Everyday technology use among older adults with cognitive impairments: Assessment and intervention approaches

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Objectives

Participants will:

a. Identify practitioners' role in addressing use of everyday technology and functional cognition among older adults with cognitive impairments;

b. Describe evidence-based everyday technology use assessment and intervention approaches; and

c. Apply assessment and intervention approaches to case examples and group activities.

Outline

- OT, ET use, and functional cognition

- ET use: Theory and evidence

- ET use: Practice & application

Activity

❖ Switch phones or computers with somebody
  ➢ Person 1: Send yourself text or e-mail with new device
  ➢ Person 2: Give fewest cues possible; analyze the activity
    ■ Which skills does your partner use?
    ■ What affects use of the device?
    ■ How much assistance (e.g., min, mod, max, total) are you giving?
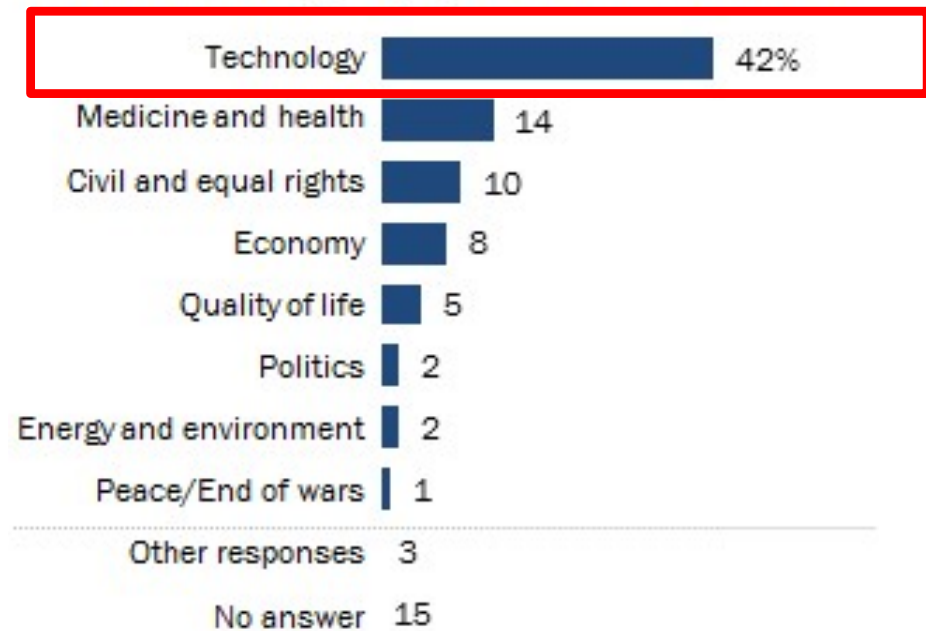
Technology: Then and now

Technology and quality of life

(Strauss, 2017)

Looking back: Biggest improvement to life in the past 50 years

% of U.S. adults who said the biggest improvement to life in America over the past 50 years or so was related to …

Category	%
Technology	42%
Medicine and health	14
Civil and equal rights	10
Economy	8
Quality of life	5
Politics	2
Energy and environment	2
Peace/End of wars	1
Other responses	3
No answer	15

Note: Verbatim responses are coded into categories; figures are based on combining related codes into NET categories. Figures add to more 100% because multiple responses were allowed.
Source: Survey of U.S. adults conducted May 30-June 12, 2017.

PEW RESEARCH CENTER

Everyday technology use?

What are everyday technologies (ETs)?

Electronic and technological appliances in the home and community *used to engage in everyday activities* (Nygård, Rosenberg, & Kottorp, 2015; Nygård, 2016).

Why OT and ET use?

ET use results from a *complex interaction between person &* technology (Malinowsky et al., 2017a).

ETs are increasingly a distinct aspect of occupational profiles (Nygård & Rosenberg, 2016)
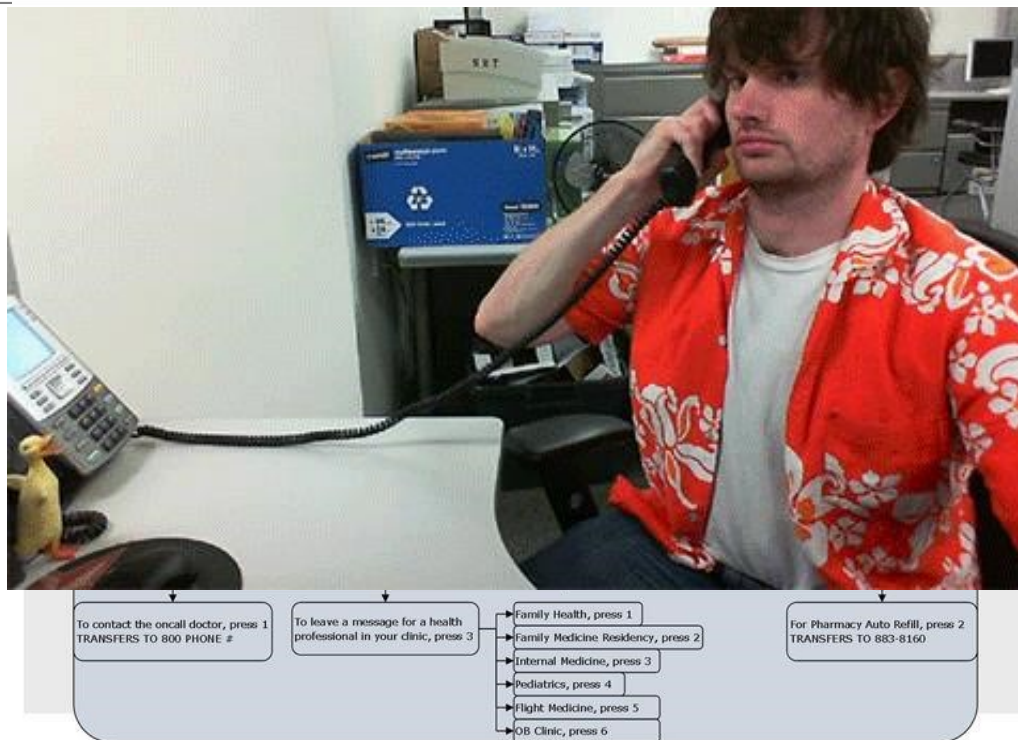
ET use and clients

Management of ETs is increasingly a *prerequisite* for participation in valued activities (Emiliani, 2006; Walsh et al., 2018).
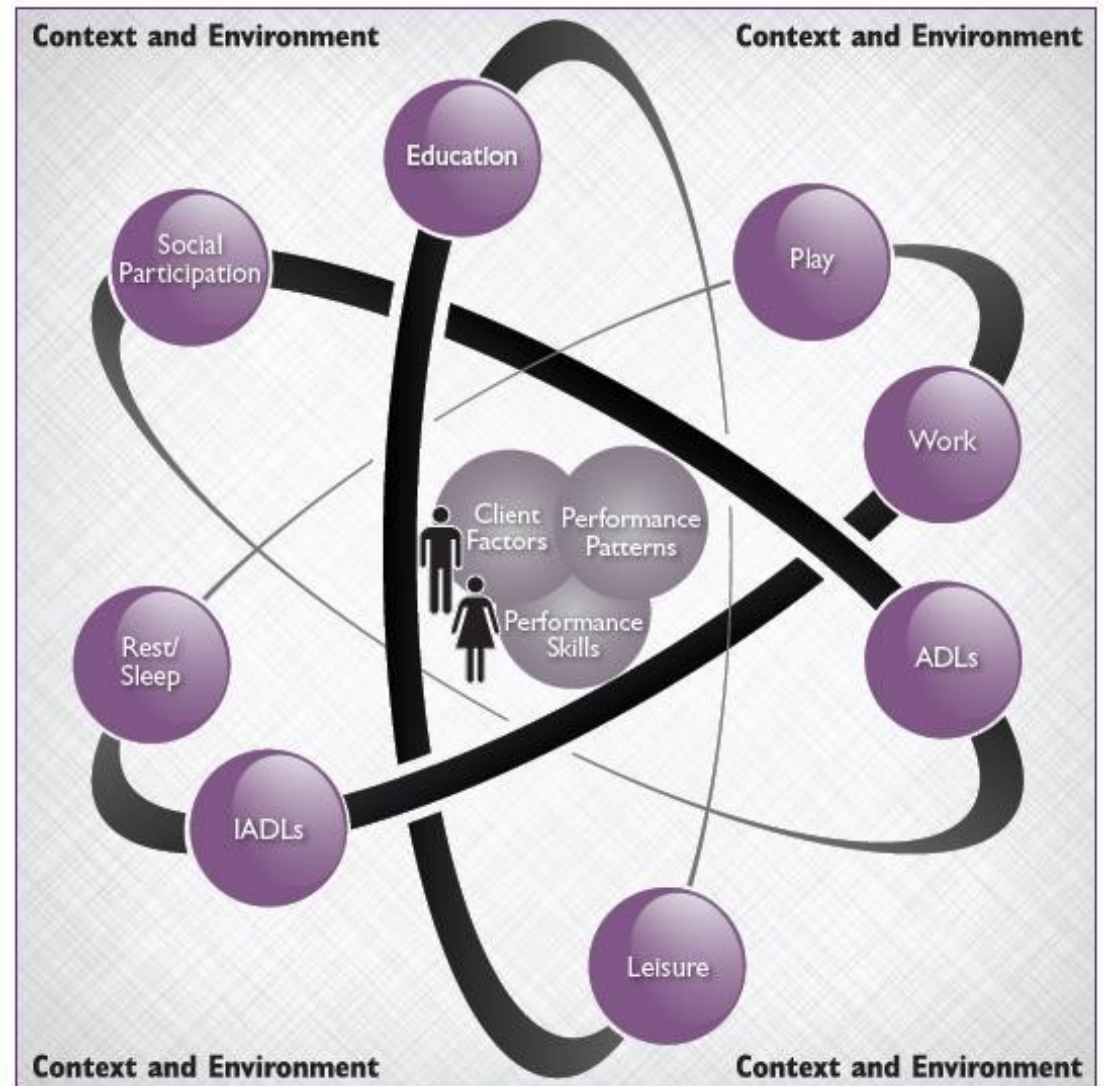
All individuals must use everyday technologies to engage in activities, *regardless of cognitive ability* (Kottorp et al., 2016).

Making a medical appointment

How do we use everyday technology to engage in activities? (AOTA, 2014)

Figure 1. Occupational therapy's domain.
Note. ADLs = activities of daily living; IADLs = instrumental activities of daily living.

ET use & MOHO environment (Fisher et al., 2017)

5th Edition (2017): Detailed Environment Schematic

Fisher, G., Parkinson, S. & Haglund, L. (2017). The Environment and Human Occupation.

In *Kielhofner's Model of Human Occupation: Theory and application* (5th Ed.).R. Taylor, Ed. Philadelphia: Wolters Kluwer Health/ Lippincott Williams & Wilkins.

Global Context
Options for living and livelihood

Local Context
Recreational activities

Immediate Context
(home, work, school, treatment facility)

Physical Geography Ecology
Physical community facilities
Climate
Economic Aspects
Social attitudes
Social networks
Laws & Policies

Occupations, activities & their properties

Physical space & objects

Social relationships & interactions

Person

ET use & PEOP (Baum et al., 2015)

PEOP: Enabling Everyday Living

THE NARRATIVE

The past, current and future perceptions, choices, interests, goals and needs that are unique to the Person, Organization, or Population

Personal Narrative
- Perceptions and Meaning
- Choices and Responsibilities
- Attitudes and Motivations
- Needs and Goals

Organizational Narrative
- Mission and History
- Focus and Priorities
- Stakeholders and Values
- Needs and Goals

Population/Community Narrative
- Environments and Behaviors
- Demographics and Disparities
- Incidence and Prevalence
- Needs and Goals

PERSON
- Cognition
- Psychological
- Physiological
- Sensory/Perceptual
- Motor
- Spirituality/Meaning

OCCUPATION
- Activities. Tasks, Roles
- Classifications

ENVIRONMENT
- Cultural Environment
- Social Support
- Social Determinants and Social Capital
- Health Education and Public Policy
- Physical and Natural Environment
- Assistive Technology

PERSON — Participation Performance Well-Being — ENVIRONMENT — OCCUPATION
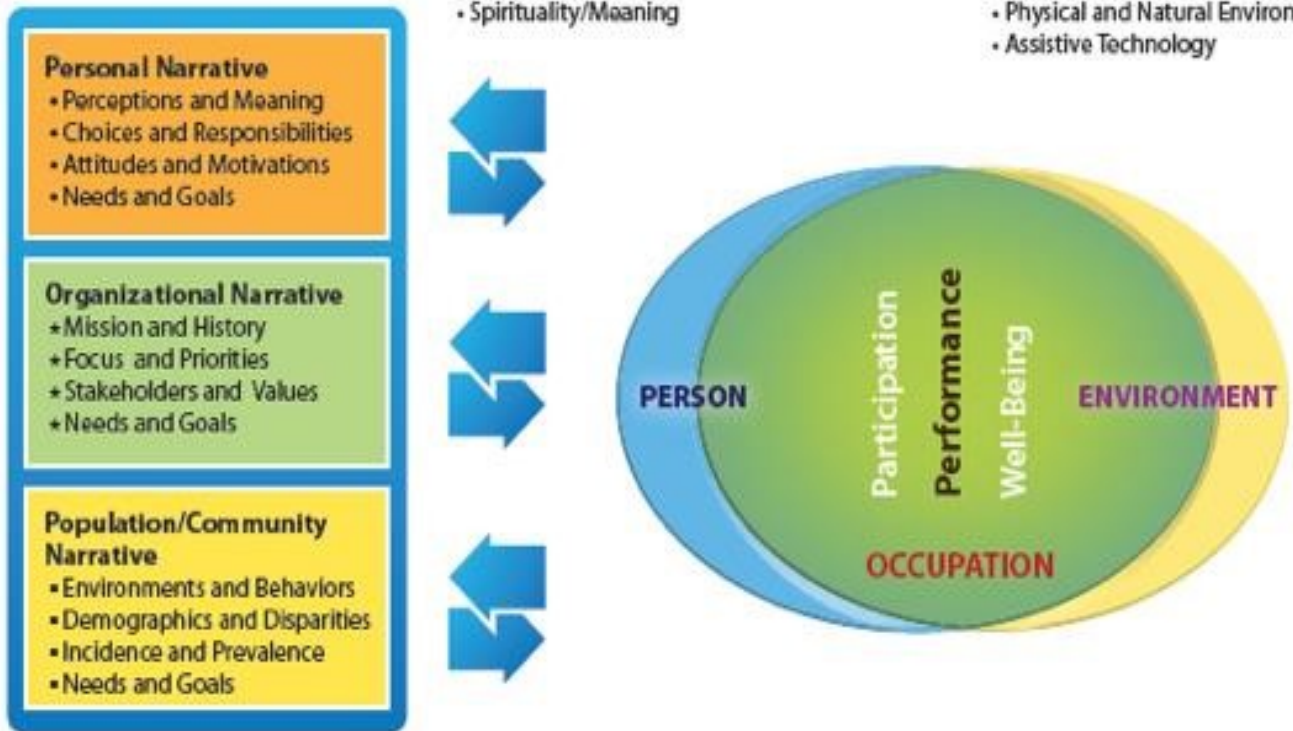
The **performance** of occupation (doing) enables the **participation** (engagement) in everyday life that contributes to a sense of **well-being** (satisfaction)

Managing ETs: Participation, performance, well-being, & occupation

Social interaction

Managing IADL

Managing ETs

Work and productivity

Health, safety and security
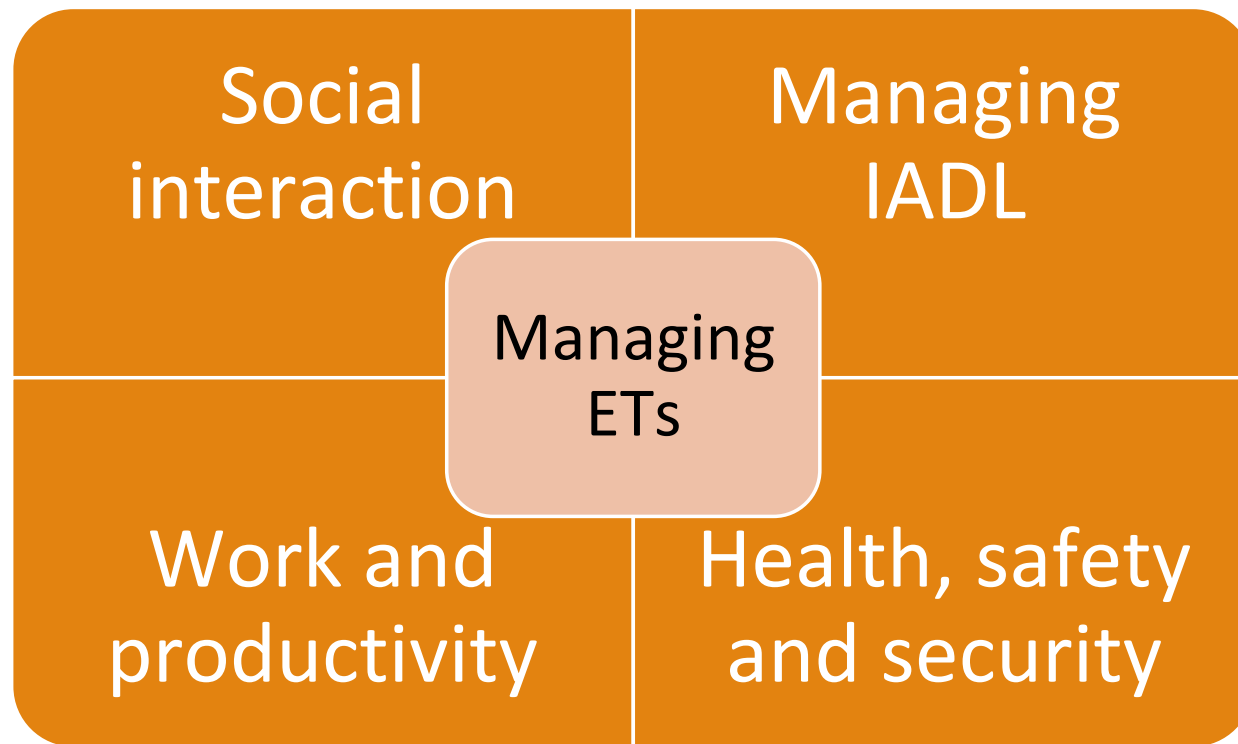
(Walsh et al., 2017)

If users are mismatched with ETs?

Individuals with cognitive challenges using ETs may face occupational marginalization, injustice, and exclusion (Kottorp et al., 2016; Patomella et al., 2013).

Functional cognition

The individual's *ability to integrate and apply thinking and processing skills to engage in ADLs and IADLs* (Giles, 2018).

OTs offer expertise in addressing cognitive factors contributing to safety and participation in occupational engagement (Hartman-Maeir et al., 2009).

Cognitive populations & ET use

Person-level barriers to performance?

- Learning & memory?
- Language?
- Visuo-spatial?
- Executive?
- Psychomotor?

Managing ETs: Think, pair, share

Which barriers to engagement affect clients with cognitive impairments?

Managing community mobility?

https://www.metrostlouis.org/nextstop/new-metro-ticket-vending-machines-and-ticket-validators-coming-to-illinois-metrolink-stations/

Managing a kitchen?

https://en.wikipedia.org/wiki/File:Modern-kitchen-spararredaindia.jpg
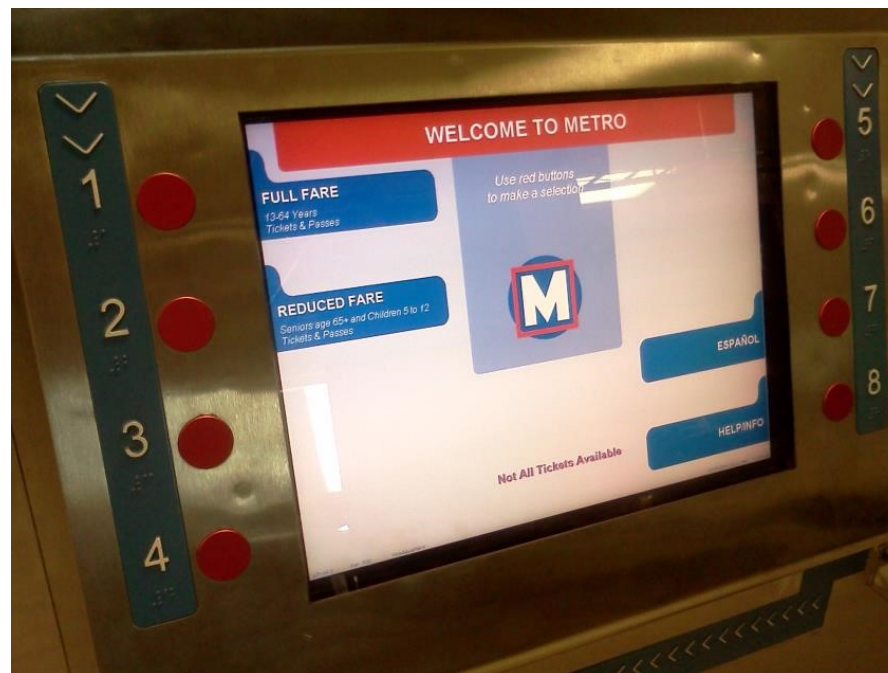
Managing smartphone apps?

https://pxhere.com/en/photo/1370785

Summary of ET use and cognition

1. ET use is increasingly a part of clients' occupational profiles - regardless of age, ability, and relevance
2. OTs offer expertise in facilitating management of ETs
3. Use of ETs is distinct from use of ATs

ET use & empirical evidence for cognitive populations

Instrument 1: Everyday Technology Use Questionnaire (ETUQ)

- **_Occupation-focused_** interview about use of everyday technology (Nygård et al., 2015).

Instrument 2: Management of Everyday Technology Use Assessment (META)

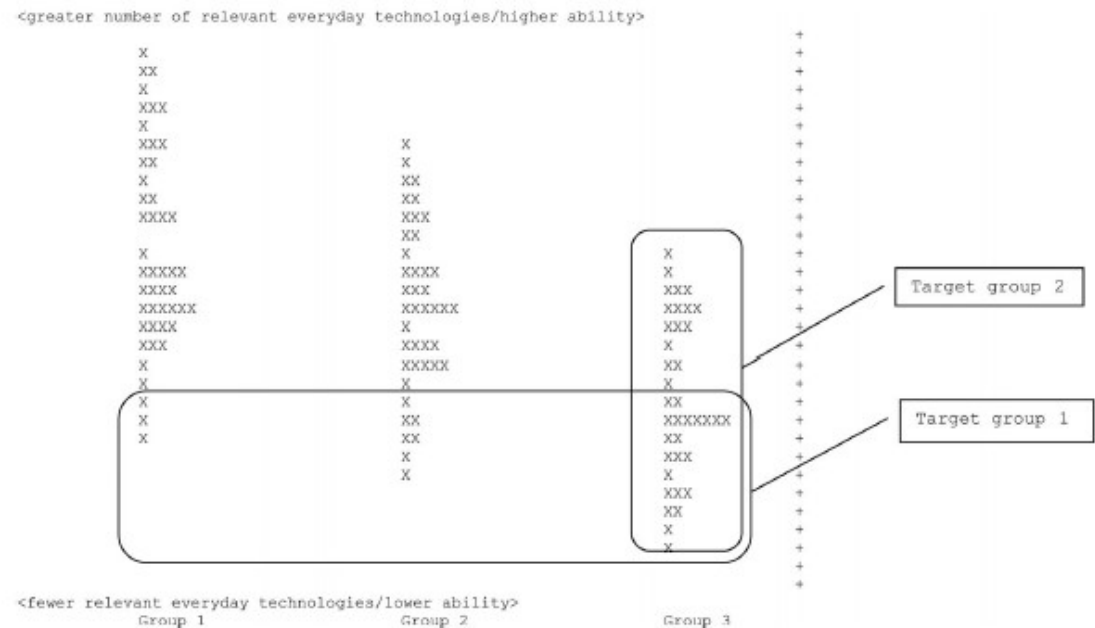- **_Occupation-based_** observation of everyday technology use (Nygård, 2016).

The ETUQ and the META

The ETUQ measures _perceived_ ability to use ETs and _perceived_ relevance of ETs

The META measures _observed_ ability to use relevant ETs

Older adults living with no cognitive impairment, mild cognitive impairment, and mild Alzheimer's Disease (Kottorp et al., 2016)

<greater number of relevant everyday technologies/higher ability>

```
          X                                                            +
          XX                                                           +
          X                                                            +
          XXX                                                          +
          X                                                            +
          XXX                 X                                        +
          XX                  X                                        +
          X                   XX                                       +
          XX                  XX                                       +
          XXXX                XXX                                      +
                              XX                                       +
          X                   X          X                             +
          XXXXX               XXXX       X                             +
          XXXX                XXX        XXX                            +    ┌──────────────┐
          XXXXXX              XXXXXX     XXXX                           +    │ Target group 2 │
          XXXX                X          XXX                            +    └──────────────┘
          XXX                 XXXX       X                             +
          X                   XXXXX      XX                             +
          X                   X          X                             +
          X                   X          XX                            +
          X                   XX         XXXXXXX                        +    ┌──────────────┐
          X                   XX         XX                            +    │ Target group 1 │
                              X          XXX                            +    └──────────────┘
                              X          X                             +
                                         XXX                            +
                                         XX                             +
                                         X                              +
                                         X                              +
                                                                       +
                                                                       +
```

<fewer relevant everyday technologies/lower ability>
Group 1   Group 2   Group 3

Adults living with mild, moderate, and severe intellectual disabilities (Hällgren et al., 2014)

Measure

More challenging items

| 65 |
| 64 |
| 63 | ** |
| 62 |
61	*
60	****			Automated check-in at airport
59	****
58	*
57	*****	o		Electric hedge cutter
56	**************			Smoke detector, Food processor, Hand-held mixer
55	******	o		Pedometer
54	*********	ooo		Electric drill, Curling iron
53	*****	oo		Internet banking, Burglar alarm, Electric screwdriver
52	******	ooo		MP3 player, Cell phone, Text message, Tumble dryer
51	***	oooo		Text TV, Dishwasher, Washing machine timer
50	***	oooooooo		Credit card with code, Stove, Soda maker, Hair cutter
49	**	oooo		Vacuum cleaner, Digital TV receiver, Digital thermometer
48	***	o		Elevator, Ticket-operated queuing system, Electric razor
47		oo	##	Loyalty card, Kettle
46		oo		Portable telephone – cordless, Microwave oven
45	*	o		Radio, Stereo/CD player
44		ooo	#	Cell phone answer
43				TV with remote control, Flushing mechanism on public toilet
42			#	Dimmer
41	*
40			#
39	*	o
38			##	TV set without remote control
37			#
36			#
35
34			#
33
32			#
31		o	#
30
29
28
27
26
25			#
24			#

Less challenging items

Older adults of low, medium, and high activity engagement levels (Walsh et al., 2018)

A

No. of Available and Relevant Everyday Technologies (ETUQ Sums)
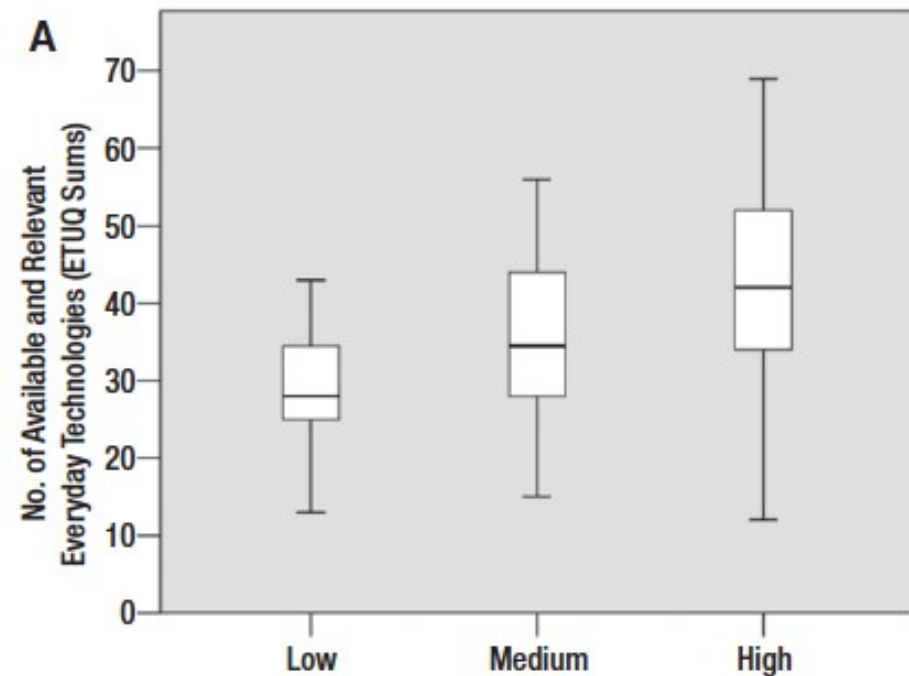
Summary of empirical evidence

1. Cognitive factors are associated with ET use
2. Diagnosis and cognition alone may not predict ability to use ETs

3. OTs develop client-centered solutions to optimize engagement in the activities of home and society

ET use in practice

Assessments and interventions

ETUQ case report - John

71 y/o, history of stroke, diabetes, and hypertension

Husband and father, retired plumber

Enjoys tech and smart phone use

s/p stroke & inpatient rehab; needs to monitor glucose and BP on phone apps

(Walsh et al., 2017)

ETUQ Score Form 1

ETUQ Score Form 2

META case report - CJ

61 y/o, OT clinical professor

The problem: The University has recently switched all email users to new server, Exchange online. Celeste have been trying to reconfigure her account with the new system, but is having some difficulty, particularly with her signature changing when using the Outlook shortcut versus the web-based email.

META case report - CJ

Celeste is working with Anders, her OT, to successfully use her university e-mail services again.

Anders has decided to use the META in order to assess Celeste's performance using this everyday technology.

While watching the video, identify 3 challenges that Celeste is having.

META case report - CJ

Video 1

META score form: CJ's observable skills – Video 2

META score form: CJ's capacity

Evidence-based interventions

The state of the evidence for older adults with cognitive impairments

OTs may play role as experts supporting ET use to increase engagement, participation, and independence (Nygård & Rosenberg, 2016; Walsh et al., 2019)

Limited evidence to improve occupational performance in technology use; most evidence is for IADLs (Patomella et al., 2018)

Cognitive interventions decision map (Haskins et al., 2012; Watters, 2018)

Environmental modifications & external aids

Direct skills training

Strategy training

Environmental modifications and use of AT

https://www.onegoodthingbyjillee.com/11-brilliant-iphone-hacks
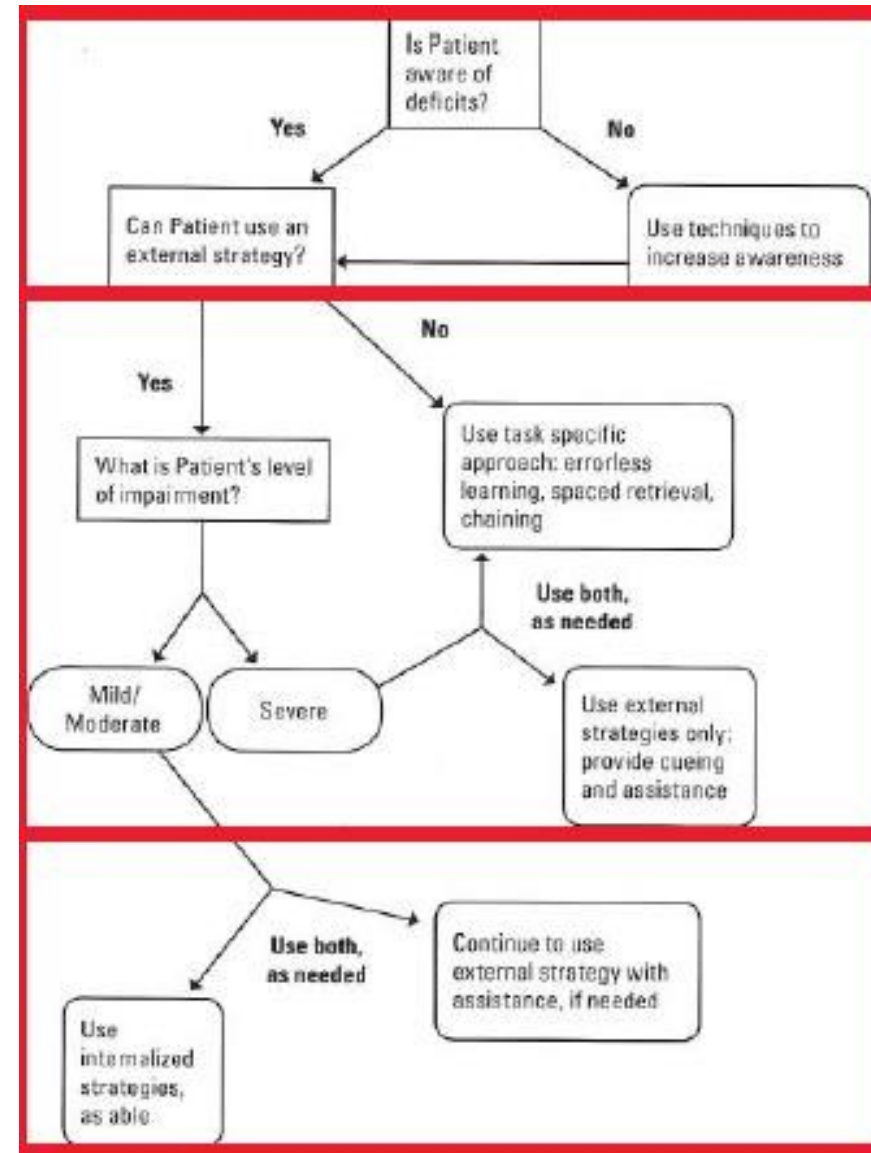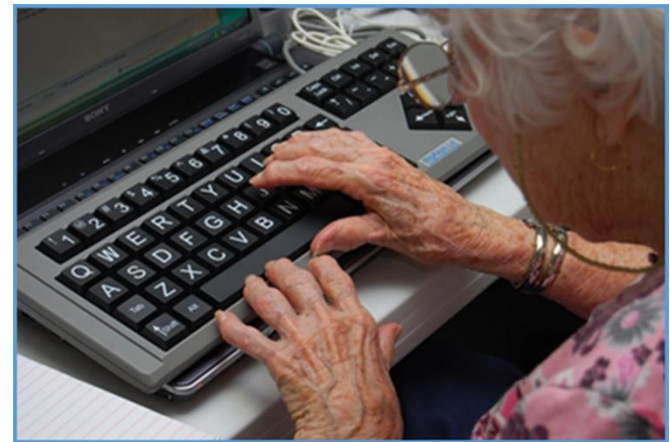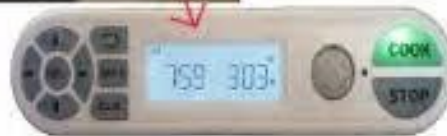
https://www.alzstore.com/v/vspfiles/assets/images/alzstore_catalog_10.6.13.pdf

https://phys.org/news/2016-08-digital-seniors-embrace-social-technology.html

Environmental modifications and use of AT

https://pixabay.com/photos/navigation-car-drive-road-gps-1048294/

https://quotecatalog.com/

Tailored verbal instruction

Performance quality improvements from MP3 player verbal instruction in older adults with mild Alzheimer's Disease (Lancioni et al., 2010)

https://www.needpix.com/photo/318561/ipad-farm-country-farmer-shelling-peas-electronic-adult-american-listening

Errorless learning and ET use

Improvement in performance of ***familiar activities*** in older adults with mild Alzheimer's Disease (Avila et al., 2004)

Prompting Hierarchy

http://mast.ecu.edu/modules/ps/concept/
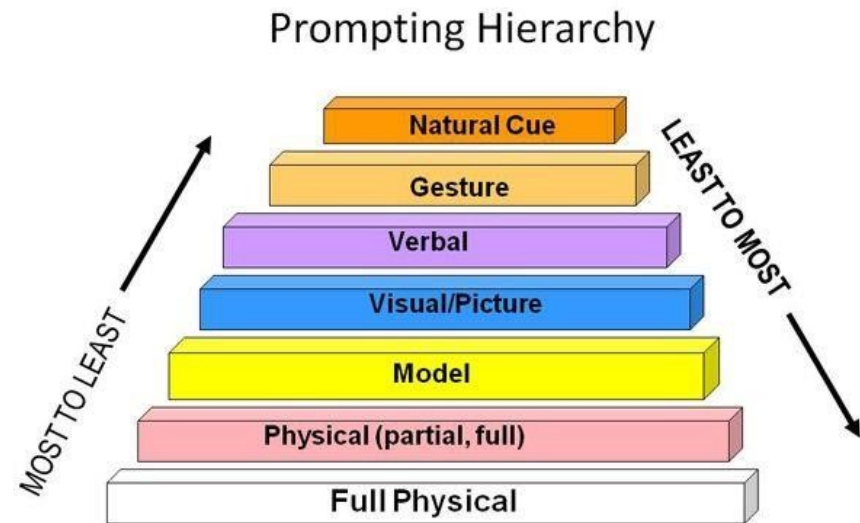
Cognitive training & task-specific training

Improvements in ***trained and untrained*** activities (McEwen et al., 2015)

> CO-OP
> Goal-Plan-Do-Check
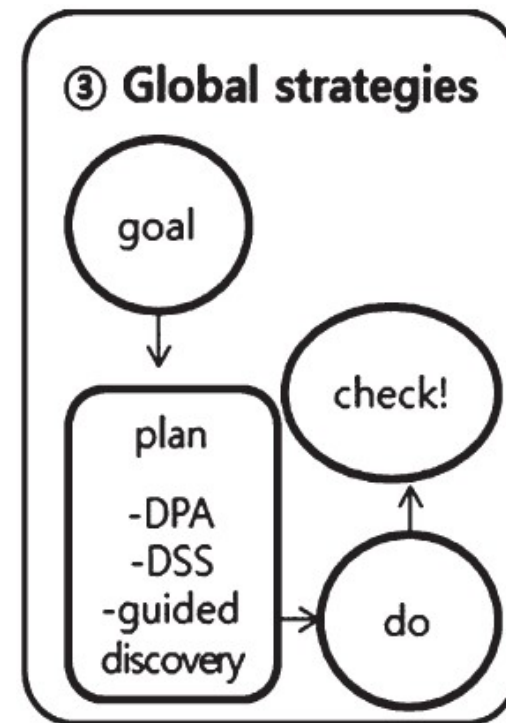
(Ahn et al., 2017)
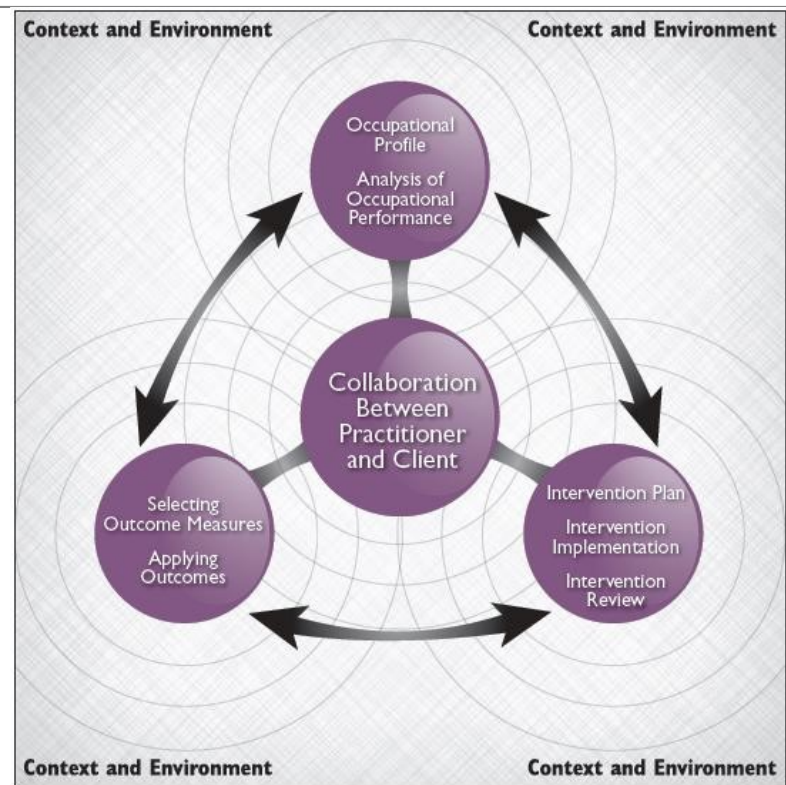
Complex interventions in working aged adults with TBI

Repetitive stepwise guidance, teaching use of adaptive equipment, and encouragement in use of ET (Kassberg et al., 2016).

Summary of intervention approaches

1. "It depends!"
2. Client-centeredness
3. Trust the OT process!

Context and Environment

Occupational Profile
Analysis of Occupational Performance

Collaboration Between Practitioner and Client

Intervention Plan
Intervention Implementation
Intervention Review

Selecting Outcome Measures
Applying Outcomes

(AOTA, 2014)

Managing ETs: Think, pair, share

Which approaches might facilitate management of the ETs?

Facilitate management of community mobility?

https://www.metrostlouis.org/nextstop/new-metro-ticket-vending-machines-and-ticket-validators-coming-to-illinois-metrolink-stations/
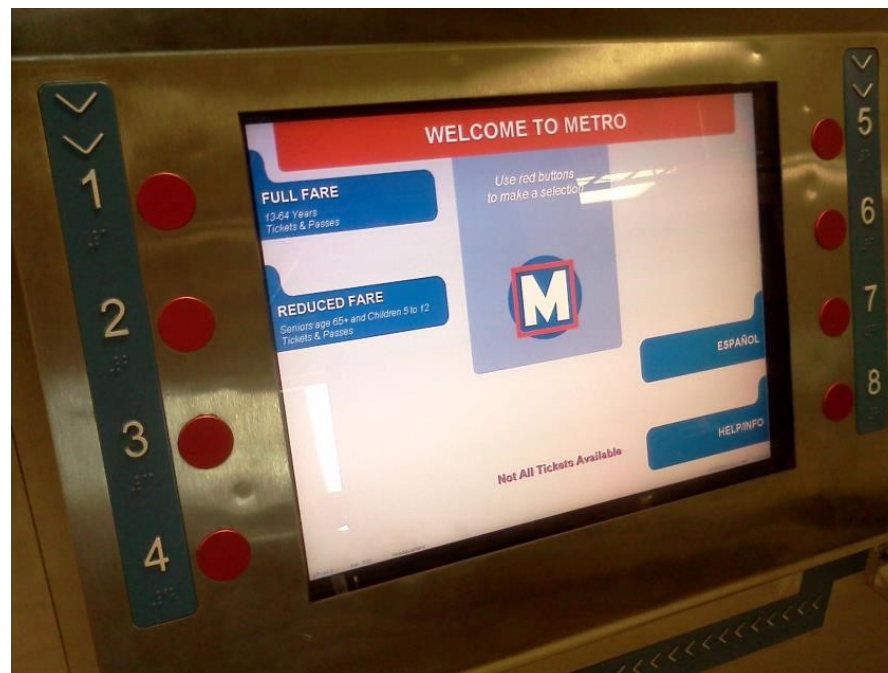
Facilitate management of a kitchen?

Facilitate management of smartphone apps?

https://pxhere.com/en/photo/1370785

Summary of ET use in practice

1. Cognitive factors affect management of ETs
2. OTs offer client-centered approach to cognitive barriers and facilitators to ET use

Group activity

Group case studies

- Split into groups of 3-4
- Please refer to online handouts or paper copies

Questions?

Thank you!
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References

Ahn, S., Yoo, E., Jung, M., Park, H., Lee, J., & Choi, Y. (2017). Comparison of cognitive orientation to daily occupational performance and conventional occupational therapy on occupational performance in individuals with stroke: A randomized controlled trial.*Neurorehabilitation, 40*(3), 285-292. https://doi.org/10.3233/NRE-161416

American Occupational Therapy Association. (2014). Occupational therapy practice framework: Domain and process (3rd ed.). *American Journal of Occupational Therapy, 68(*Suppl. 1), S1-S48. https://doi.org/10.5014/ajot.2014.682006

Avila, R., Bottino, C. M. C., Carvalho, I. A. M., Santos, C. B., Seral, C., & Miotto, E. C. (2004). Neuropsychological rehabilitation of memory deficits and activities of daily living in patients with alzheimer's disease: A pilot study. *Brazilian Journal of Medical and Biological Research, 37*(11), 1721-1729. https://doi.org/10.1590/S0100-879X2004001100018

Bass, J., Baum, C., & Christiansen, C. (2015). Interventions and outcomes: The Person-Environment-Occupational Performance (PEOP) occupational therapy process. In C. Christiansen, C. Baum, J. Bass, *Occupational Therapy: Performance, Participation, Well-being. (4th ed.).* Thorofare, NJ: Slack.

Fisher, G., Parkinson, S., & Haglund, L. (2017). The environment and human occupation. In R. R. Taylor (Ed.), *Kielhofner's Model of Human Occupation: Fifth edition* (pp. 91–106). Philadelphia: Wolters Kluwer Health.

Giles, G. M. (2018). Neurocognitive Rehabilitation: Skills or Strategies? *American Journal of Occupational Therapy*, *72*(6), 1-16. https://doi.org/10.5014/ajot.2018.726001

Hällgren, M., Nygård, L., & Kottorp, A. (2014). Everyday technology use among people with mental retardation: Relevance, perceived difficulty, and influencing factors. *Scandinavian Journal of Occupational Therapy*, *21*(3), 210–218. https://doi.org/10.3109/11038128.2013.862295

Hartman-Maeir, A., Katz, N., & Baum, C. M. (2009). Cognitive Functional Evaluation (CFE) process for individuals with suspected cognitive disabilities. *Occupational Therapy in Healthcare*, *23*(1), 1–23. https://doi.org/10.1080/07380570802455516

Haskins, E. C., Cicerone, K., Dams-O'Connor, K., Eberle, R., Langenbahn, D., & Shapiro-Rosenbaum, A. (2012). *Cognitive Rehabilitation Manual: Translating evidence-based recommendations into practice* (1 ed.). Reston, Virgina: ACRM Publishing.

Kassberg, A.-C., Malinowsky, C., Jacobsson, L., Lund, M. L. (2013). Ability to manage everyday technology after acquired brain injury. *Brain Injury*, *27*(13–14), 1583–1588. https://doi.org/10.3109/02699052.2013.837196

References

Kassberg, A.-C., Prellwitz, M., Malinowsky, C., Larsson-Lund, M. (2016). Interventions aimed at improving the ability to use everyday technology in work after brain injury. *Scandinavian Journal of Occupational Therapy*, *23*(2), 147–157. https://doi.org/10.3109/11038128.2015.1122835

Kottorp, A., Nygård, L., Hedman, A., Öhman, A., Malinowsky, C., Rosenberg, L., Lindqvist, E., & Ryd, C. (2016). Access to and use of everyday technology among older people: An occupational justice issue – but for whom? *Journal of Occupational Science*, *23*(3), 382–388. https://doi.org/10.1080/14427591.2016.1151457

Kottorp, A., Nygård, L., Hedman, A., Öhman, A., Malinowsky, C., Rosenberg, L., Lindqvist, E., & Ryd, C. (2016). Access to and use of everyday technology among older people: An occupational justice issue – but for whom? *Journal of Occupational Science*, *23*(3), 382–388. https://doi.org/10.1080/14427591.2016.1151457

Lancioni, G., Singh, N., O'Reilly, M., Zonno, N., Cassano, G., De Vanna, F., . . . Minervini, M. (2010). Persons with Alzheimer's Disease perform daily activities using verbal-instruction technology: A maintenance assessment. *Developmental Neurorehabilitation, 13*(2), 103-113. https://doi.org/10.3109/17518420903468480

Malinowsky, C., Fallahpour, M., Lund, M., Nygård, L., & Kottorp, A. (2017a). Skill clusters of ability to manage everyday technology among people with and without cognitive impairment, dementia and acquired brain injury. *Scandinavian Journal of Occupational Therapy, 1.*

Malinowsky, C., Kottorp, A., Wallin, A., Nordlund, A., Björklund, E., Melin, I., … Nygård, L. (2017b). Differences in the use of everyday technology among persons with MCI, SCI and older adults without known cognitive impairment. *International Psychogeriatrics*, *29*(7), 1193–1200. https://doi.org/10.1017/S1041610217000643

McEwen, S., Polatajko, H., Baum, C., Rios, J., Cirone, D., Doherty, M., & Wolf, T. (2015). Combined cognitive-strategy and task-specific training improve transfer to untrained activities in subacute stroke: An exploratory randomized controlled trial. *Neurorehabilitation and Neural Repair, 29*(6), 526-536. https://doi.org/10.1177/1545968314558602

Nygård, L (2016). Management of Everyday Technology Assessment (META). Stockholm: Karolinska Institutet.

Nygård, L., & Rosenberg, L. (2016). How attention to everyday technology could contribute to modern occupational therapy: A focus group study. *British Journal of Occupational Therapy*, *79*(8), 467–474. https://doi.org/10.1177/0308022615613354

Nygård L., Rosenberg, L., & Kottorp, A. (2015). Everyday Technology Use Questionnaire (ETUQ): Everyday technology in activities in home and society. Stockholm: Karolinska Institutet.

Patomella, A.-H., Kottorp, A., & Nygård, L. (2013). Design and management features of everyday technology that challenge older adults. *The British Journal of Occupational Therapy*, *76*(9), 390–398. https://doi.org/10.4276/030802213X13782044946229

References

Patomella, A.-H., Lovarini, M., Lindqvist, E., Kottorp, A., & Nygård, L. (2018). Technology use to improve everyday occupations in older persons with mild dementia or mild cognitive impairment: A scoping review. *British Journal of Occupational Therapy*, *81*(10), 555–565. https://doi.org/10.1177/0308022618771533

Strauss, M. (2017, October 12). Four-in-ten Americans credit technology with improving life most in the past 50 years. Retrieved from http://www.pewresearch.org/fact-tank/2017/10/12/four-in-ten-americans-credit-technology-with-improving-life-most-in-the-past-50-years/

Tech adoption climbs among older adults. (2017, May 15). Pew Internet Research. Retrieved from http://www.pewinternet.org/2017/05/17/tech-adoption-climbs-among-older-adults/pi_2017-05-17_older-americans-tech_1-01/

Technology Related Assistance for Individuals with Disabilities Act of 1988. PL 105-394 Sec (3) (a) 3–4.

Walsh, R., Drasga, R., Lee, J., Leggett, C., Shapnick, H., & Kottorp, A. (2018). Activity engagement and everyday technology use among older adults in an urban area. *American Journal of Occupational Therapy*, *72*(4), 1-7. https://doi.org/10.5014/ajot.2018.031443

Walsh, R., Drasga, R., Lee, J., Leggett, C., Shapnick, H., & Kottorp, A. (2017, November). *Addressing the use of everyday technology among older adults with and without functional limitations*. Oral presentation delivered at the Illinois Occupational Therapy Association 2017 Conference, Bloomington/Normal, USA.

Walsh, R. J., Lee, J., Drasga, R. M., Leggett, C. S., Shapnick, H. M., & Kottorp, A. B. (2019). Everyday Technology Use and Overall Needed Assistance to Function in the Home and Community Among Urban Older Adults. *J Appl Gerontol*, 733464819878620. doi:10.1177/0733464819878620

Watters, K. (2018, September). *Functional cognition: Making sense of it all*. Oral presentation delivered at the ILOTA 2018 Annual Conference, Lisle/Naperville, USA.