The impact of familiarity on the usability of everyday products for older adults with Alzheimer's disease

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Motivation

- Older adults with dementia, such as Alzheimer's, have difficulties completing activities of daily living (ADL). Research is showing that familiar environments can help older adults with dementia complete ADL [1]. This could be because familiar items help cue implicit memory, and therefore, the steps and tools required to complete activities.
- Although there have been studies examining environment familiarity, to date, there has been very limited research that specifically examines what impact familiarity has on the usability of tools and products used by older adults with dementia to complete ADL.

Objective

The objective of this research is to determine what role familiarity plays in the usability of product operation by cognitively impaired older adults. This study examines water faucet use, as successful operation of this product is necessary for several self-care activities.

Method

- Five faucets designs were examined in this study (Figure 1).
- Five older adults with no, mild, moderate, and severe cognitive impairments were recruited for a total of 20 participants (determined through administration of the MMSE).
- There were two portions for each trial:
  - **Freestyle**, where the participant washed his/her hands as s/he wishes.
  - **Mandatory**, where the participant was asked to turn the water on, and if applicable, adjust the temperature, adjust the flow, and turn the water off.
- Participants completed 10 trials with each faucet type (presented in a random order) for a total of 50 trials per subject.
- A within-subjects design was used to collect usability data on the areas of *effectiveness*, *efficiency*, and *satisfaction* [2]. These will be measured by factors such as task speed, errors committed, amount of assistance required to use the faucet, and learning time.

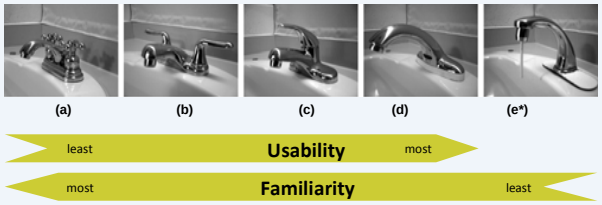

Figure 1. Faucets used in the study: a) crosshead, b) dual-lever, c) single lever, d) automatic, and e) plastic wand intended for older adults with dementia. Usability was defined in terms of human factors criteria. Familiarity was defined as the number of years since the product has been in the mainstream market.

***As there has not yet been a formal human factors analysis on this product, it was not possible to rate its usability.**

Preliminary Results

- To date, 13 older adults (mean age=79, SD = 9.7) have participated in the study and have had no (n=5), a mild (n=4) or a moderate (n=4) cognitive impairment.
- All participants are from the same long term care facility in Toronto, Canada.
- Data for three of the measures is presented by group in Figure 2.
- Examples of unsolicited comments made by participants during the trials include:
  - "[I] had this kind as a child" - *Participant with a moderate impairment, regarding crosshead*
  - "[I] like something I have control over" - *Participant with a moderate impairment, regarding automatic*
  - "You can use your whole hand or just one finger. Nice looking." - *Participant with no impairment, dual lever*
  - "Easy. If it's hard than I ask you for help. It's okay, We don't have it in my country. Only people with money, not easy or difficult, for older people it is harder"
    - Participant with a mild impairment, regarding single lever
  - "Anyone in a hurry that would be good, don't have to use a lot of muscle power. I have weakness in my joints. Not good. Sometimes it takes a moment to come on and you might break the wand." - *Participant with a moderate impairment, regarding plastic wand*

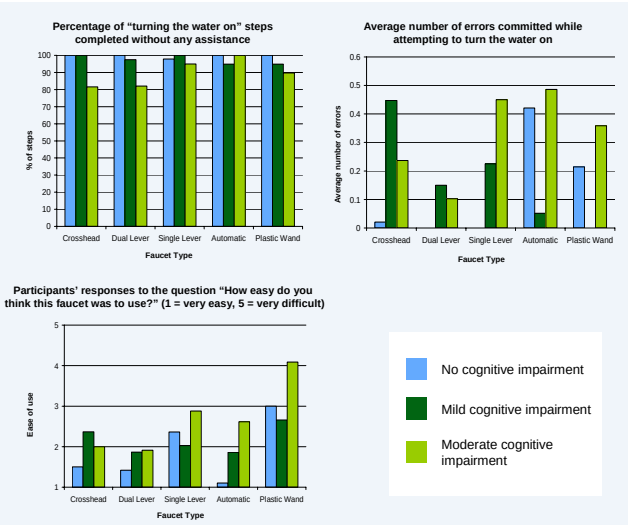

Figure 2. Preliminary results from the *mandatory* portion of the study. 'Water on" data is presented as this was the only common step across all faucets

Discussion

Although data collection is still underway, these mid-study results are suggesting some interesting trends.

- Comments by participants tend to agree with the familiarity ordering (Figure 1).
- It is still unclear what role familiarity plays in faucet use
- In general, mild and moderate participants were able to learn how to use faucets that were previously unfamiliar to them, specifically the automatic and plastic wand faucets
- Subjectively, the plastic wand appears to be the most difficult for older adults to use, although this is may not supported by assistance and error rates.
- The dual lever seems to result in the fewest number of errors committed for the water on step. This may not only be because of the operational modality, but because although it is a different make and model, this is the type of faucet residents have in their washrooms at the long term care facility (participants have an average of 3.08 years in residence).
- This raises the question of what is *familiarity* when older adults with dementia are concerned – is it how long over his/her lifespan a person has used a faucet, is it what they have recently been using, or something else?

Future Directions

- Finish collecting and analyzing data for the remaining participants (five with severe, one with moderate, and one with mild cognitive impairments).
- Identify what aspects of tap design appear to play roles in their usability
- Publish recommendations on faucet design for older adults with a cognitive impairment
- Use these results to inform the development of a computer-based tool to assess product usability by older adults with dementia

References

[1] Cohen, U., and Weisman, G. D. (1991). Holding on to home: Designing environments for people with dementia. Baltimore: Johns Hopkins University Press.

[2] Nielsen, J. (1994). Usability Engineering. Academic Press, Boston, MA.

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For Further Information

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More information on this and related projects can be obtained at *www.iatsl.org*

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