On Time, On Task and Organized: Using Technology to Build Executive Function Skills

AzTAP Assistive Technology Summer Institute
July 22, 2014 - Phoenix, AZ

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Who is Shelley, and what is TechPotential?

Technology for learning & executive function challenges
- Certified Assistive Technology Professional (ATP)
- 27 years AT experience

Former director of assistive technology at Stanford
- Helped create Schwab Learning Center at Stanford (for LD & ADHD)

Assistive technology services throughout Bay Area
- AT Assessment, Training, Support, Implementation
- Professional development for schools
- Classes & workshops
- Online consulting and tech assistance

TechPotential short for “Technology to Unlock Potential”
- My philosophy on “why use technology”
Goals for Today

What is “executive functioning”? 

Introduce technology tools to support EF strategies
  ‣ Demos

Key Learning Outcomes
  ‣ Identify key strategies to address challenges in each of nine executive skill areas
  ‣ List examples of technology tools that can support or enhance these key strategies
  ‣ Explain why technology to support executive functioning is most effective when coupled with skill-building strategies
Problems with Productivity

Jennie stares at her binder, not knowing where to start.

Hank has great ideas, but his written work is disorganized.

Sarah has difficulty listening and taking notes at the same time.

Alex didn't realize that 30 minutes had passed and now he needs to leave for school but isn't dressed.

Priya is careful to write down important info but can't find it later.

Danny gets frustrated when things don't go as planned or expected.

Cindi's best homework intentions are derailed by off-task behavior.

Ray can't understand why he's always busy but never has enough time.
Executive Functioning Challenges

Executive Functions: mental processes required to manage oneself and one's resources to achieve a goal

- Take place in frontal lobe of brain
- Needed to function independently

“Producing challenges” vs. “learning challenges”

Not related to intelligence, but to how you use intellect

Multiple functions are in play

- Solutions depend on specific executive function challenge, task, and environment (context)
Popular Executive Function analogies

CEO of a company
  ‣ Actually executive management team

Orchestra conductor
  ‣ Need multiple conductors

Coaching staff of football team
  ‣ Multiple coaches
  ‣ Analyze situation, strategize, execute plan, evaluate, revise

Manually fly plane vs. autopilot
  ‣ Everyone needs to “fly” manually for some tasks
  ‣ Building “flying skills” now pays off later (college, adult life)
## What are the “Functions”? (1 of 2)

<table>
<thead>
<tr>
<th>Activation</th>
<th>• Get started, maintain effort, finish</th>
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| **Attention**       | • Direct/manage attention and shift focus  
                    | • Capacity for attention (for students who also have ADHD) |
| **Working Memory & Retrieval** | • Mentally hold and manipulate info while completing task (interim steps, rules)  
                    | • Analyze (break into parts)  
                    | • Synthesize (create whole from parts)  
                    | • Retrieve info from memory |
| **Organization**    | • Organize materials and info to be “findable”  
                    | • Organize workspace |
What are the “Functions”? (2 of 2)

| Planning               | • Prioritize & sequence actions to achieve goal  
|                       | • Anticipate and predict outcomes                         |
| Sense of Time          | • Estimate time                                           |
|                       | • Awareness of time passage                               |
| Cognitive Flexibility  | • Change view or adapt approach as needed to fit circumstances (schedule, problem-solving) |
| Self-Regulation        | • Inhibition, impulse control                             |
|                       | • Emotional control                                      |
| Self-Monitoring        | • Evaluate self and actions                              |
|                       | • Error analysis                                          |
|                       | • Adjust behaviors as needed                              |
Good News and Bad News

Bad news:
› Technology alone cannot fix time, attention, organization, and other executive function problems

Good news:
› Coupled with proven and thoughtfully-selected strategies, technology can greatly improve performance and productivity

Goal:
› Use technology to support or enhance strategies
Basic Executive Functioning Strategies

- Externalize! – out of head, into “real world”
- Make visual or tangible
- Break into smaller manageable parts
- Impose structure, framework, routine
- Be explicit – step-by-step vs. “clean your room”
- Provide strategies & models, all taught by adults
- Remove supports gradually as strategies and routines are internalized
- Recognize and understand how you think, process, respond (metacognitive)
Activation & Attention

Key Strategies
- Establish routine
- Break tasks into explicit parts, steps
- Prompts to keep on task
- Manage distractions and off-task behavior
- Incorporate movement, breaks

Technology to Support Strategies
- Visual checklists (“Where was I?” - helps get back on track)
- Countdown timers with visual, auditory, or tactile feedback
- “Assignment calculator”
- Distraction reducers (various)
Visual & Auditory Prompts

Visual countdown timer
- Time Timer (physical timer or app)
- Time Tracker (lots of time => wrap it up => stop!)

Watch with vibrating alarm
- “Am I on task?”
- Vibralite, WatchMinder
Procrastination and Timers

Parkinson's 3rd Law: Work expands to fill available time
- Extra time does not mean more work completed
- Long tasks can be intimidating => hard to get started

Use countdown timer
- Break task into small discrete parts (10 minutes to complete)
- “Race the clock”
- Short break (movement, not screen time)
- Move to next task

Procrastination Hack
- App: (10+2)x5 Procrastination Hack
“Assignment Calculator”

Helps students...

- Break project into smaller tasks
- Set due dates for each task
- Link to helpful resources

Free online tool

- Deployed in universities, schools
- High school version: “Research Project Calculator”

Idea: Adapt as project template

- Word, Pages, Inspiration, OneNote
Minimize visual clutter on computer

Hide or minimize all but the front application
- Mac: Cmd-Opt-H
- Windows: Win-Home

Free utility dims, blurs, or hides all but current application or doc window
- Focus only on current task
- Mac: Isolator
- Windows: Ghoster
SelfControl (Mac) and Cold Turkey (PC)

Blocks access to selected websites for preset time

- Less attention on resisting temptation to “surf” => more attention on task

Once started, cannot be stopped by closing app, rebooting, deleting

- Use wisely!

WEAPONS OF MASS DISTRACTION
Other distraction reducers

Visual
- Readability, Safari Reader (reformats webpage, remove distractions)
- AdBlock extension (blocks ads - available for most browsers)
- Task lighting

Auditory
- Ear plugs, noise-canceling headphones
- White Noise app or instrumental music + headphones
- Assistive listening system (increase foreground/background ratio)

Internal
- Take email offline, turn off phone
- Scratch pad/recorder to jot down thoughts - “forget with confidence”
- Dedicated workspace - uncluttered, other tasks “out of sight”
Working Memory & Retrieval

Key Strategies
- Externalize!!
- Make it visual (colors, images)
- Break tasks into parts
- Overlay structure
- Reduce amount to process, increase time to process
- “External brain” for quick access to frequently-used info

Technology to Support Strategies
- Visual checklists
- Digital camera
- Graphic organizer, outliner, or mind map software
- Notetaking device or software that records audio
- Digital notebook for reference (formulas, examples, rules, etc.)
- Word banks (vocabulary, topic specific, transition words, etc.)
Picture is Worth 1000 Words

Visual images reinforce understanding, retention

Taking photo taxes working memory less than copying
- Whiteboard (e.g., homework)
- Experiment setups
- Steps in process
- Reference page in textbook
- Parking space

Digital camera, cell phone, apps
Drop into digital notebook, email, reminder or to-do app
Graphic Organizer Software as “Idea Processor”

Show ideas and relationships...
- Textually (outline)
- Visually (concept map, mind map)

Visual/tangible working memory
- Brainstorm to free idea generation
- Group and sequence ideas
- Use text, images, recorded voice
- Permanent vs. transient
- Writing, planning, checklist, study guide, etc.

Add details to predefined framework
- Built-in or custom templates

Collapse/expand topics to aid focus
Taking Notes in Class

Working memory overload!
- Listen, watch, read, recall, evaluate, organize, write/type
- Time-constrained

Provide framework, reduce material to be copied
- Notetaking template
- Electronic whiteboard - snap screenshot of board
- Type on, annotate PDF of slides or teacher notes

Supplement with audio recording, images
- Digital voice recorder
- Livescribe smartpen
- Some digital notebooks, iPad apps record linked audio
- Capture lecture with electronic whiteboard software
- Digital camera
Livescribe Smartpen

Links notes & audio recording
- Records audio
- Captures notes, drawings written on special microdot paper
- Tap note to playback linked audio

Potential to reduce notes taken
- Listen more, write less
- “Digital auditory memory”
- Best coupled with notetaking strategy

Upload notes and audio to...
- ...computer (Echo)
- ...wirelessly to Evernote (Sky WiFi)
- ...iPad (Livescribe 3)
How Livescribe Works

Special paper has unique microdot pattern

IR camera in pen sees pattern, tracks location on page, page number, and written notes
Notetaking Strategy to Leverage Audio Recording

Goal: listen more, write less, target your playback
  ‣ Use with Livescribe or notetaking apps that record linked audio

Before: Think about what you want to listen to later:
  ‣ Assignment, action item, "This will be on the test"
  ‣ Main points, change in topic or activity
  ‣ Title of projected title (running list in margin as "index")
  ‣ Don't understand, zoned out for a few minutes

During: Actively listen for and mark these points
  ‣ Symbols: star, question mark, circled "A" (assignment), etc.
  ‣ Keywords, abbreviations (not full sentences)

After: Summarize verbally while fresh in mind
  ‣ Immediately after class, or later that day (10-30 seconds)
  ‣ Listen to own “summary” for quick review
Organizing Materials & Information

Key Strategies
- Make it visual, use colors to categorize
- Clearly-defined place for everything; everything in its place
- Organize so you can find it
- Dedicate time for organization

Technology to Support Strategies
- Accordion files vs. 3-ring binders
- Digital notebook and web clippings
- “Smart folders” on computer
- Calendar, planner, task management apps (see Planning & Time Sense section)
Organization: A Place for Everything

Without designated “place” for materials or info, they won't be organized and won't be findable

- 6-Second Rule: If it can't be placed in 6 seconds, it likely won't be

Need pre-defined places for:

- Action items
- Appointments
- Reference info (for future use)
- Papers
- Fleeting thoughts and ideas

Set aside dedicated time to organize

- Only three options: Requires action, File for reference, Throw it out
Tools to aid organizing papers

Thoughtfully-arranged binders, dividers, etc.

Accordion files and the 6-second rule
  ‣ Consider pockets vs. 3-ring binder for daily use

Pockets in backpack categorized by “next action”
  ‣ To Turn In
  ‣ Give to Parents, Give to Teacher
  ‣ Homework for Tonight
  ‣ Reference (e.g., schedule, daily checklists)

“Unfiled” folder + daily filing strategy
  ‣ Empty each day

Long term reference: file crate, colored folders
Tools to aid organizing files on computer

Cloud drive (Google Drive, iCloud, Dropbox, OneDrive)
- Access anywhere, reduce multiple versions

Virtual folder or “saved search”
- Autosaves files per user-set criteria
- Use common naming protocol, such as: Algebra-notes-9.19.13 [class]-[topic]-[date]
- Windows: search, then Save Search (e.g., “Algebra”)
- Mac: search, then File > New Smart Folder

“Unfiled” folder + daily filing strategy

Digital notebook + web clipper utility
- Evernote, OneNote, Circus Ponies NoteBook, others
Digital Notebook

Digital version of spiral notebook

- Easily organize, rearrange
- Highlight, annotate
- Tag with dates, keywords
- Attach related files, emails
- Record audio, sync with notes

Clip material from Web, docs

- Retains link to source

Robust search, indexing

- Quick retrieval - “external brain”
- Grammar rules, solved math problems, writing models, checklists, vocabulary, reference info, etc.
Clip to digital notebook (OneNote, others)

Select text or image – Web, email, documents
Send to page in notebook (procedure varies by software)
Clipped material retains link to source

› ...great at bibliography time!
Evernote - digital file cabinet

Capture any digital “stuff”
- Text – email, docs, Web
- Photos, images
- Web clippings, files
- Voice recordings
- Sketches, scribbles
- Reminders
- Files from partner apps (e.g., Notability, Livescribe, many others)

Retrieve “stuff” based on criteria
- Text search, image search, tags, date created, saved searches

Capture, send, and retrieve from whatever is handy
- Mac, PC, any browser (need Web Clipper), smartphone, e-mail
- Everything synchronized/organized to Evernote cloud
# Planning & Time Sense

## Key Strategies
- Make time visible or tangible
- Visualize tasks
- Group tasks by context
- Increase awareness of time passage, how time spent
- Provide prompts
- Dedicate time for planning

## Technology to Support Strategies
- Timers!
- Digital calendars
- Task management apps
- Task sequencing apps
- Alerts (alarms, notifications)
Making Time “Real”

Task timer
- Kitchen timer, TimeTimer, visual timer apps
- Also see Activation & Attention section

TimeTracker add-on (Firefox)
- “I've been online how long?!?”

Parental controls
- Set computer use times

Evaluate use of time
- Estimate time for task, track actual time
- Refine estimates or ID what took longer

Increase awareness of how time spent
- RescueTime - see Self-Monitoring section
Digital calendars, to-do apps

Advantages over paper system
- Alarms, alerts
- Sync between all devices - computer, mobile, Web-based
- Access anywhere - more likely to be used
- Note: student may still prefer handwriting for kinesthetic connection to info

Filter tasks by various criteria
- Show only tasks to be done “here & now”
- Limits info overload so “to-do” list doesn't become a “not-done” list

Shared calendar
- Family, teachers provide guidance
- Different read/write permissions
Getting from “To-Do” to “Done”

“To-Do” lists and calendars tell what needs to be done by when, but not how to...

- Manage workflow
- Prioritize
- Use time efficiently

How do I know...

- What to focus on now?
- Where to start?

Strategies & tools to help “get things done”:

- Visual planner
- Kanban board
- Priority matrix
- Filter by context
Visual Task Management

Good for very young, ASD, elderly

Picture Planner (Mac, Win, iOS)
- Icon/image-based personal organizer
- Schedule and sequence day
- Define columns for When, What, Where, Who, How, Bring, etc.
  - www.cognitopia.com

First Then Visual Schedule (iOS, And.)
- Sequences multi-part tasks
- Add own pictures, videos
- Checkboxes for completed items
  - www.goodkarmaapplications.com
Kanban task management board

Assembly line approach
- Origin: Toyota production line

Key points
- Make each task visual/tangible
- Drag-&-drop according to status: To Do, Doing, Done
- Manage workflow: Limit work in progress (“Doing”) to 2-3 items

Personal Kanban software
- KanPlan app (for students)
- Trello app
- Firetask app has a Kanban view
- www.personalkanban.com
Priority Matrix

Based on Covey's “7 Habits of Highly Effective People”

Prioritize tasks by quadrants:

- Urgent vs. Not Urgent
- Important vs. Not Important

Key points

- Important/Not Urgent tasks easy to put off (so do a little each day)
- Guides what to do, what to put off

App to consider

- Priority Matrix (by Appfluence.com)
GTD: Getting Things Done

Popularized by Dr. David Allen (IBM)

Key points

- Single “inbox” for everything (temporary holding)
- Review and process each day
- Group like-tasks together according to context (e.g., calls, at computer, 5-minutes, read, creative mood, high energy, person involved, location)
- Filter tasks by “what do I do in this context?”

Benefits

- Tackling like-tasks together increases efficiency
- Less overwhelming

Many apps employ GTD, context tagging

- Things, Firetask, ToodleDo, Remember the Milk
Self-Regulation & Cognitive Flexibility

Key Strategies

- Incorporate movement
- Calming routine (recognize trigger, know what to do)
- Pre-think strategies
- Prepare and practice for transitions, unexpected situations
- Make them visual/tangible

Technology to Support Strategies

- Fidget tools to regulate own behavior, attention
- Sit-stand desk
- Calming toolbox (stress ball, positive pictures, music)
- Diagram software for pre-thinking decisions and outcomes
Incorporate movement to regulate attention

Fidget toys/tools (quiet ones!)

Inflatable seat cushion
  - Bumps (sensory input)
  - Semi-inflated (“wiggle room”)

Work at whiteboard
  - Permits gross motor movement

Sit-stand desk or table
  - AlphaBetter adjustable student desk

Bluetooth headset
  - Dictate using speech recognition software while pacing
Decision Flowchart

Previewing: best way to build self-regulation skills
- Anticipate what comes next
- Prepare for possible changes

Use templates, scripts, diagrams
- How to deal with changes or undesirable outcomes
- How to adapt to unexpected situations
- Helps internalize this process
Self-Monitoring

Key Strategies

‣ Use visual reminders
‣ Set aside time to reflect
‣ Use templates for analysis
‣ Keep track of progress (motivating)

Technology to Support Strategies

‣ Visual checklists (e.g., COPS)
‣ RescueTime utility

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<th>C</th>
<th>Capitalization</th>
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<tbody>
<tr>
<td>Are the first words in each sentence and proper names capitalized?</td>
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<th>Overall Look</th>
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<td>How is the overall appearance and readability (spacing, indentation of paragraphs, neatness, complete sentences)</td>
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<th>P</th>
<th>Punctuation</th>
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<tbody>
<tr>
<td>Did you remember your periods or exclamation points? or question marks</td>
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<tr>
<th>S</th>
<th>Spelling</th>
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</table>
| Did you spell your words the best you can?
RescueTime

Software “automagically” tracks:
- Time spent on websites
- Time spent in applications

Bird's-eye view of time usage
- User ranks apps and websites as productive or distracting
- Watches usage, sends alerts

Benefits:
- Increase awareness of how time spent
- Internalize good time management skills
Matched with the right tools, students can more easily demonstrate their potential.
For more information & other AT resources...

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For more info on technology described herein, visit the AT Toolbox:
www.TechPotential.net/ATtoolbox