

ProbonoWorld:

Educating the Mentally Handicapped in a Virtual Environment using Props on a Board

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Overview

- Motivation
- Existing Systems
- Input Device
- Navigation
- Learning
- Future Work

Motivation

- Computer-based learning common in schools
- Very few programs for mentally handicapped children
- Schools use unspecialized programs

Aim

- Develop education system for children with mental handicaps
- Topic: train planning skills for independent life
- Implementation: realistic virtual world

Motivation

Existing Systems

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General Questions

- Which interface can we use?
- How to design the virtual world?
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Interfaces for Virtual Learning Environments

	AS Interactive  [Cobb et. al. 2002]	AVC  [Geiszt & Sik-Lanyi 2006]	ProBoNo  [Schild & Göttel 2005]
Visual Interface	Monitor	HMD	Monitor
Interaction Device	Mouse, Joystick	Voice	Prop on a Board

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Our Interface

- Input device: Prop on a Board



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World Structure



- Representation of virtual world in layers
- Organisation follows tree-like structure

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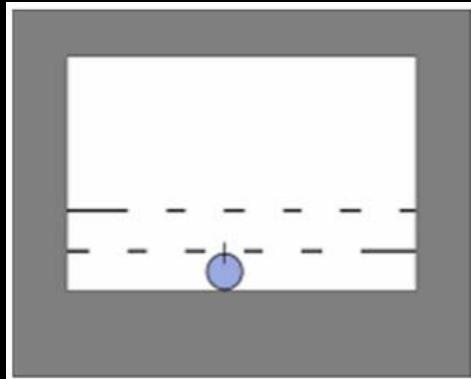
Evaluation

Future Work

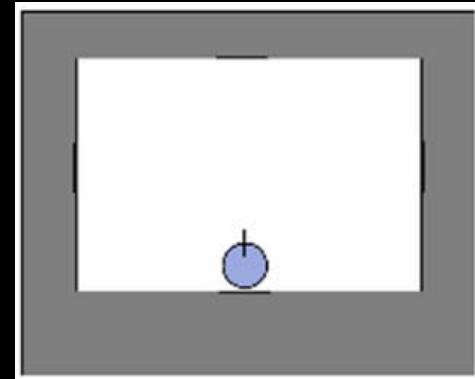
Conclusion

Navigation Strategies

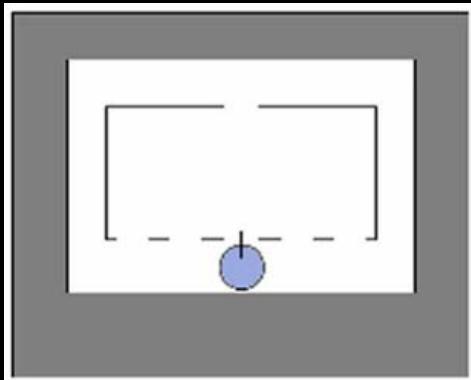
Street Navigation Strategy



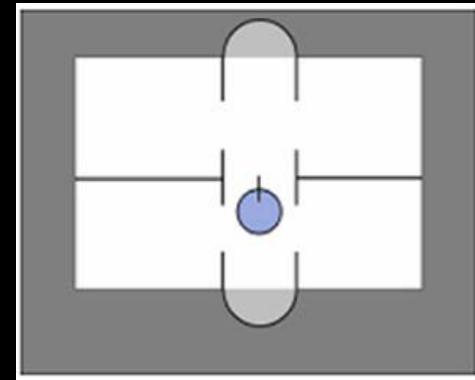
Button Navigation Strategy



Staircase Navigation Strategy



Position Navigation Strategy



Motivation

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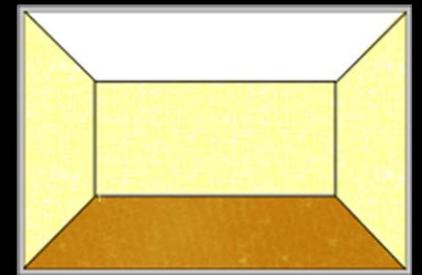
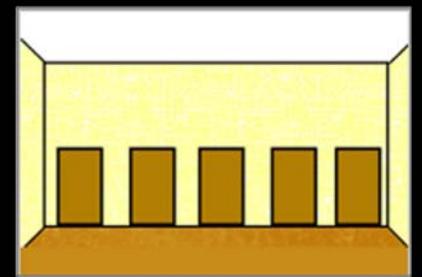
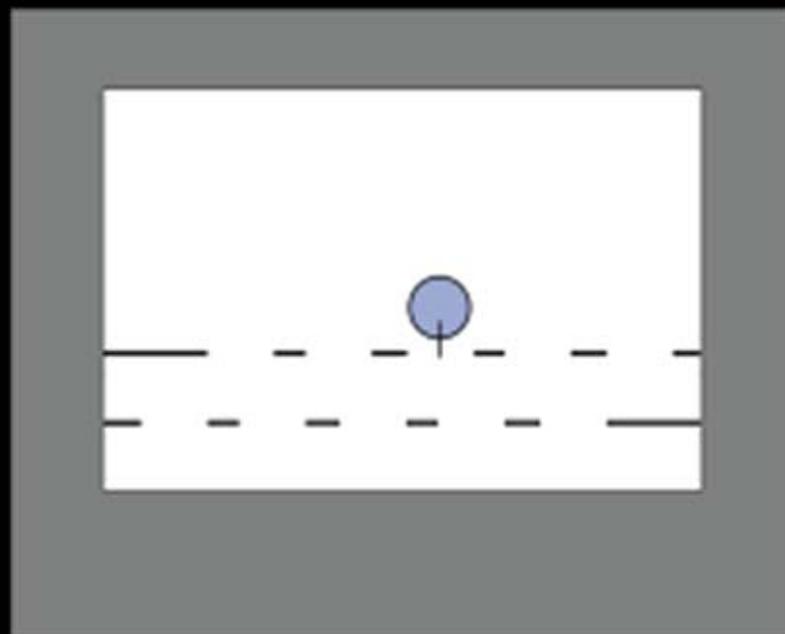
Planning

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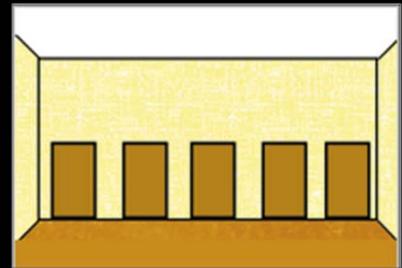
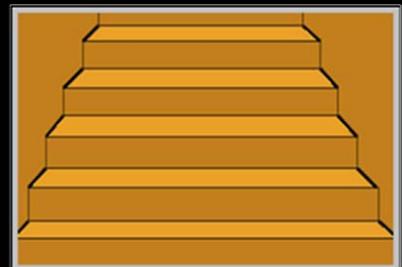
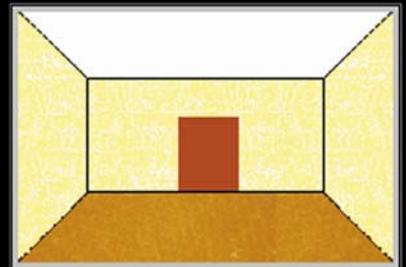
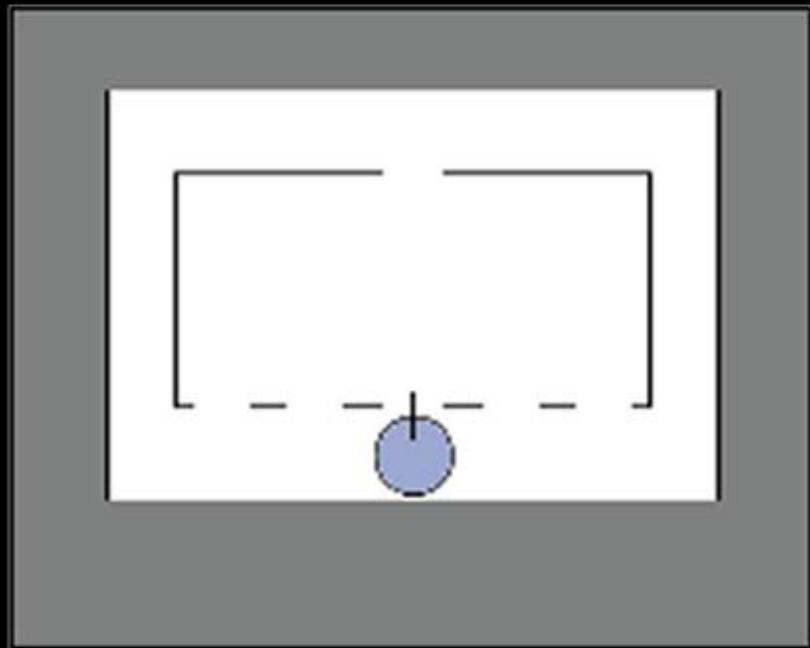
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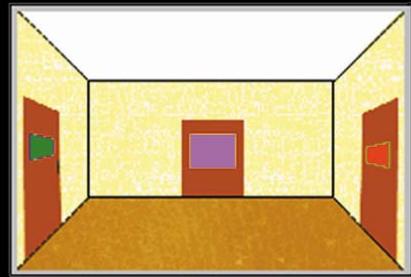
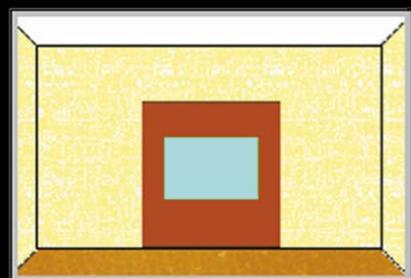
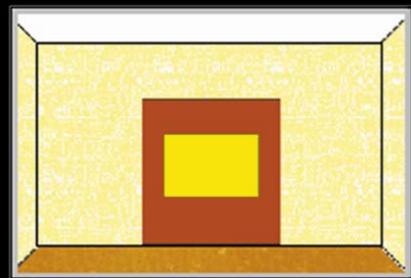
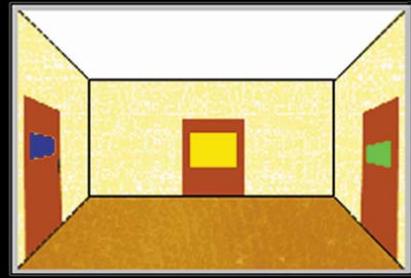
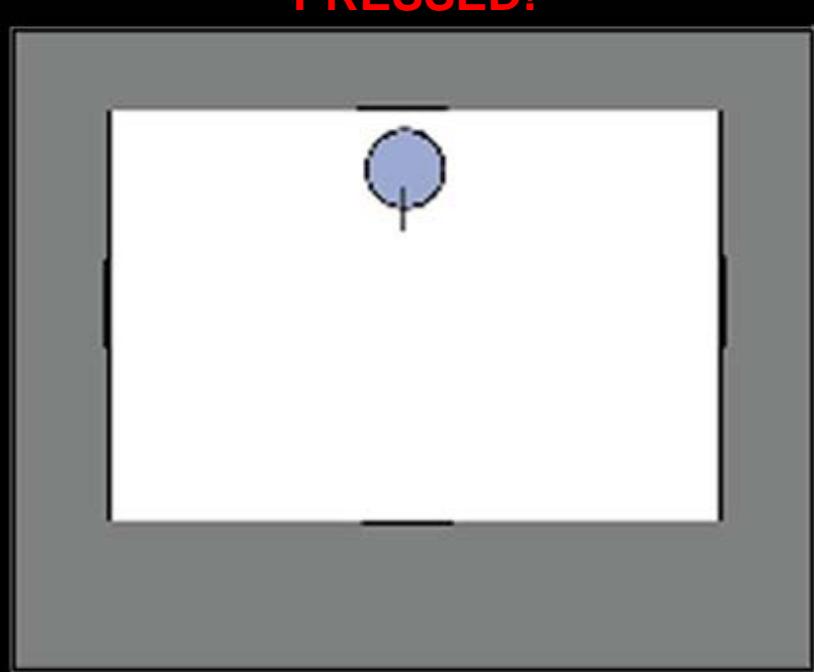
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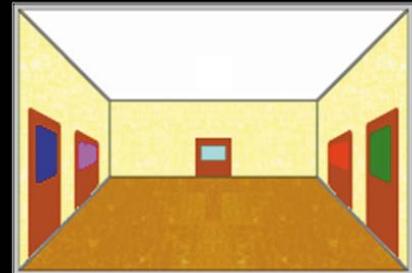
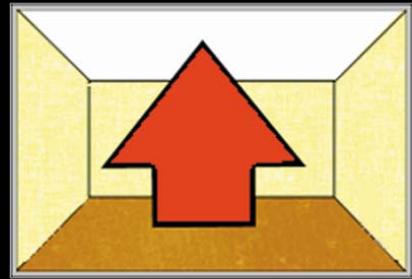
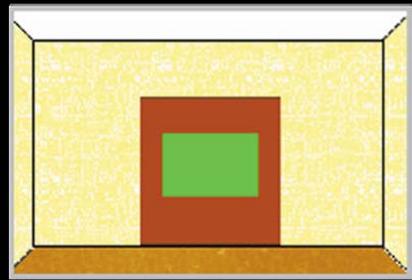
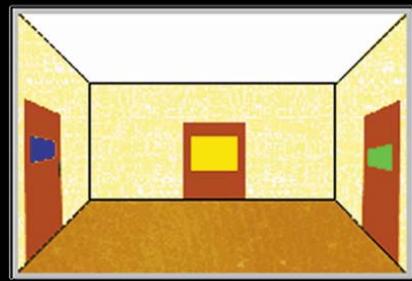
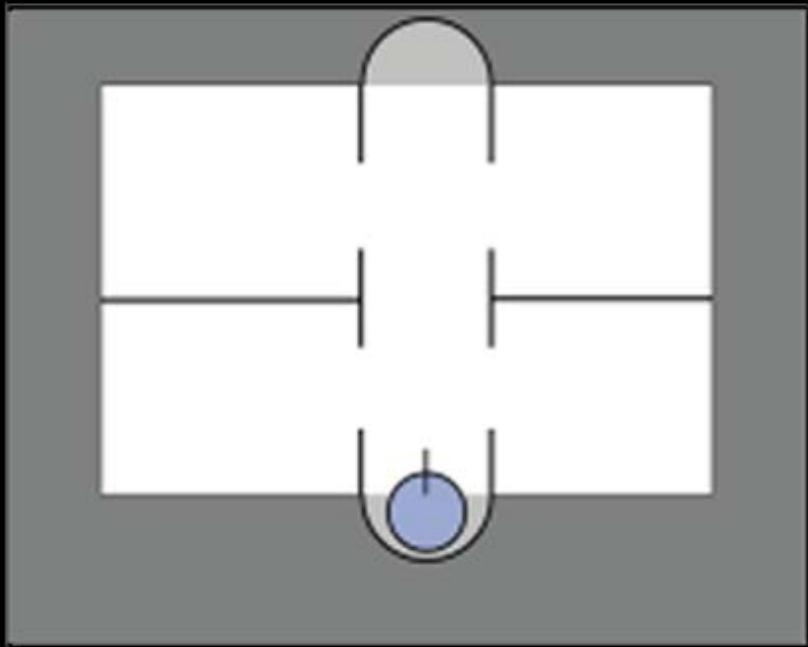
Staircase Navigation Strategy



Button Navigation Strategy



Position Change Navigation Strategy



Navigation Strategies Evaluation

		Staircase	Street	Button	Position
Navigation Complexity	Orientation	***	*****	**	***
	Board->World	*	****	****	**
	Nav. difficulty	***	*****	**	**
Ergonomics	World layout	*	**	*****	**
	Board usage	*	*	*****	***
	Extensibility	*****	*	*****	*****
	Haptics	***	*****	*	*
Overall Score		**	***	*****	**

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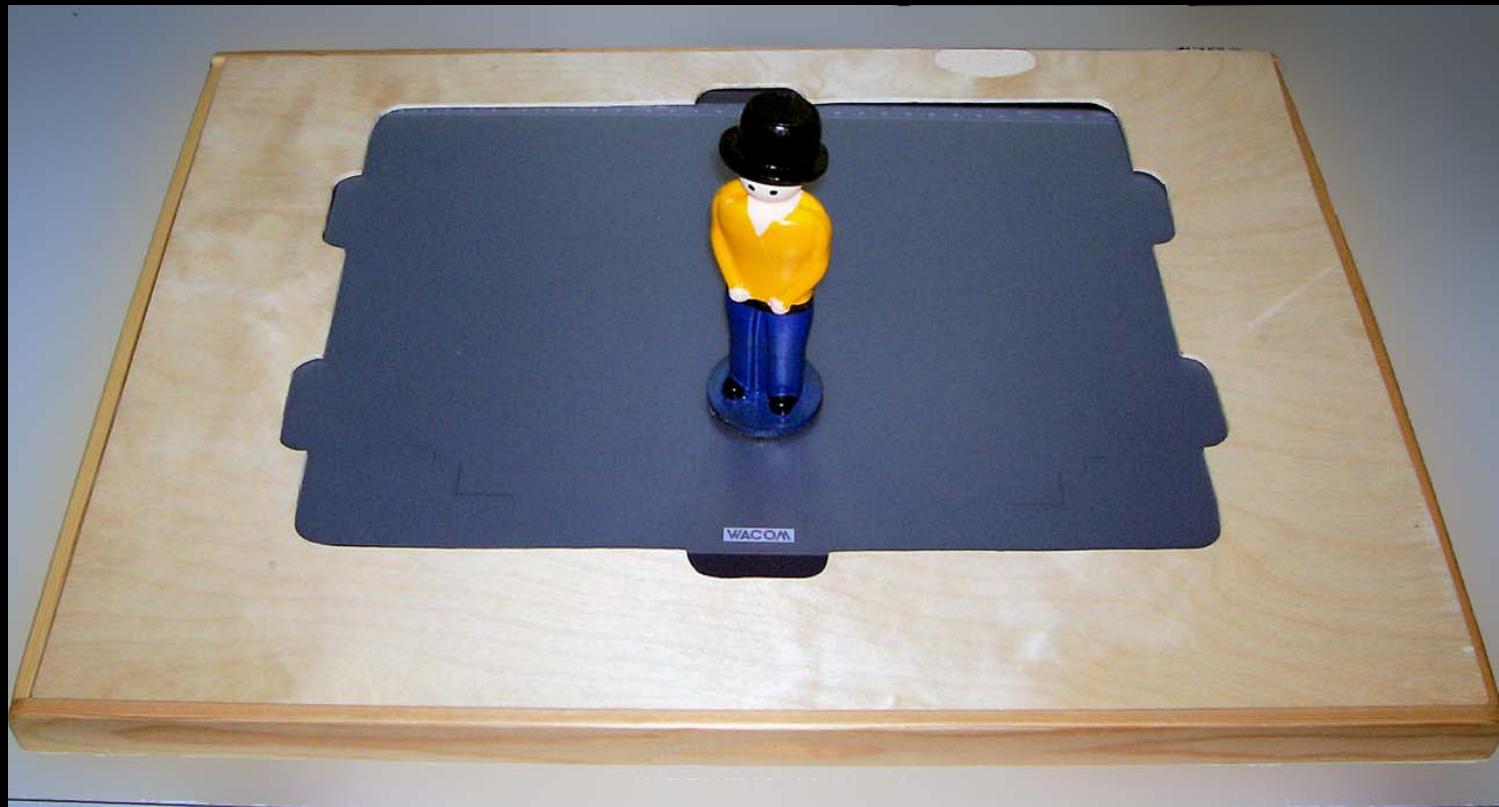
Planning

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Board Setup



Motivation Existing Systems Navigation Planning Evaluation Future Work Conclusion

Navigation in the Virtual World



VIDEO



Motivation

Existing Systems

Navigation

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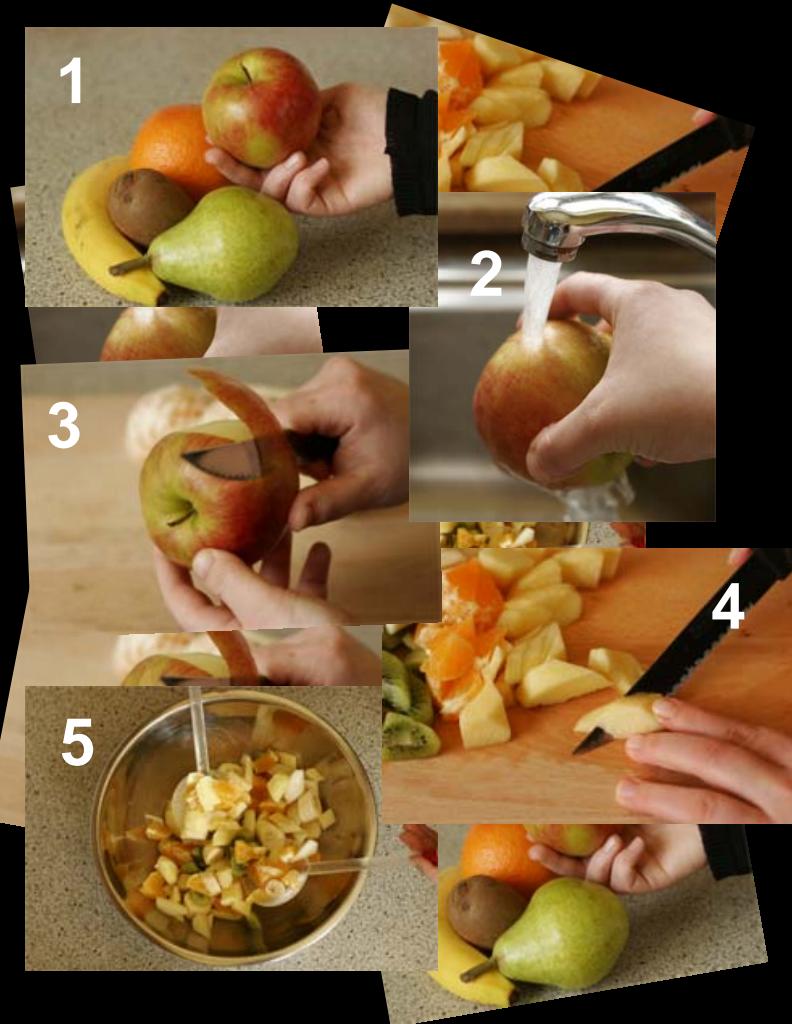
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Planning Tasks



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Planning Tasks

Deine Aufgabe: Bereite einen Obstsalat zu!



Alles richtig!

VIDEO



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Assignment of Tasks



Time →

Motivation

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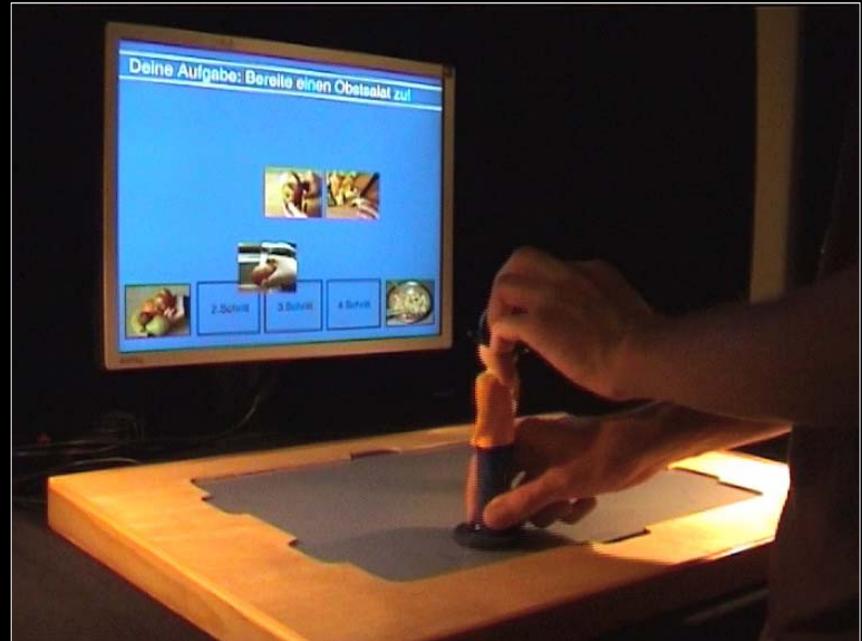
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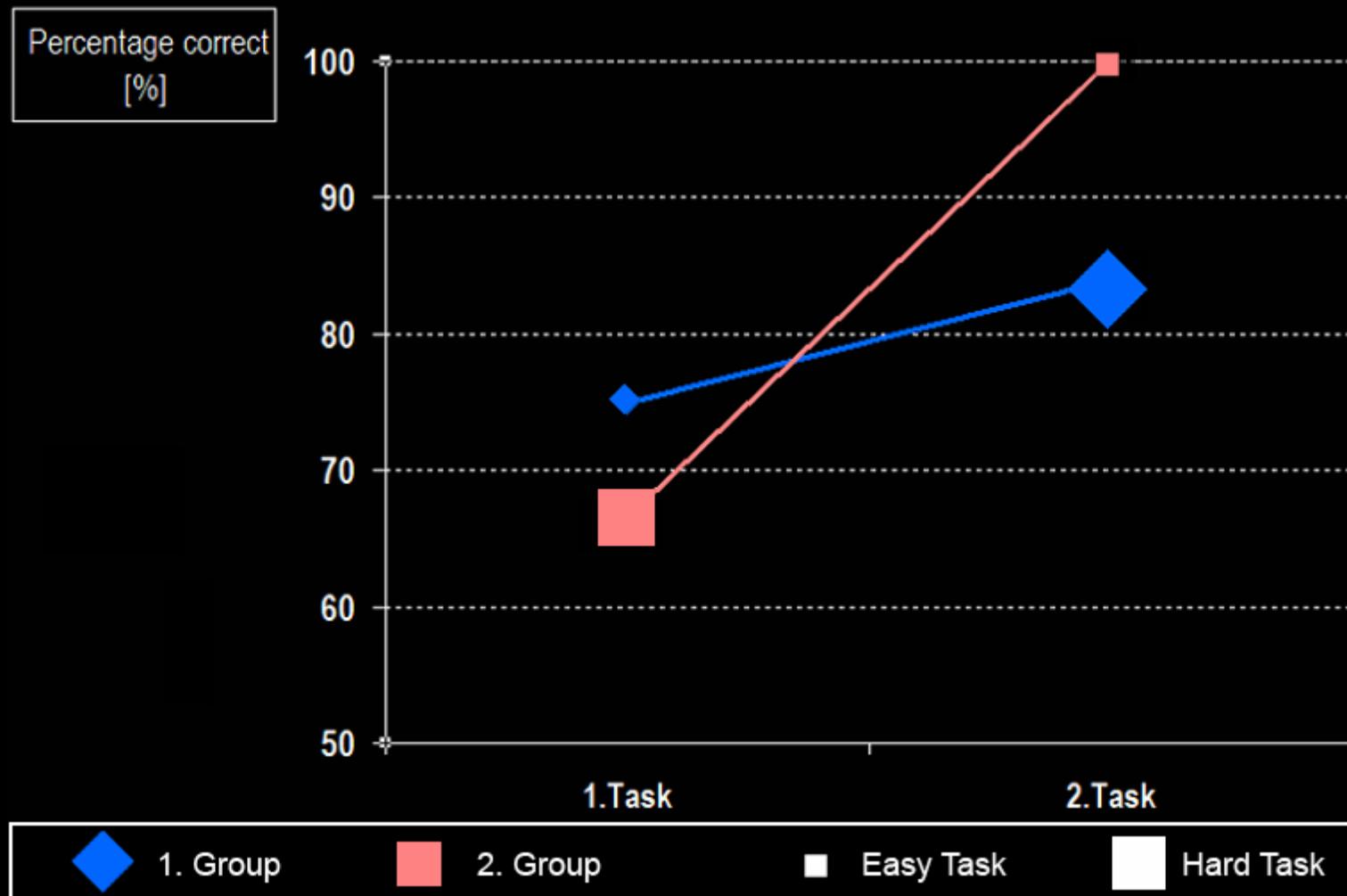
Conclusion

Planning Task Evaluation

- Usability of device,
interface design and
navigation strategy
- Learning effect
- 24 children
- Tasks:
 - Fruit salad or letter
 - Hard or easy



Planning Task Evaluation



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Other Observations

- Inexperienced users embraced system
- Prop handling and grasping easy
- Orientation and navigation no problem
- Wooden indentations helpful
- Correct association with rooms



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Conclusion

- New system for mentally handicapped children
- Training of everyday tasks
- Intuitive interaction concept
- Appropriate navigation strategy for extendable world
- Evaluation showed great acceptance

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Future Work

- Adjustability of interface & task difficulty
- Tasks in 3D & spanning several locations
- Feedback system
- Authoring tool
- Assess the impact of training on the improvement of real world skills

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The End

Thank you for listening!

Virtual Reality Systems Group
www.uni-weimar.de/medien/vr