Studying Personal Information Management as a Dual-Task Scenario

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Thursday, March 22,
Scenario
Scenario

• You are working on some project
• (realization) I have to email something to my boss today.
• Switch to email & 20 mins later...
• Switch back to work...
• (confusion) What was I doing?
• Oh %$#@, email to my boss!
• Switch back to email.... (repeat?)
**Problem: EBH**

- Email program is a compact mass that *deforms spacetime* (particularly time) ... where nothing can escape once you cross the event *horizon* (activate the email program)

* Email is a Black Hole
Reality is ...

• There is nothing wrong with email ... other than it has poor support for:
  • Prospective Memory
  • Attention Management
  • Minimizing the Cost of Interruptions

• In other words: email is a secondary task to our **real work** (**primary task**)
Our problem

• Human attentional system is very fragile

• Much like the dog in the movie *Up*

* images from Pixar’s *Up*
My Thesis Today is ...

- Most PIM tasks are a secondary task to a primary task (in a dual-task setting)
  a) There are exceptions: *Spring Cleaning* of my files is a primary task
  b) Morning routine to do 30 mins of email is primary task

- With what we know of dual-task scenarios,
  a) how can we inform PIM research?
  b) how can we improve our PIM activities?
Informal support: attention

• Informal Observations of work
  a) Getting lost on email
  b) “postpone” work on email (procrastinate)
  c) duality of email/task management

• Observations of new interface designs
  a) Quick capture
  b) Full-Screen Apps

• Productivity Gurus (e.g. David Allen’s GTD) address mental load more than organization
Some Observations: Inbox

- People get distracted by leaving things in inbox
  a) Reduce distractions (hide things)
  b) Reduce time to check new emails
  c) Inbox-0

- What to do with things to be handled later?
  a) leave in inbox and pay price of revisit
  b) capture and move elsewhere (task manager)

- High variability among individuals
Procrastinate*

• What if we could push email away and have it come back later?

• Tag emails with future date
  • we support relative dates (tomorrow, friday) and absolute dates (3/23)

• Deamon runs at 5am and checks emails postponed for today

• Move email back to inbox and mark it unread

* Presented at 2012 PIM Workshop
Procrastinate: Initial Observations

• Pros
  a) Nice match with prospective memory
  b) No new interface required; supports all devices
  c) Combines well with threaded view in GMail

• Cons
  a) When to run the cron job is critical
  b) Adding reminders doesn’t work well (new UI needed)
Distractions are a problem

• New interface designs are attempting to address this problem

• Plenty of applications now support “Full Screen Mode”

• Apple added it to OS X Lion to “work and play without distractions”
Coincidentally

• Project in Kickstarter.com
• Reached their funding goal, now on development
• 2 VT students (no connection to me)

http://mail-pilot.com/
Human attention

• Limited resources to devote to tasks
• Task switching requires more resources
• Multiple vs. single resource theory
• Performance suffers as the amount of resources required increases
• Interruptions cause a task switch (more resources), continuous interruptions cause thrashing
  • Internal (endogenous) vs. external (exogenous) interruptions
Prospective memory

- Memory of future events "I have to pick up milk on the way home"
- Four stages, relevant to PIM:
  a) Intention formation
  b) Intention retention
  c) Intention initiation
  d) Intention execution
Measuring workload

- Changes on mental workload produce physiological signals
- We can measure them as
  - Self-report (NASA TLX)
  - Pupillometric measures (eye tracker)
  - Electro-encephalographic activity
PIM as attention hog

1. Phone Rings
   - 2ndary Task
   - Internal Interruption + Task Switch
   - Remembers Something
   - Resumes Work

2. External Interruption + Task Switch
   - 2ndary Task
   - Resumes Work

3. FILE Something
   - Resumes Work
   - 2ndary Task

4. Task Switch

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PIM as attention hog

★ Cost of task switch

Internal Interruption + Task Switch

External Interruption + Task Switch

Phone Rings

2ndary Task

1ary Task

Resumes Work

Remembers Something

2ndary Task

Resumes Work

File Something

Task Switch

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PIM as attention hog

- Cost of task switch
- Compatibility Match
PIM as attention hog

★ Cost of task switch
▲ Compatibility Match
● Cost of resumption
PIM as attention hog

- Cost of task switch
- Compatibility Match
- Cost of resumption
- Disruption, Attention Grab, Time spent

Diagram:
- Phone Rings
- External Interruption + Task Switch
- 2ndary Task
- Remembers Something
- 2ndary Task
- Internal Interruption + Task Switch
- 1ary Task
- Resumes Work
- Task Switch
- Resumes Work
- Resumes Work
- File Something
- 2ndary Task

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Research Considerations

- Can we use physiological measures to study PIM in a dual-task paradigm?
- How disruptive are internal vs external interruptions?
  a) we are not good at managing our *interruptability*
  b) presumably we can control external ones
- Can we help reduce the workload in interruption through interface designs?
- Are the solutions global (e.g. Voida’s work) or local?
4 Practical Considerations
1. Reduce Attention Grab

Each icon is an anchor for prospective memory

Which desktop do you want to face all day long?
2. Reduce # of workflows

- Inbox, Mark (somehow), Work on it or Postpone it, and then file/archive (make it go away)

- Files? “Downloaded Files” folder but we also have “Desktop” and we also have “/User/ Manuel” and “~/Documents”... which one of these is where things go?
3. Enable quick-n-go actions

- Quick capture UIs

- Small-media browsers in other apps

- More “tasks” on the go would reduce switch to other contexts
4. Filter by context

- Voida's work is on track but not far reaching enough

- Ben Hanrahan's hypothesis: meta-contextual tools can become a black hole by allowing unintended distractions to prompt context switch

  a) Meta-contextual are tools that support multiple work contexts as one (email, calendar, file manager, etc.)
Conclusions

• PIM should be considered in a dual-task scenario
• There is strong theoretical foundations in attention that matches well with PIM activities
• There is design practices that support the idea that managing attention is a problem
• We might be able to measure workload in PIM activities in multiple ways
• Future will tell if we can address the EBH problem
Any Questions?

Thanks!
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