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# Accessible Technology for the Elderly

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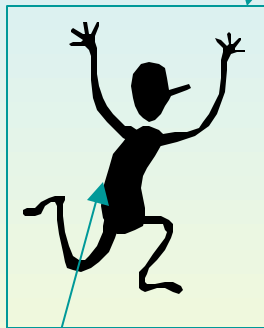
# Assistive Technology definition

- Assistive Technology includes all kinds of devices designed to enable a person to overcome his/her functional challenges due to a special mismatch between his/her ability and the environmental demands.

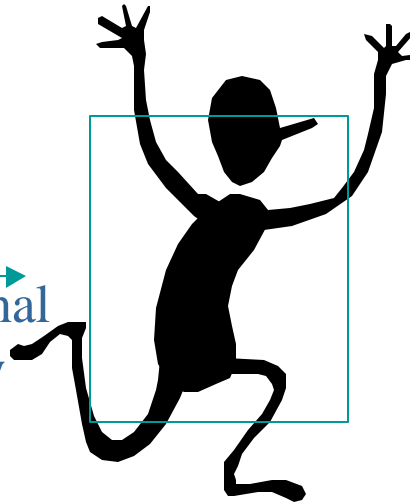
# Disabling Process

(from Enabling American 1997)

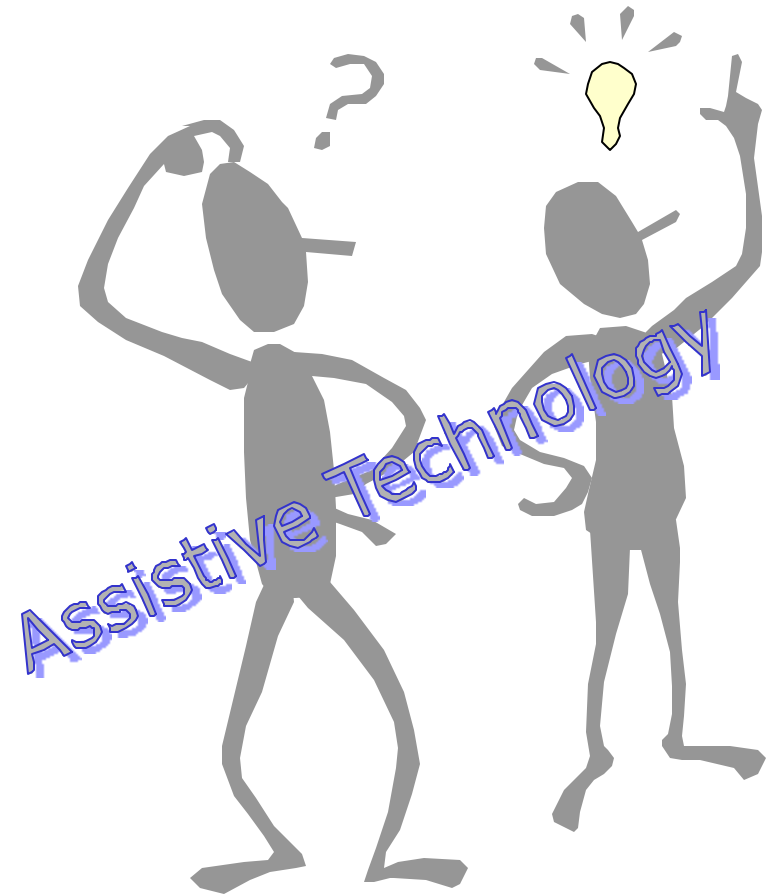
Environmental Demands



Relative Changes in Functional Capacity



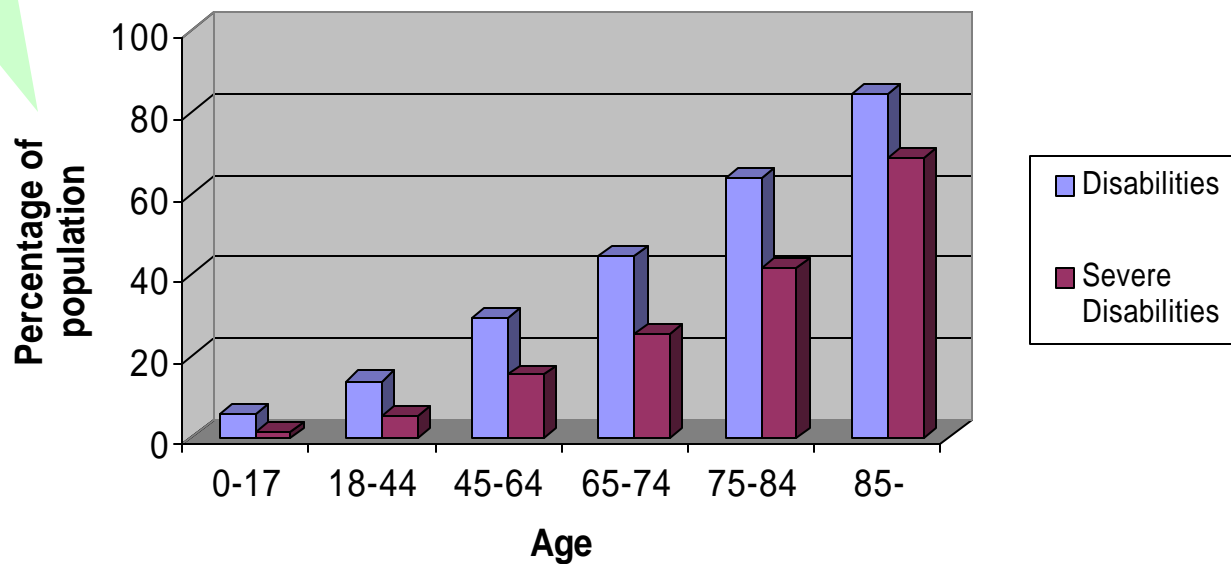
Person's Functional Capacity



# The Needs of Our Aging Population

40% of the people over age 65 in North America need some forms of assistive technology

Figure 1: Population of Individuals with Disabilities in USA



# Types of Assistive Technology

- Mobility Assistive Technology
- Sensory Assistive Technology
- Communication Assistive Devices
- Environmental Control Systems
- Other Daily Living Aids



Assistive Technology  
Devices for Daily Living

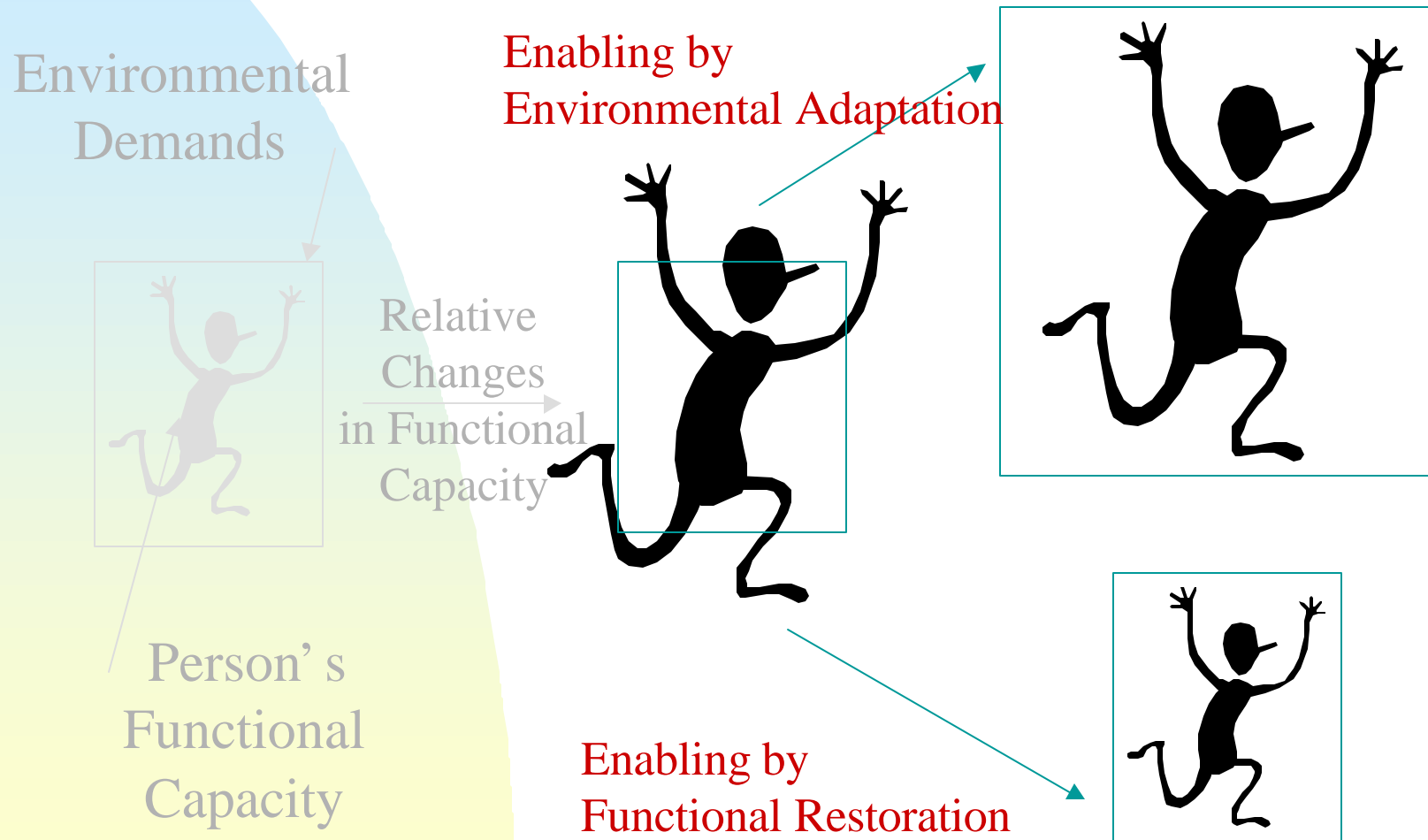


# Environmental Control System



# Enabling Process

(from Enabling American 1997)





# Environmental Facilitation

Architectural  
Neighborhood  
Transport  
Information  
Communication  
Technology

Good designs facilitate.  
Poor designs inhibit / constrain.

# Architecture & Neighborhood



From RERC UD

From HHRI



From RERC Ageing



# Kitchen Products

# Bathroom Products



From RERC UD

# Kitchen Products



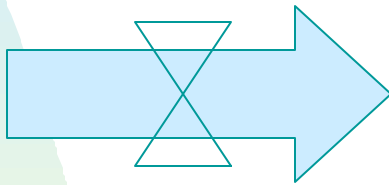
From RERC UD

# Home Appliances

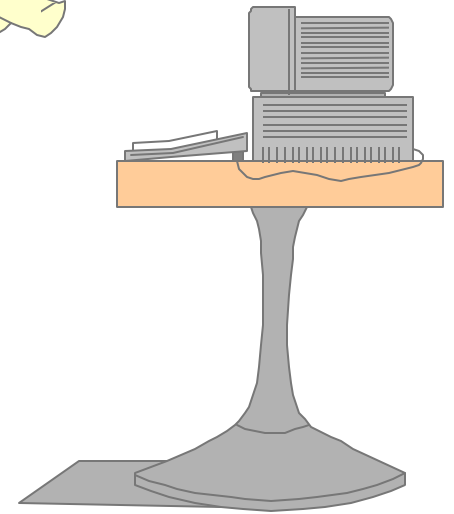
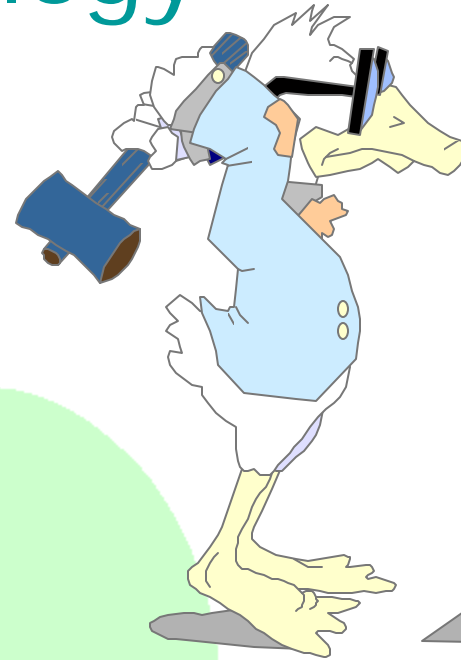


Advances in Technology

!?



Less Barrier

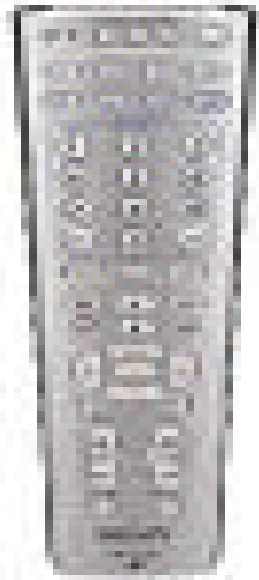




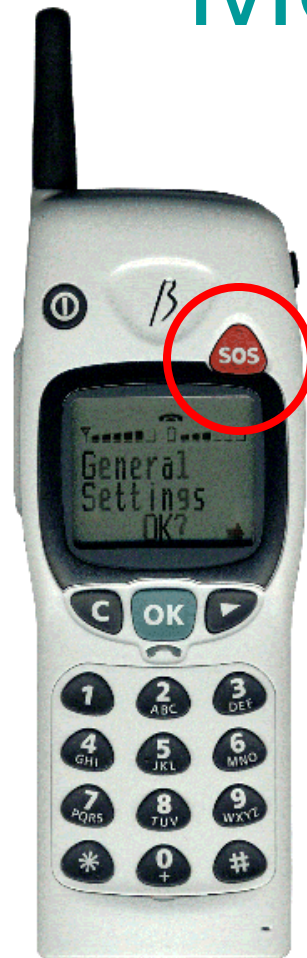
# Home AV

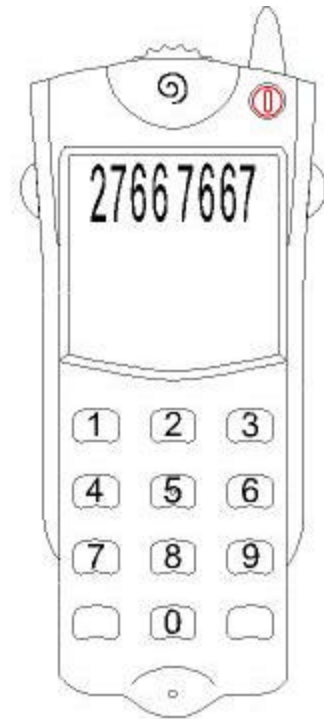
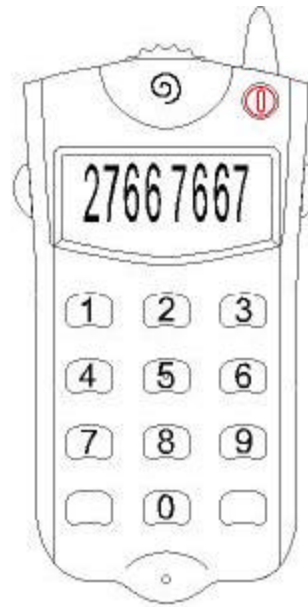


# Universal Remote Control



# Mobile Phone





# The Principals of Universal Design

(from The Center for Universal Design,  
North Carolina State University, 1997)

Equitable Use

Size and Space for Approach and Use

Flexibility in Use

Low Physical Efforts

Simple and Intuitive Use

Tolerance for Errors

Perceptible Information

# Accessible or Adaptable Design

- **ACCESSIBLE** design, which takes into account as many potential users as possible starting from the product conceptualization stage, should also include the needs of the Elderly.
- Design of a general consumer product should allow the product to be readily **ADAPTED** for use by a wide range of end-users, including those who are elderly.
- These design strategies should be applied to all technology.

## What one can learn from building accessibility -

- The expensive cost of retrofitting / adaptation
- The roles of consumer advocacy
- The involvement of professionals
- The impacts of guidelines, standards, and regulations
- The needs of continual monitoring
- The needs of public awareness

Are these issues relevant to other consumer technologies ?

## Mission Possible?

- Not all technology can be made accessible to all people with all disabilities or combinations of disabilities at this point of time.
- Is the technology as accessible as it could be?

Vanderheiden 1997

# Benefits of Assistive Technology & Accessible Environment

Effectiveness of Assistive Technology and Environmental Interventions in Maintaining Independence and Reducing Home Care Costs for the Frail Elderly: A Randomized Trial.

Mann WC, *et al* (1999). Archives of Family Medicine. May/June. Volume 8.

## Benefits of Assistive Technology & Accessible Environment *Mann et al*

**Objective:** To evaluate a system of AT/ EI service provision designed to promote independence and reduce health care costs for physically frail elderly.

**Design:** Randomized controlled trial. **Setting and Participants:** 104 home based frail elderly living in Western New York were assigned to one of two groups (52 treatment, 52 control). **Study Duration:** 18 months.

# Benefits of Assistive Technology & Accessible Environment

## Mann *et al*

### Intervention:

- All participants received a comprehensive functional assessment and evaluation of their home environment.
- Participants in the treatment group received AT and EI based on the results of the comprehensive evaluation. Monthly phone calls and six-month reassessments determined additional or changing needs, with additional AT and EI provided.
- The control group received "usual care services."

### Main Outcome Measures:

- Functional Independence Measure (FIM)
- Health care costs including the costs and services related to AT and EI, in-home health care personnel (therapist, nurse and case manager visits and aide hours), and institutionalization costs (hospitalizations and nursing home stays).

# Benefits of Assistive Technology & Accessible Environment *Mann et al*

## ■ RESULTS

	<u>Treatment</u>	<u>Control</u>
FIM Total Score Decline	4	11.5
FIM Motor Score Decline	2.5	8.6
AT/ EI Costs	\$2,620	\$443
Institutional Care Costs	\$5,630	\$21,847
In-Home Personnel Costs		nsd

# Benefits of Assistive Technology & Accessible Environment

**The frail elders experienced functional decline over time.**

**The study indicated the rate of decline can be slowed, and the cost of institutional care reduced through a considerate provision of assistive technology and an accessible environment.**



Accessibility via Technology  
Better Functional Independence  
More Cost Effective