Hierarchy or List? Understanding **Menu Navigation** by **Emergent Users**

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Is it important?

ICT Intervention

Meaningful and sustainable design

7 billion+

Mobile phone users in the world

60%

Live in developing countries

Emergent users (~50%)

Disadvantaged in terms of capabilities to (1) access, (2) learn and (3) use ICT

Guess, which one is better?

Hierarchy

List

Guess, which one is better?

Hierarchy

List

6 Designs:

Hierarchy-AOI   List-AOI

Hierarchy-GUI   List-GUI

Hierarchy-AVI   List-AVI

Acronyms:

AOI - Audio only interface

GUI - Graphical User Interface

AVI - Audio Visual Interface

What has been done?

| Researches	GUI			AVI			AOI		
	Deep Hierarchy	Shallow Hierarchy	List	Deep Hierarchy	Shallow Hierarchy	List	Deep Hierarchy	Shallow Hierarchy	List
Medhi et al. [13,14]	✔	—	✔	—	—	—	—	—	—
Shrivastava et al. [15]	—	—	—	✔	✔	—	✔	✔	—

Our Study

H1: GUI will perform better in list menu than hierarchical menu

H2: AOI and AVI will perform better in the hierarchical menu than in the list menu

H3: AVI will perform better than GUI and AOI in both hierarchical menu and list menu

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**By "better" we mean in terms of task success, task time and the number of errors.

Our Study
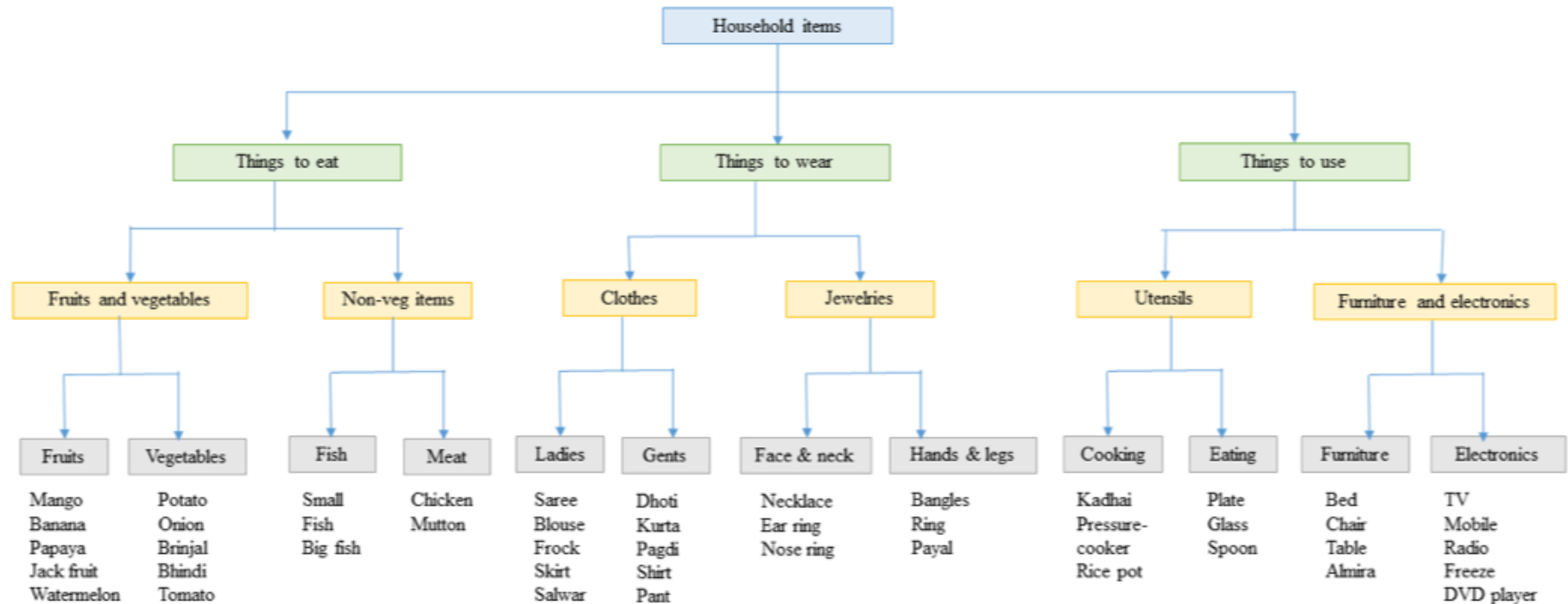
Task: *Find a household item from a pool of 45 items*

Prototypes

List AVI (AVI-List)   List GUI (GUI-List)   List IVR (IVR-List)
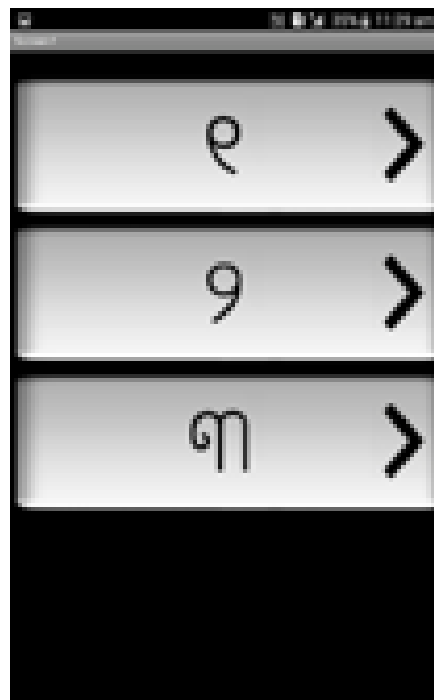
Prototypes

Hierarchy AVI (AVI-Deep)   Hierarchy GUI (GUI-Deep)   Hierarchy AOI (AOI-Deep)

The Study

Research Design
- Independent Variables
  - Interface Type: AVI, GUI and AOI
  - Menu Structure: Hierarchy and List
- Dependant Variables
  - Task Success
 - Task Completion Time
  - Task Errors

Demographics:

- 24 Participants (7 male and 17 female)
- Mean age = 33.13 years; SD = 6.96; Range= 25 – 45 years
- Education (4th - 8th Std)

METHOD

Protocol

- Objective briefing to the participants
- Participant training on 6 training prototypes (20-30 mins)
- Main task in random order (Task was printed in local language and kept in front of them)
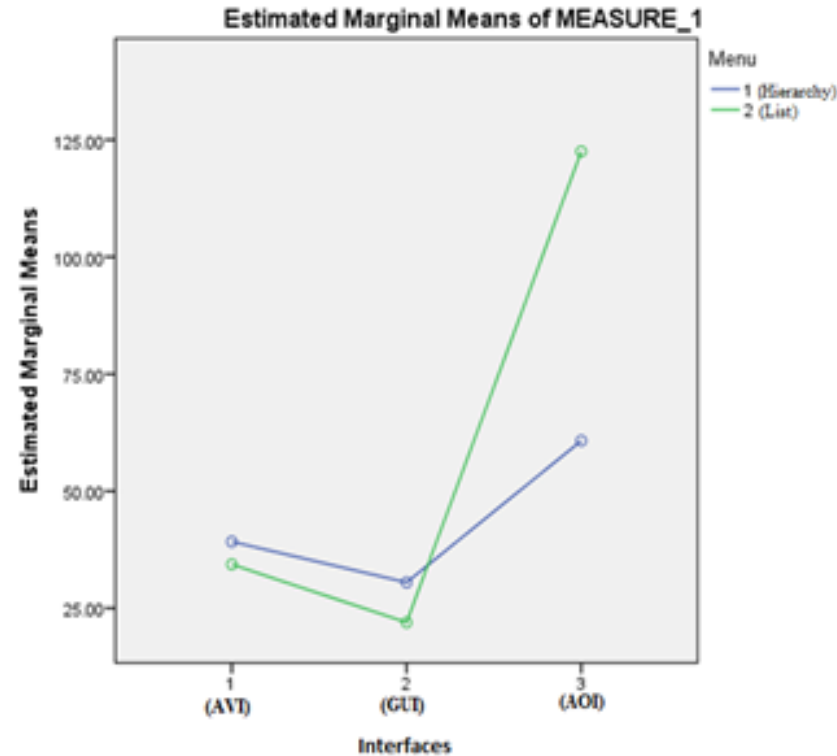- Participant debriefing and feedback
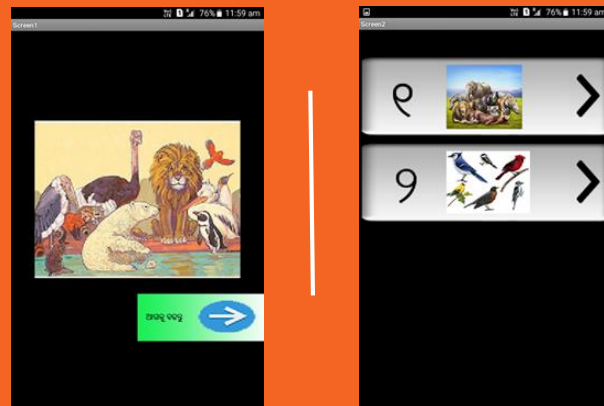
Training: 2 levels deep/pages

Results

Task Success

Estimated Marginal Means of MEASURE_1

Repeated measures ANOVA

- **98.6% task success (Very high)**
- AVI and GUI are faster in List menu than Hierarchy
- AOI performed faster in Hierarchy than List (Significant p<0.0005)
- AVI_list vs AVI_Hierarchy (Not significant, P=0.33)
- GUI_list vs GUI_Hierarchy (Not Significant, P=0.24)

Results

ERRORS:

- Errors are more in hierarchy than the list

- Although errors are more in AOI-Hierarchy prototype than List, it has a higher performance rate

Conclusion

- **Very high task success** (98.6%) contrary to other studies
  (Reasons: Penetration of ICTs in the community, Extensive training and others)

- **Faster** and **fewer errors** with the list menu than the hierarchical menu. **This confirms H1** and verifies (marginally) findings from earlier work

- **Qualitative findings** suggest that the visual modality of these interfaces dominate the **audio messages** while audio messages may be adding to the users' **cognitive load**

- AVI-List is faster than the hierarchical menu. Hence, we **cannot accept H2.**

- GUI task times and errors are less than AVI and AOI in case of both list menu and hierarchical menu, **cannot accept H3**

we compared task success, task times and errors on three interfaces (GUI, AOI, and AVI) and two menu structures (list and hierarchy) with emergent users on smartphones with training.

Limitations

- Opportunity incorporate better strategies to ensure equal gender participation.

- Participant screening can also be made stronger by conducting reading ability test and others.

- We would also like to conduct these studies in different geographical locations, and several other test prototypes addressing diverse services.

- A comparative study with non-emergent users can possibly give a better visualization of the scenario

Thank You

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