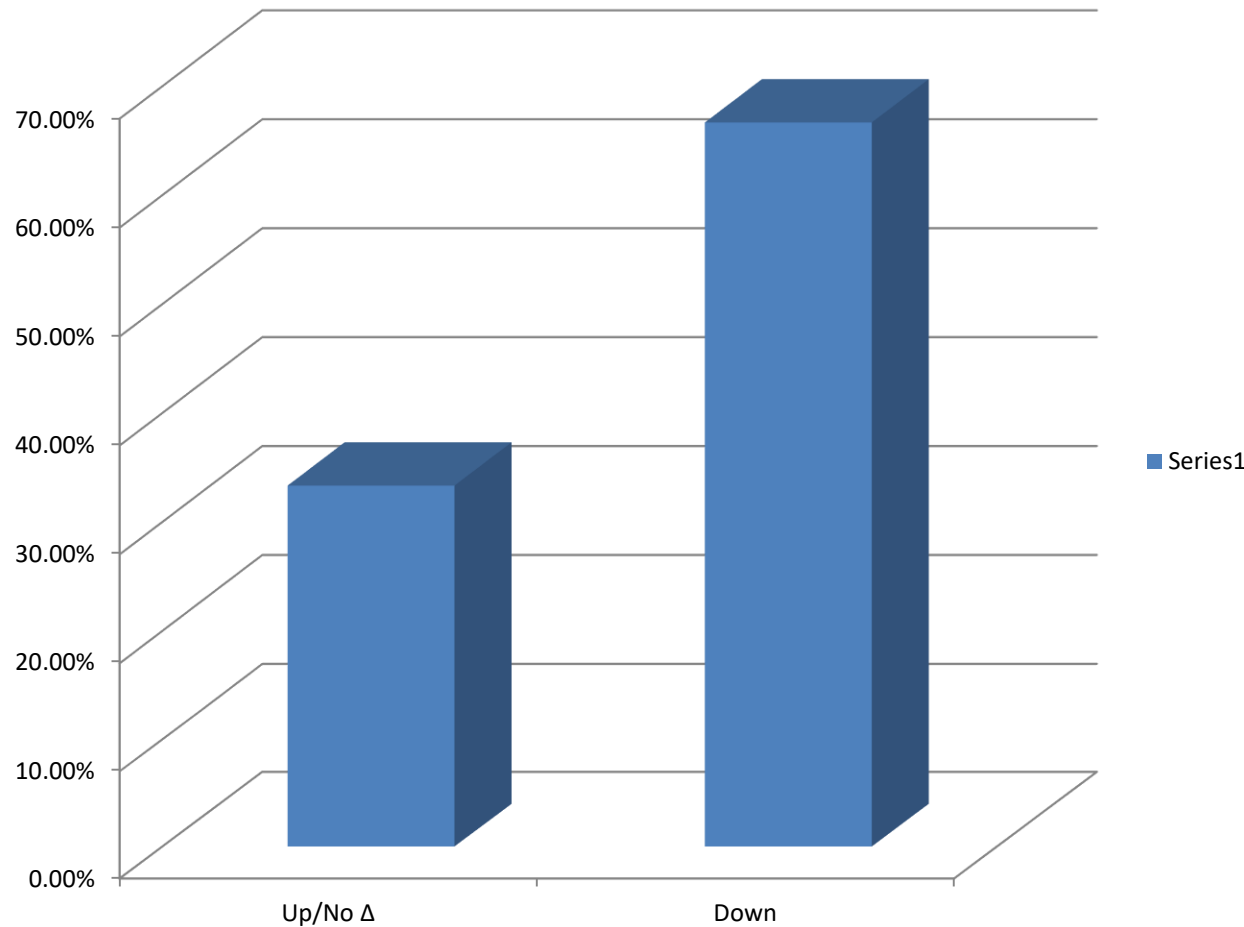
Research: Mastery of AT in High School (SWHID)

Change in grade point average from High School to Post-Secondary among SWHID who mastered AT in high school:

GPA went up/ no change 88%,
GPA went down 12%



Research: Mastery of AT in High School (SWHID)



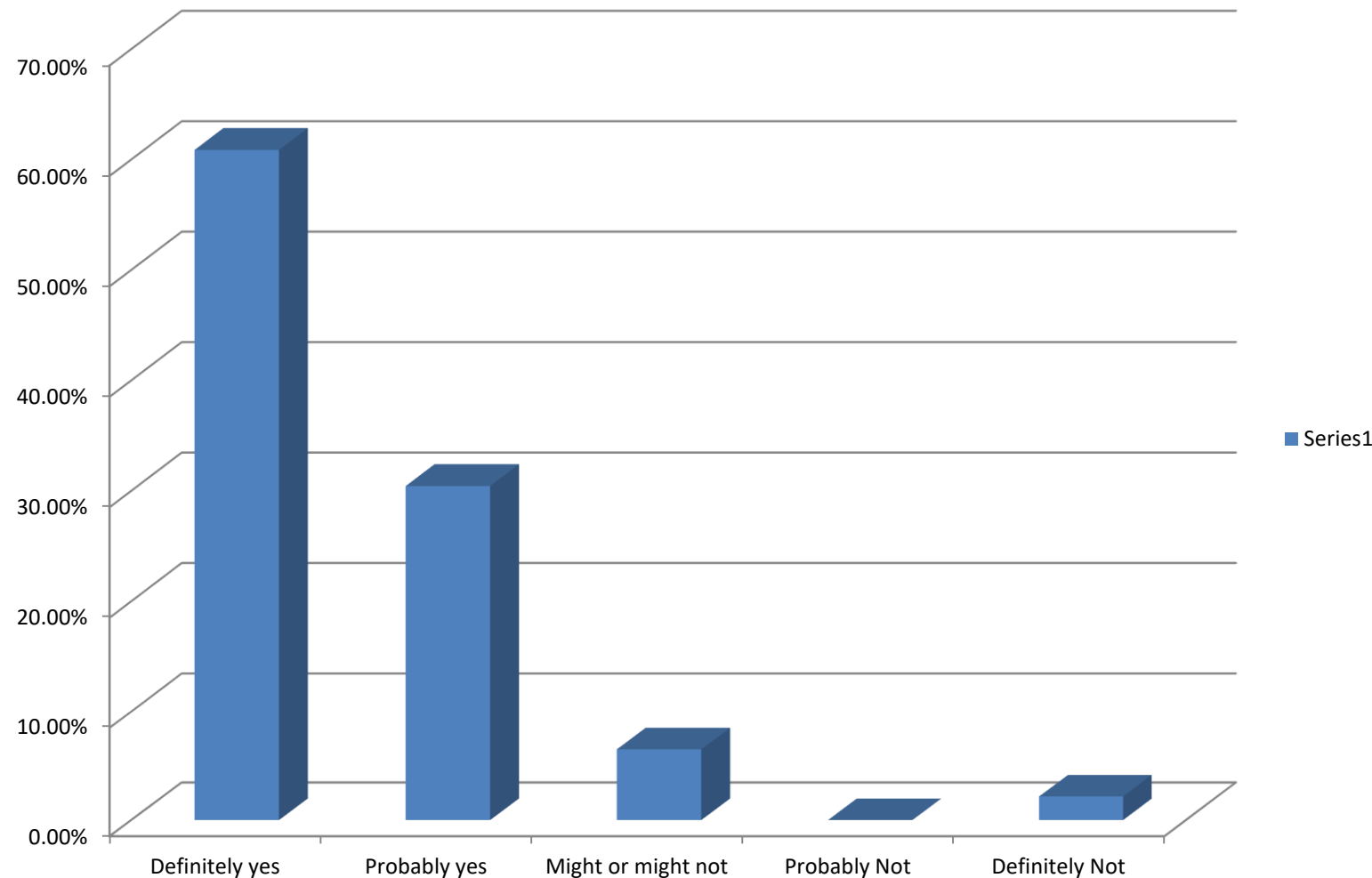
Change in grade point average from High School to Post-Secondary among SWHID who had not mastered AT in high school:

GPA went up/ no change 33%,
GPA went down 67%

Did Students Feel AT Made a Difference? (All participants)

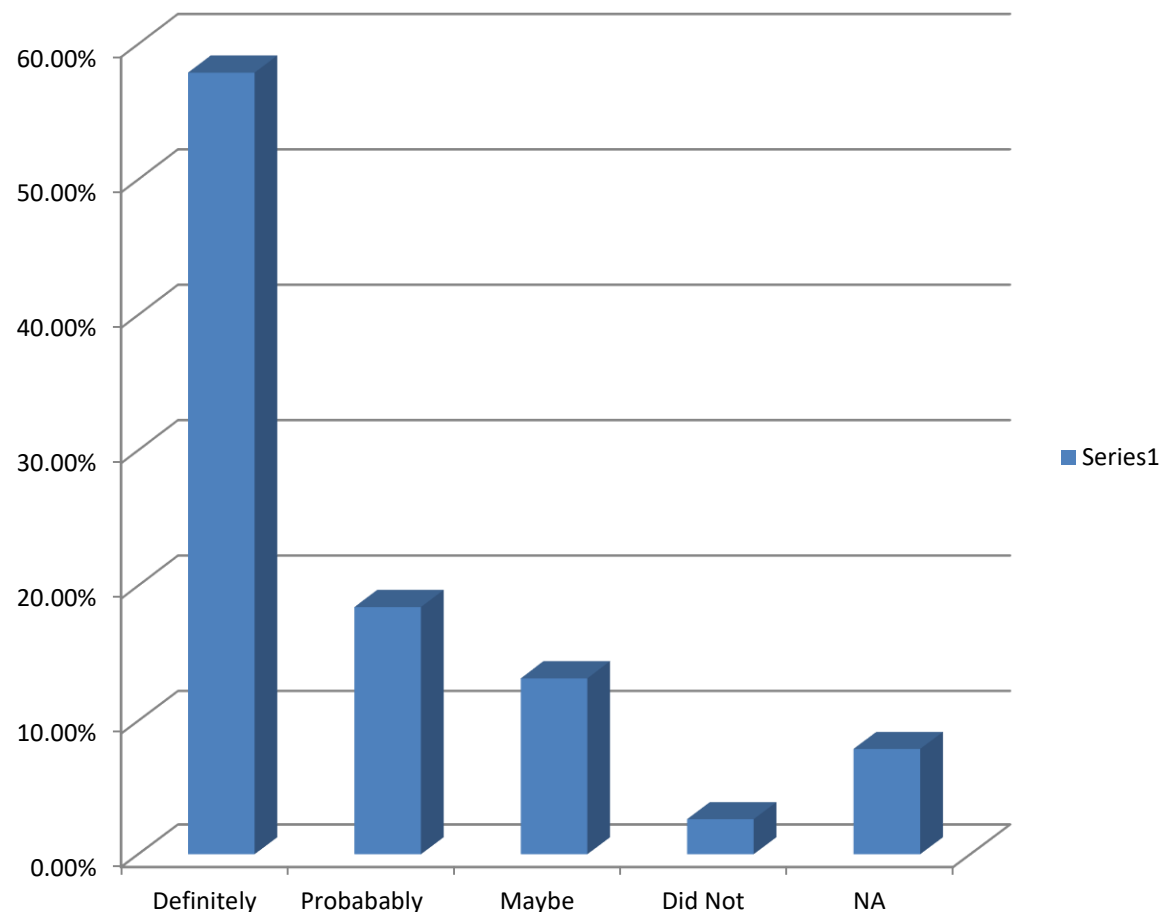


Among all participants:
Definitely 57%,
Probably 15%,
Maybe 9%,
Not 4%,
No Answer 15%



Did Students Feel AT Made a Difference?

(students with high incidence disabilities)



Among students with high incidence disabilities :

Definitely 58%,
Probably 18%,
Maybe 13%,
Not 3%,
No Answer 8%

AMAC Study: Participant Comments



My grades and gpa has [sic] gone up dramatically with the [AT] I have been given.”

“I am visually impaired - need all the help. I can not write - was never taught how to use tech in HS.”

“It helped make learning in college easier to understand.”

AMAC Study: Participant Comments (2)



“Typing is excruciatingly painful for me; I don't think I would've been able to write the required essays in my intro humanities courses without the use of speech recognition technology. Now i use assistive technology and my grades have improved.”

AMAC Study: Participant Comments (3)



“I feel [AT] should be more readily available to students from the time they are diagnosed through their entire education in order to better enable them for a successful education and learning environment.”

How would you describe your first year of college/tech school?



| | |
|---------------------|--------|
| Easy | 12.22% |
| Straightforward | 23.33% |
| I had to work at it | 30.00% |
| It was hard | 18.89% |
| It was very hard | 15.56% |

How difficult was each of the following tasks for you in college/tech school?



| | Reading | Writing | Computation | Note Taking | Test Taking |
|---------------------|---------|---------|-------------|-------------|-------------|
| Real Easy | 14.61% | 13.48% | 14.61% | 10.11% | 7.87% |
| Sort of Easy | 20.22% | 16.85% | 21.35% | 20.22% | 14.61% |
| Had to Work | 15.73% | 19.10% | 24.72% | 21.35% | 21.35% |
| Hard | 30.34% | 32.54% | 21.35% | 28.09% | 32.58% |
| Real Hard | 19.10% | 17.98% | 17.98% | 20.22% | 23.60% |

How difficult was each of the following subjects for you in college/tech school?



| | English/ Lang. Arts | Math | Science | Social Studies |
|--------------|------------------------|--------|---------|-------------------|
| Easy | 14.12% | 20.24% | 19.51% | 16.87% |
| Sort of Easy | 29.41% | 15.48% | 20.73% | 33.73% |
| Had to Work | 30.59% | 17.86% | 37.80% | 26.51% |
| Hard | 15.29% | 15.48% | 4.88% | 7.23% |
| Real Hard | 10.59% | 30.95% | 17.078% | 15.66% |

How did you learn how to use the AT tools that helped you?



| | |
|--|--------|
| Self-taught | 66.67% |
| Support from the Office of Disability Services | 53.09% |
| Support directly from AMAC | 22.22% |
| Viewed tutorials on product website | 16.05% |
| Friend or peer showed me how to use it | 16.05% |
| Attended a training | 3.70% |
| Other | 6.17% |

What AT tools were available to you in high school?



| | |
|--|--------|
| 1. Calculator | 68.09% |
| 2. Spell checker | 34.04% |
| 3. Screen reader (text-to-speech) | 17.02% |
| 4. Audio recorder | 17.02% |
| 5. Audible text books | 17.02% |
| 6. Word prediction | 11.70% |
| 7. Audible text books | 17.02% |
| 8. Magnification/ enlargement tools | 11.70% |
| 9. Speech recognition (speech-to-text) | 10.64% |
| 10. Graphic organizer | 10.64% |
| 11. Electronic dictionary | 7.45% |
| 12. Talking word processor | 6.38% |
| 13. Other | 3.19% |
| 14. None of these | 23.40% |

What technology did you use regularly in college/tech school?



| | |
|-------------------------------------|---------------|
| Calculator | 64.10% |
| Audible textbooks | 44.87% |
| Audio recorder | 42.31% |
| Spell checker | 33.33% |
| Screen reader (text-to-speech) | 25.64% |
| Electronic dictionary | 14.10% |
| Magnification/enlargement tool | 10.26% |
| Speech recognition (speech-to-text) | 10.26% |
| Word Prediction | 7.69% |
| Talking word processor | 7.69% |
| Graphic organizer | 3.85% |
| Other | 15.38% |

Conclusions?

- *Confirmation of previous research...*
- *College is hard for students with disabilities...*
- *Mastering AT before college is an advantage...*
- *Importance of the role of Office of Disability Services and AMAC...*

QUESTIONS



Contact Info



Dr. Ben Satterfield

- ben@c4atx.com
- ben@gatfl.org

Disclaimer



Disclaimer: Produced by Tools for Life (TFL), which is a result of the Assistive Technology Act of 1998, as amended in 2004. TFL is a program of the Georgia Institute of Technology, College of Design, AMAC Accessibility Solutions and Research Center and was made possible by Grant Number H224C030009 from the Administration for Community Living. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of HHS.