10-2007

Assistive Technology Enhancement of Written Expression for Individuals with Neurodevelopmental Disorders [Poster]

Laura Greiss Hess
MIND Institute, University of California, Davis, laura.hess@dominican.edu

Kerrie Lemons Chitwood
MIND Institute, University of California, Davis

Susan Harris
MIND Institute, University of California, Davis

RERC-ACT
ADVANCING COGNITIVE TECHNOLOGIES
University of Colorado School of Medicine

R4. AT Enhancement of Written Expression for Individuals with Neurodevelopmental Disorders

Principal Investigator: Randi Hagerman, MD; Project Staff: Laura Greiss Hess, MS, OTR/L, Susan Harris, BS, CCRP, Kerrie Lemons Chitwood, MA, CCC-SLP

CO:Writer® 4000 and Write:OutLoud® is software for literacy development. Children and youth (8-21) with mild mental retardation are routinely excluded from accessing these readily available tools. This study will investigate the impact of these tools, using valid measures and analysis technique

Purpose: AT Intervention Efficacy Study

The purpose of this project is to carry out an intensive training program in subjects with a broad range of neurodevelopmental disabilities to assess the efficacy of assistive technology (AT) intervention.

Assistive Technology and Neurodevelopmental Disorders

There is a lack of research efficacy concerning the use of assistive technology in individuals with cognitive deficits. Approximately 3% of the U.S. population has mental retardation with varied etiologies.

Computer Software (Don Johnston, inc.)

CO:Writer® 4000

- Word prediction software.
- Reduces total number of keystrokes required
- Facilitates correct spelling
- Features auditory feedback
- Grammar and vocabulary support

Write:OutLoud®

- Talking word processor
- Also reads imported text
- Provides visual and auditory feedback

Procedures

Baseline Testing

- IQ Testing (WASI or WISC -IV)
- Visual Motor Integration Test (VMI)
- Reading /Written Expression Battery: Mini-Battery of Achievement (MBA), Process Assessment of the Learner (PAL), Test of Written Language (TOWL-3)
- School Function Assessment (measures school participation and any AT applications implemented)
- Parent and Teacher Questionnaires
- Families and schools will receive summary of test findings and recommendations including the use of AT

- Subjects are randomized into intensive intervention group or standard of care group. Subjects who are initially randomized to the control group are rolled over into the intervention group the following year.
- Re-evaluation post-control/pre-intervention, and post-intervention

Subjects

32 subjects enrolled to date

- 2 subjects disqualified to continue: 1 due to reading level lower than 1st grade, 1 due to cognitive level too high
- 17 randomized to intervention group, 13 to control group
- 10 subjects have completed 1 year of intervention
- 6 subjects have completed control year, rolled over to intervention group

- Subjects include individuals with fragile X syndrome, sex chromosomal abnormalities, Down syndrome, fetal alcohol syndrome and autism spectrum disorders.

- Subject Demographics (N=32):
  - Mean Age: 12.9 years
  - Mean Verbal IQ: 78
  - Mean Performance IQ: 74
  - Mean Full Scale IQ: 76
  - Mean Reading Level: 5th grade 1st month
  - Mean Writing Level: 3rd grade 6th month

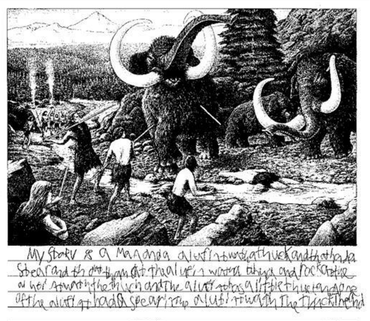
TOWL-3 Spontaneous Writing Task Example

Subjects are asked to write a story about a picture for 15 minutes

Boy with FSIQ 68, Learning Disability, ADHD:

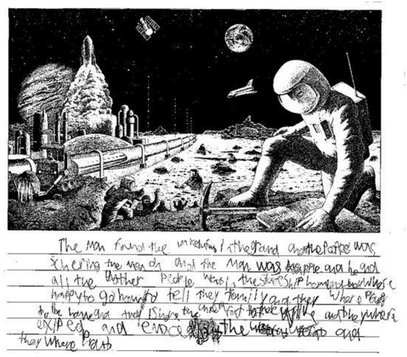
Pre-intervention:

13 years 4 months, 7th grade, 58 words, SS= 64



Post-intervention:

14 years 6 months, 8th grade, 72 words, SS= 70



Acknowledgments

- This study is funded by the Coleman Institute for Cognitive Disabilities, as well as the National Institute on Disability and Rehabilitation Research under the US Department of Education, Grant #H133E040019
- We are very grateful to the individuals who are participants of our study, as well as their parents and teachers

Preliminary Results

Group of 10 subjects who have completed 1 year of intervention using the software:

	Pre-intervention Group Mean (n=10)	Post-intervention Group Mean (n=10)	Significance (Paired samples t-test)
VMI	72	68	.81
VMI: Visual Perception	85	81	.57
VMI: Motor Coordination	79	66	.39
MBA reading SS	70	61	.03*
MBA writing SS	51	53	.66
TOWL Story Quotient	76	83	.11
PAL Written: amount of time to complete (sec)	69	60	.04*

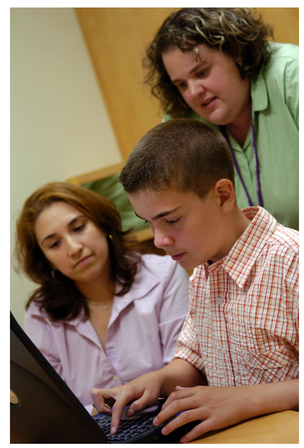
Parent Survey

Parents are asked questions about their feelings/attitudes toward use of software and their child's abilities both before and after the intervention year of the study

Survey Questions

1. I am comfortable using the computer
2. I feel it is important to augment writing when it is difficult for children
3. I feel that good writing is an important part of learning
4. **I understand how to use Co:Writer**
5. **I understand how to use Write:OutLoud**
6. I think using software will help me teach writing
7. I think being taught how to best use the software will help me with teaching writing
8. I would be likely to use the software on my own without additional intervention
9. My child writes better when he/she uses the computer
10. My child struggles with writing – legibility
11. **My child struggles with writing – effort/time**
12. At this time I feel that my child's writing is OK
13. At this time I feel that my child's writing could be improved

	Significance (two-tailed)
4. I understand how to use Co:Writer	p=.01
5. I understand how to use Write:OutLoud	p=.01
11. My child struggles with writing – effort/time	p=.03



Discussion

- Although we do not yet see a trend in improvement of writing quotient scores, some individuals have shown improvement in skills such as amount of generative language produced after a year of software use.
- Although the MBA reading level is significantly lower at time 2 thus far, we believe this is not a sign of loss of skills, but rather the demands of the standardized testing increasing with age

Funding is provided by the National Institute on Disability and Rehabilitation Research under the US Department of Education, Grant # H133E040019.

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