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Understanding the Users
of Future CLever Technologies

Patterns of technology usage,
priorities, hopes, and concerns
of families and teachers of children
with cognitive disabilities,
in the Boulder/Denver area

Goals of Interview Study

- Find out what (assistive) technology young adults with cognitive disabilities are **using today**

- Understanding factors that affect adoption or abandonment of assistive technology

- Get different viewpoints of the technology adoption process, by looking at school and home

Theoretical grounding

    Rogers' Diffusion of Innovation framework (1995)

    Orlikowski and Gash Technological Frames Theory (1994)

    Assumption: The adoption vs. abandonment decision-making unit includes end-user, caregiver, family, teacher, AT specialist, speech therapist ..

Recruiting Respondents

Snowball Recruiting Method

- Assistive Tech Team in Boulder Valley School District identified teachers of appropriate students, who then referred parents

- Met a parent of Littleton Public Schools in social network

- Parents referred other parents

Specified Criteria:

- student (child) has a developmental/cognitive disability
- student (child) is not too cognitively or physically involved to operate a hand-held device (e.g. a PDA or cell phone) to perform simple tasks (the hand-held device will have a special, simplified interface)
- student (child) is preferably older (over 10) and socially capable of being alone

Who Participated

20 Interviews

Distribution

Teachers	Moms	Families (Mom & Dad, +)	Other
5 (1 twice)	4	8	2

Interviews where I talked to parent & teacher of same child: 8

Demographics

Boulder Valley	Littleton/Jefferson County
All teachers/trainers (7)	6 families
6 families	

Description of Children/Young Adults with Disabilities

Type of Disability

Down's Syndrome	Autism	Other/Unidentified
5	4	12

Age

Under 15	15 – 18	19 – 21	Over 21
5	6	9	2

Gender

Male	Female
12	9

Description of Devices

	Examples
Communication	Aug Comm Device, Picture Symbols
Writing	Word prediction, spelling, e.g. AlphaSmart
Prompting/Scheduling	Picture Schedules, timers, watches
Reading	Screen reading software
Educational Software	Games, software & on-line
Alternative Input	Keyboard e.g. IntelliKeys, switch
Math (Calculator)	
Reading & Writing	Write Out Loud
Remote Communication	Cell phone
Entertainment	Talker used as a toy
Medical Monitoring	LifeLine System
Navigating Web/Email	Voyager Suite by AbleLink

Description of Devices

	# Devices	# Different Users
Communication	**21**	**8**
Writing	**10**	**5**
Prompting/Scheduling	**10**	**8**
Reading	**9**	**4**
Educational Software	**8**	**6**
Alternative Input	**6**	**4**
Math (Calculator)	**3**	**3**
Reading & Writing	**3**	**3**
Remote Communication	**3**	**3**
Entertainment	**1**	
Medical Monitoring	**1**	
Writing/Navigating Web	**1**	

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Description of Devices

	# Devices	In Use	Abandoned	Considered
Communication	**21**	**6**	**14**	**1**
Writing	**10**	**5**	**4**	**1**
Prompting/Scheduling	**10**	**5**	**5**	
Reading	**9**	**5**	**4**	
Educational Software	**8**	**7**	**1**	
Alternative Input	**6**	**4**	**2**	
Math (Calculator)	**3**	**3**	**0**	
Reading & Writing	**3**	**3**	**0**	
Remote Communication	**3**	**3**	**0**	
Entertainment	**1**	**1**	**0**	
Medical Monitoring	**1**	**1**	**0**	
Writing/Navigating Web	**1**	**1**	**0**	
	77	**42**	**32**	**2**

Case Study I: Elaine

Disability: Down's Syndrome

Age: Early 20's

Gender: Female

Vocation: in Labor Source office labeling envelopes and packages, as roller at a restaurant/brewery, and volunteers at a retirement community passing out cold water.

Technology Family Owns but Doesn't Use

Voyager Suite, by AbleLink

Parents purchased with Imagine! SLS Funding - $700.

Benefits: "The benefits will be, one step closer to independent living. Being able to communicate with friends, family, care providers, and so forth without a lot of hopefully, without a lot of problems, and with success."

Complexity: "I think that it will be very beneficial once .. I mean, you've got to set up the pictures, and download the files, and .wav files, and .. just to make it user specific, or specific to her needs. Her friends, her circle." ..later: ""This is very complex .. And I think the issue is, getting the time to set it up and work all the bugs out."

Case Study I: Elaine (cont'd)

Technology Family Owns but Doesn't Use (cont'd)

Communicator (small communication device)

Acquired "a while ago" with help from Imagine!

Benefits: Mom believes "there's potential,"

Intended to help her communicate with those who don't understand her.

Appropriate?

"this was prior to Elaine improving her

speaking skills, and communicating skills. .. now it's much easier to understand her"

"she's such a chatterbox, I don't know if she'd allow this to be something that she would use to communicate."

Not enough time/priority: Mom: "I think it'd be wonderful to get using this. I need a big vacation. "

Case Study I: Elaine (cont'd)

Technology Family Owns but Doesn't Use (cont'd)

Picture Phone

Large keypad with a photo on each button, stores 8 – 10 numbers

Abandoned because "Elaine got too in the habit of calling everyone."

Talking Wallet

A "little toy" we have, can speak name & address

Abandoned because: never set up

Case Study I: Elaine (cont'd)

Technology Elaine Uses

Memo Recorder

Mom "picked it up at RadioShack". Records single 15 second message.

Mom: "what I like about this, Melissa, is the simplicity of it. The ease of use, the, in the hurried world that we all live, it's just real, there. She pushes a button, she gets a message, she knows what the day will include."

Kitchen Timer

Each day, parents set kitchen timer to go off 15 minutes before Elaine bus arrives.

Cell Phone

Mom calls her, and Elaine uses redial.

Each morning Mom clears out call history, and doesn't store any phone numbers in the address book. Otherwise, Elaine would be "on the phone all day""

Case Study II: Adam

Disability: Autism

Age: Early 20's

Gender: Male

Vocation/Activities: Doesn't have a job but parents are "working on that". Involved in social groups, likes bowling, movies ..

Technology Adam Used in the Past

Touch Talker

Communication Device, used age 5 – 10

Difficulties: "t crashed all the time and things like that, it was just, again it was pretty big, really meant for someone to use with a wheelchair "

Dynavox

Age 10 – 16ish

Difficulties: bulky

Case Study II: Adam (cont'd)

Technology Adam Uses Today

Dynamite

Ages 16ish - now

Smaller than earlier devices, still bulky

ChatPC

Past few months

Uses mainly to talk on the phone from home

"this is the first time after all these years with this device that they've gotten down to the size where he feels at ease with."

"at first we weren't quite sure how it was going to go, what he was going to use the most and all of that, but it's looking like it's the ChatPC and he's even sort of programmed some things himself and things like that so .. he's really kind of into it. And in fact the other night with a little help from his Dad he ordered pizza from Domino's with it, so yeah!"

Still communicates at home primarily through gestures, signing (first letter of words), "charades, 20 questions"

Case Study II: Adam (cont'd)

(Other) Technology Adam Uses Today

Walkman

"he, like, lives with it, and this is the third one, and he's worn out the
other ones."

Digital Camera

"he has one .. I would like this to work more independently but he has
done some emailing of some pictures. I think one of the problems is
our system takes a long time to do one. "

Video Games

Likes sports games, wrestling games. "That's where his attention is a
lot of the time"

Telephone

"loves to talk on the phone"

Case Study III: Maureen

Disability: Down's Syndrome

Age: Early 20's

Gender: Female

Technology Used in the Past

Speech Recognition Software

Parents (especially father who researched and found it) really wanted speech recognition technology to work for her at school. School bought it, but teacher didn't use it. It "never got off the ground"

Dad: "my read on it is that they really just bought it to placate us." Later he said, ""It wasn't their idea, so it wasn't a good idea."

Parents never installed software at home.

Case Study III: Maureen (cont'd)

Technology Used in the Past

Alphasmart

Chosen by high school, used for a few years, brought between school and home. Used for a daily journal she did in high school.

After high school the school kept it.

Parents seemed unaware that they could do anything about that, or that they might consider buying a replacement.

Mom: You liked the Alphasmart, didn't you?

Maureen: Yeah. And I want it back.

Talking book machine

Used at home, takes "old fashioned tapes" – she can adjust the speed and slow it down.

Maureen prefers DVDs, so she doesn't use it.

Case Study III: Maureen (cont'd)

Technology Used in the Past

Picture Scheduler/Prompter

Created by her job coach (in transition program).

Used while learning her job as courtesy clerk at grocery store.

She doesn't need it anymore

Technology Used Today

Cell Phone

Maureen rides public transportation in combination with Call and Ride.

Dad: "when she first started going to work, I mean, she'd call from the bus stop, she'd call from the bus itself, she'd call when she got to Lafayette, she'd call when she got to work. I mean, it's part of the process. Without the cell phone .. she wouldn't have a job. "

Mom: "I know I can contact her, find her you know, and she can call us, or she can call .. she knows a lot of numbers, she knows a lot of people she can call if she needs help."

Case Study III: Maureen (cont'd)

Response to Mobility For All Concepts

Mom: It would be so nice!

Dad: "if you design something that's easy to use, I'm sure that Maureen could benefit from it."

Mom explains to Maureen: "Honey, a system that would keep track of you when you're on the bus, and .. know where you are at all times for us. So we would know you were safe, and if you needed help."

Maureen: "Mom, honey, I am safe."

Patterns in Technology Usage

- Many non-vocal individuals in our population (6 children non-vocal; 5 more speak with effort, difficult to understand): communication devices most common assistive technology

- Prompting devices are low-tech, paper based

- Video Games are Everywhere!

- Music, musical software also extremely popular

- At home, majority of devices are off-the-shelf, inexpensive devices or "paper technology", simple enough that non-technical parents can troubleshoot and fix them.

- Some parents look to school to introduce new technology and "make adoption happen"; other parents much more pro-active (latter set had more complex devices at home)

Patterns in Difficulties and Concerns

- Computer Platform Problems between school and home

- Complexity: needs very low bar to get started, to troubleshoot

- Parents worry about losing the device (although there are counter-examples)

- Concern by parents that technology will reduce independence; Reduce social interaction

- Safety a very common concern when considering using public transportation

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Patterns in Priorities, Hopes

- Independence a very high priority

- Parents/Teachers optimistic about technology: computers ARE the future, are the key to employment, success for their children/students

Trend at Schools: "Limited Resource Pool"

"there's usually kind of a friendly inertia working against you in the sense that yeah, they want to be nice to you but they really don't want to do anything special because they have a limited dollar pool." -- parent

Examples:

• Teacher switched technologies because one became available in school district, even though student had been using another which was more appropriate;

• Parents completed SWAAC eval which recommended dynavox; months later don't have device because none are available;

• Teacher pulled Dynavox because it's a $7,000 device that's being held up by someone who isn't motivated to use it;

• Another teacher pulled touchscreen because it was expensive device.

Suggests Possible Pattern

Teachers → expensive may mean abandonment more likely, because it needs to make more of an impact

Parents → expensive may mean abandonment less likely, because the investment has been made (there are examples and counter examples of this)

Technology available in classroom, in district → good fit less important

Technology purchased by insurance → "work long and hard" with trials to ensure good fit

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Future Work: Smart Cell Phone Project

Research Question: How to support remote communication between the caregiver parent and the son or daughter, to fit the unique needs of these individuals:

- Some are non-vocal (SMS more appropriate than voice?)

- Some do not read, others read perfectly fine

- Some have difficulty remembering number combinations, others do it well

- Some will need to be limited in the numbers they should be allowed to dial, others will not have social tendencies at all

- Concept of technology to "check in", maintain social connection in a way that's healthy for for both sides.

Technology direction will definitely be affected by the families that I end up working with!