

# DOMO ARIGATO MR. ROBOTO: THE USE OF SIMULATORS IN TRAINING

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## USE OF NON-HUMAN SIMULATORS

- Effective training typically includes an intermediate step between the classroom instruction and working directly with clients
- Researchers in other fields have adopted training methods utilizing non-human simulators
- We provide a short overview of research evidence on the advantages and disadvantages of using simulators in behavior analysis and other fields

## OVERVIEW OF FINDINGS FROM OTHER FIELDS

### Aviation

Hays et al. (1992)

- Meta-analysis of flight simulators
- Found that simulation is an effective method of training pilots

### Medicine

Cook et al. (2010)

- Meta-analysis of virtual patients (VP) used to train health care professionals
- Found that in comparison with no intervention, VPs are associated with higher learning outcomes

Johnson et al. (2011)

- Designed, validated, and used a training simulator to teach medical residents to perform a Seldinger procedure.
- Found that skills learned on a simulated patient transferred to real patients

### Military

Schribner et al. (2007)

- Compared a shooting simulator with live fire
- Found no difference in hit performance between the two

## ADVANTAGES

- Ethical concerns of using clients
- Increased control over educational environment
- Cost/resource effectiveness
- Learning is not client dependent
- Complex skills can be broken down to small components

## DISADVANTAGES

- Sparse literature on how skills acquired during simulator training transferred to natural environment
- Experimenters often measured how well the skill was acquired by testing on the simulator rather than a real world application of the skill
- Difficulties with generalization

## OVERVIEW OF FINDINGS FROM BEHAVIOR ANALYSIS

### Skill Acquisition

- Anatomical dolls used to train children self-administration of various medical procedures
- Neef et al. (1989) taught children self-catheterization preparation, insertion, and clean up
- Derrickson et al. (1991) taught children who had undergone tracheostomy to self-administer a suctioning procedure
- Reimers et al. (1995) taught an adolescent with Crohn disease to insert his own nasogastric tube
- McComas et al. (1999) taught children self-catheterization and were able to decrease latency during training

### Examining Behavioral Processes

- Non-human simulators used to examine various behavioral processes
- Loeber (1971) examined the effects of a simulated client's head banging on staff behavior and found rewarding staff increased treatment integrity while indicators of client improvement did not
- Thompson et al. (2011) examined the effects of a simulated infant's crying on care giving responses of nine participants under experimental conditions and found that their behaviors were under the control of negative reinforcement

## ADVANTAGES

- Same advantages listed for other fields
- Addressed disadvantages of other fields by:
  - Measuring skill gains in natural environment
  - Programming multiple exemplars for generalization

## DISADVANTAGES

- Need more literature directly comparing training methods
- Trainers can benefit from a better understanding of the behavioral processes at work during training

## OUR LAB'S CURRENT EFFORTS

- NAO
  - Autonomous programmable humanoid robot
  - 23" tall, object recognition capabilities, speaks nine languages
  - Highly versatile platform that allows users to create and edit a wide variety of complex behaviors
  - Used across classrooms and research labs



NAO selecting items during a preference assessment

- Our lab has begun initial steps in using NAO in place of a confederate to examine numerous variables
  - Schedules and type of feedback
  - Complexity of task when feedback is delivered
  - Training of staff, teachers, caregivers

## FUTURE CONSIDERATIONS

- Advances in technology will allow simulated clients to resemble real clients more closely
- Expand upon the literature utilizing non-human simulators to examine variables that may otherwise be difficult to hold constant
- Consider using simulators during training of skills that may be dangerous to train in-vivo or for which opportunities for teaching are limited

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