Application of the Use of Online Streaming Video for Instruction of Psychomotor Skills in Health Professions

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The Use of Online Streaming Video for Instruction of Psychomotor Skills: Theory and Application

Kathy Swanick PT DPT MSEd OCS
Ellen Williamson PT MS
Arie van Duijn PT EdD OCS
Blooms Taxonomy

- Cognitive Domain: Bloom 1956
- Affective Domain: Krathwohl, Bloom and Masia 1973
- Psychomotor Domain: Simpson, 1972
<table>
<thead>
<tr>
<th>Instructional Strategy</th>
<th>Cognitive Domain (Bloom, 1956)</th>
<th>Affective Domain (Krathwohl, Bloom, &amp; Masis, 1973)</th>
<th>Psychomotor Domain (Simpson, 1972)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture, reading, audio/visual, demonstration, or guided observations, question and answer period</td>
<td>1. Knowledge</td>
<td>1. Receiving phenomena</td>
<td>1. Perception</td>
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<tr>
<td></td>
<td></td>
<td>2. Set</td>
<td>2. Guided response</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>3. Mechanism</td>
</tr>
<tr>
<td>Discussions, multimedia CBT, Socratic didactic method, reflection. Activities such as surveys, role playing, case studies, fishbowls, etc.</td>
<td>2. Comprehension</td>
<td>2. Responding to phenomena</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Application</td>
<td></td>
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<tr>
<td>On-the- job training (OJT), practice by doing (some direction or coaching is required), simulated job settings (to include CBT simulations)</td>
<td>4. Analysis</td>
<td></td>
<td>5. Adaptation</td>
</tr>
<tr>
<td></td>
<td>5. Synthesis</td>
<td>4. Organize values into priorities</td>
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<tr>
<td>Use in real situations. Also may be trained by using several high level activities coupled with OJT.</td>
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<td>High interest (hard to train to these levels because they take more time than normal classroom periods allow). Normally developed on own through self-study or learning through mistakes, but mentoring and coaching can speed the process.</td>
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Our Current Context

- Graduate students enrolled in professional program
- Complex psychomotor tasks / clinical skills
- Investigated use of streamed video in combination with traditional labs
- Research is ongoing with each new cohort of students
- Through this project became interested in psychomotor learning theories and learning styles
Psychomotor Theory

- Romiszowski (1997): focuses on complex physical and cognitive skills that are acquired in combination with each other
Psychomotor Theory

Five Stages:

- Acquire knowledge: of what should be done, why, in what order and how
- Execute actions: in correct order for each part of the skill
- Transfer control: from the eyes to the kinesthetic or other senses
- Automatize the skill: through repetition
- Generalize the skill: to a wider application
# Psychomotor Learning

<table>
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<tr>
<th>Bloom Category</th>
<th>Romiszowski Stages</th>
<th>Application</th>
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<td><strong>Perception:</strong> the ability to use sensory cues to guide the motor activity, ranges from sensory stimulation, through cue selection to translation</td>
<td>Acquire knowledge: of what should be done, why, in what order and how</td>
<td>Video provides auditory and visual cues, but lacks tactile cues.</td>
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Psychomotor Learning

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<td><strong>Set:</strong> Readiness to act: includes physical, mental and emotional sets. These 3 sets predetermine a persons response to different situations</td>
<td>Acquire knowledge: of what should be done, why, in what order and how</td>
<td>Video provides cues for mentally setting the activity. Audio provides step by step instructions</td>
</tr>
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## Psychomotor Learning

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<td><strong>Guided Response:</strong></td>
<td>Execute actions: in correct order for each part of the skill</td>
<td>Students can use video for on demand review of skills. Traditional face to face lab provides a one time demonstration</td>
</tr>
<tr>
<td>Early stages in learning a</td>
<td></td>
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<td>complex skill that includes</td>
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<tr>
<td>imitation and trial and error.</td>
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<tr>
<td>Adequacy of performance is</td>
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<td>achieved through practice</td>
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<td><strong>Mechanism:</strong> intermediate stage in learning a complex skill. Learned Responses become habitual, movements are performed with some confidence and proficiency</td>
<td>Transfer control: from the eyes to the kinesthetic or other senses</td>
<td>During independent practice video can provide feedback mechanism for students</td>
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<td><strong>Complex Overt Response:</strong> skillful performance of motor acts that involve complex movement patterns, proficiency is indicated by quick, accurate and highly coordinated</td>
<td>Automatize the skill: through repetition</td>
<td>Students can submit video of themselves performing the skill to receive faculty feedback, assessment can also be done face to face</td>
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<td><strong>Adaptation:</strong> Skills</td>
<td>Automatize the skill: through repetition</td>
<td>Apply simple techniques to more complex tasks, carry over into clinical practice.</td>
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<tr>
<td>are well developed and the individual can modify movement patterns to fit special requirements</td>
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<tr>
<td><strong>Origination:</strong> Creating new movement patterns to fit a particular situation or problem, emphasizes creativity based on highly developed skills</td>
<td>Generalize the skill: to a wider application</td>
<td>Students can apply the skill in a novel way and use video to develop a library of applications</td>
</tr>
</tbody>
</table>
Research Results

- Generally no differences in performance outcomes
- Drilling down looking at the individual learner
  - Individual learner characteristics
  - Usage behaviors
Individual Learner Needs

Learning Style Preferences

Personality Preferences

How can we apply what we know about teaching psychomotor tasks online and still consider individual learner needs?
Learning Style Preferences

- Kolb Learning Style Inventory (LSI)
  - Diverger
  - Assimilator
  - Converger
  - Accommodator
Learning Style Preferences

- **Diverging Style:**
  - considers information prior to taking action
  - Works in groups well
  - Prefers personalized feedback

- **Streamed video:**
  - Provides that ‘consideration time’
  - Would need the group interaction and feedback to maximize
Learning Style Preferences

- **Assimilating Style:**
  - Abstract thinkers, like theory
  - Like to consider material on their own

- **Streamed video:**
  - This group most difficult
  - May be too concrete as stand alone
Learning Style Preferences

- **Converging Style:**
  - Practical learners
  - Work well alone

- **Streamed video:**
  - Best suited for this method
  - Would be good to pair up with others
Learning Style Preferences

- **Accommodating style:**
  - Hands on learners
  - Act on intuition
  - Work well with others

- **Streamed video:**
  - Good for slowing them down
  - Provides best practice technique prior to hands on
Personality Preferences

- Myers-Briggs Type Indicator (MBTI):
  - Introvert (I) vs. Extrovert (E)
  - Thinking (T) vs. Feeling (F)
  - Judging (J) vs. Perceptive (P)
  - Sensing (S) vs. Intuition (I)
Personality Preferences

Introvert (I)

- focus inward (be reflective) in a quiet environment
- streamed video: observe tasks over and over prior to practicing with peers

Extrovert (E)

- interactive, collaborative learning
- streamed video: in lab/practice session as a resource while they learn.
Personality Preferences

Thinking (T)

- concrete facts and information
- streamed video: concrete, step by step procedure; could be used to verify feedback to/from peers

Feeling (F)

- value personal interaction and group ‘harmony’
- streamed video: provides ‘unified’ look at a procedure; consensus point for practice
Personality Preferences

Judging (J)
- immediate decisions; may not consider the step-by-step procedures

Perceptive (P)
- Consider great deal of information before acting
- streamed video: helps focus, especially when many procedures to learn.
Personality Preferences

Sensing (S)
- prefer established facts, good with memorization
- video streaming: allows factual memorization, but gives big picture

Intuition (I)
- connect different pieces of information well, but sometimes lose detail
- video streaming: provides the detail
Questions???