The Effects of Computer-Assisted Instruction on Physical Skills Acquisition

Melanie Fowler
University of Colorado, Denver

Bryan Ferguson
Metro State College of Denver
Overview

- Background
- Methods
- Results
- Discussion
- Questions
Background

- Experiential Learning
  - Kolb

- Layered Learning Theory
  - Repeated exposure to material increases comprehension. (Schwartzman & Tuttle, 2002)

- Computer-Assisted Instruction
  - Combines traditional instruction with Internet, CD-ROM, or other computer technology.
Experiential Learning

Kolb Cycle of Learning  (Curtis Kelly)

http://iteslj.org/Articles/Kelly-Experiential/
Experiential Learning

Our proposed cycle of learning

[Diagram showing the cycle of learning with stages: Beginner, Practice, Learner attempts, Execute skill, Guided reflection, Instructor feedback, Intermediate, Practice, Peer feedback, Reflection, Expert, Practice, Self analysis, Peer feedback, Review, Learning Cycle]
Background

- Computer-assisted instruction resulted in higher achievement than no instruction of physical skills. (McKethan, Everhart, & Sanders, 2001)

- Interactive video instruction was more effective than self-directed instruction (Walkley & Kelley, 1989)

- Multimedia has a positive effect on learning in most cases (Liao, 1999)
Background

■ Problem
  – We do not know the effects of computer-based learning assets on acquisition of physical skills.

■ Action
  – Examine effects of web-based video instruction on learning physical skills
Hypothesis

- Participants who receive web-based video instruction on the forward stroke and the sweep stroke will perform the skills better than those who do not receive web-based video instruction on the two skills.
Method

- Participants
  - 26 adults ages 19 to 51
    Median age = 27
  - Female: 58%    Male: 42%
  - White: 84%,
    Hispanic: 4%
  - Asian-American: 4%
  - Native American: 4%
  - Other: 4%
Method

- Participants
  - 77% had no experience with kayaking
  - 69% had DSL/Cable or On-campus connection to the internet
Variables

- **Independent Variable**
  - Web-based video learning group

- **Dependent Variables**
  - Post-test forward stroke score
  - Post-test sweep Stroke

- **Covariates**
  - Pre-test forward or sweep stroke score
  - Number of times videos watched
Method

- Procedure
  - Assessed skills after first class
  - Asked participants to visit a web page
  - Assessed skills after last class
  - 3 kayak classes over 3 weeks
Method

Web pages: http://www.mscd.edu:9099/kayaks/
Videos – 1 of 4

Straight Stroke

Front View
Videos – 2 of 4

*Sweep Stroke*

*Side View*
Videos – 3 of 4
Videos – 4 of 4

Front View
Results Forward Stroke

Main effect

Group: F(24,2)=3.67, p<.05

Covariates

Pre-test Score: F(24,1)=0.78, ns

Video Viewing: F(24,1)=3.22, p<.05

(M=2.67)
### Results Forward Stroke

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Number of Hits</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Videos</td>
<td>2.80</td>
</tr>
<tr>
<td>Relevant Videos</td>
<td>1.59</td>
</tr>
<tr>
<td>Irrelevant Videos</td>
<td>4.41</td>
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</tbody>
</table>
Discussion

■ Application
  – University and secondary schools
  – Outdoor leadership programs

■ Limitations
  – Small Sample Size
    ■ No traditional control group
  – Loss of learner control
    ■ Difficulty pulling students to the web
  – Bandwidth/Resolution

Kelly, C (????). http://iteslj.org/Articles/Kelly-Experiential/


Questions?