



Using Virtual Reality to Test Educational Strategies for Genomic Concepts

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Overview

- Background
- Experimental design
- Pilot results

Common Genetic Variants & Common Conditions

	<u>Marker</u>	<u>Function</u>
Drug Response	Cytochrome P450	Drug metabolism
Colon Cancer	MTHFR	Folate metabolism
Type 2 Diabetes	PPAR gamma KCNJ11	Fat cell development Insulin regulation
Lipid metabolism	OLR1, IL-6	Plaque development Inflammatory response
Osteoporosis	COLIA1, ER-a	Accelerated bone loss Estrogen resistance

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Background and rationale

- Limited genomic knowledge in US adults
- Focus: Gene*Environment interactions
- Research in science education suggests active learning for abstract concepts

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Research questions

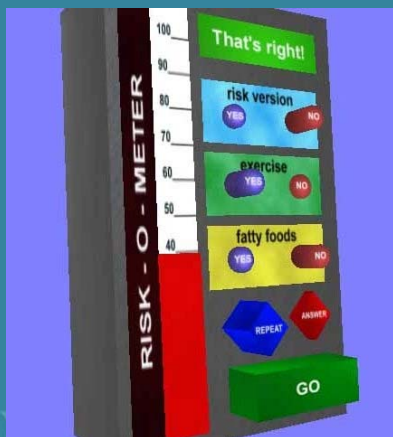


- What is the effect of learning mode on comprehension of G*E concept?
- Is the hypothesized association moderated by health literacy level?
- What are potential mediators of the hypothesized association?

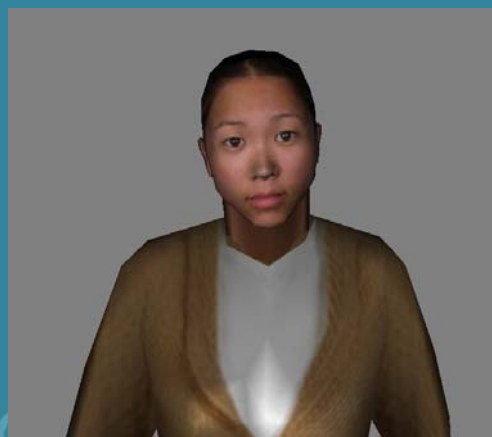
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Independent variable: Pedagogical mode

Active learning



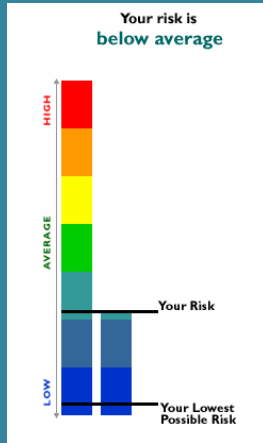
Didactic learning



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Metaphor

Your Disease Risk
THE SOURCE ON PREVENTION



The "risk" elevator



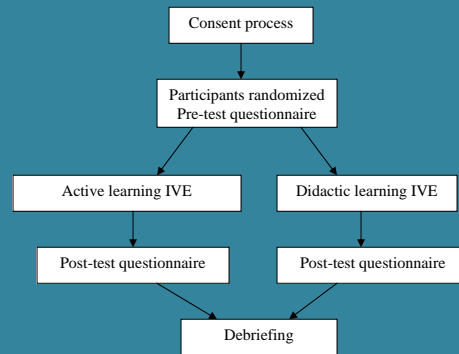
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Dependent variables

- Comprehension
 - Recall
 - Transfer
- Mental models

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Experimental procedure



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System parameters

- HMD-based VE system
 - nVisor SX
- 6 dof tracking system controlled by body movement
 - WorldViz 4-camera Point Position Tracking system
 - InterSense InertiaCube
- Custom software
 - Developed for Vizard (WorldViz)



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Didactic IVE development



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Didactic learning IVE



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Active learning IVE



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Pilot results

	Active learning	Didactic learning
Change in recall	1.7	3.4
Transfer	2.1	2.5
Interest 1	5.3	4.6
Interest 2	4.6	3.8
Like	5.7	5.1
Motivation	5.6	5.1
Attention	6.1	5.6
Elaboration 1	5.4	4.9
Elaboration 2	4.4	4.1
Presence	5.0	3.9
Satisfaction/ enjoyment	5.4	4.5

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Future directions

- Currently enrolling 150 community members 18-40
- Plan to examine characteristics of environments that affect learning
- Will develop other metaphors for visualizing risk

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