Promoting Curiosity in Students using a Design Theory Approach

Sarah McLean, PhD

Western University
ALL LIFE IS PROBLEM SOLVING-
KARL POPPER
Overview

5 components of the design process
Constructivism vs. constructionism
Development of Dragons’ Den Project
Sample Projects
Feedback
DESIGN PROCESS
Learning Theories
Dragons’ Den
Sample Projects
Feedback

Imagining
Creating
Sharing
Playing

Resnick, 2007
<table>
<thead>
<tr>
<th>CONSTRUCTIVISM</th>
<th>CONSTRUCTIONISM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceptual changes by experience</td>
<td>Conceptual changes by experience and <em>making</em></td>
</tr>
<tr>
<td>Learning can still occur in silos</td>
<td>Learning is silo-less</td>
</tr>
<tr>
<td>Instruction is embedded in an authentic context</td>
<td>Design and creation of novel things in learning is important</td>
</tr>
<tr>
<td>Piaget</td>
<td>Papert</td>
</tr>
</tbody>
</table>

(Ackerman, 2001)
What’s missing?
Design Process
Learning Theories
Dragon’s Den
Sample Projects
Feedback
EndoChip: A novel, non-invasive diagnostic tool for endometriosis

Natasha Kayumi, Siddhi Lakhani, Ke Meng (Mary) Wang

Western University

I have adhered to the University policy regarding academic integrity in completing this assignment. I have also submitted and reviewed my submission to Turnitin.

Submitted to Dr. Sarah McLean in fulfillment of the course requirements for Medical Sciences 4200G at the Schulich School of Medicine and Dentistry.

Disease outline: pathophysiology, biochemistry, and epidemiology

Fibromyalgia (FM) is a chronic inflammatory disease characterized by increased sensitivity and response to pain. 51.4% of patients also experience fatigue and cognitive impairment (Wolf, Walitt, Katz and Häuser, 2014). The prevalence of FM is 2-8% (Cerdà-Olmedo, Mena-Durán, Monsalve and Oltra, 2015), however there is variability due to high undiagnosed rates, and poor diagnosis criteria. FM is found worldwide with no known trends based on location or environment (McBeth and Jones, 2007). FM affects 3.4% of females but only 0.5% of males, although the reason is unclear because the etiology of FM is not fully understood (Borchers and Gershwin, 2015).

Some researchers suggest that FM is triggered by stress or physical trauma, but genetics and environmental factors also seem to play a role (Kato, Sullivan, Evengård and Pedersen, 2009). FM is perpetuated by central sensitization; repeated unpainful stimuli are perceived as painful, and the pain will increase with each stimulus (Desmeules et al., 2003). FM pain was associated to joint inflammation initially, however this is still unknown based on contradictory cytokine studies (García, Cidoncha, Bote, Hinchado and Ortega, 2014; Taylor et al., 2015). The pathology of FM seems to be related to changes in pain processing in the brain and changes in the neurotransmission of dopamine and serotonin (Matsuda et al., 2010; Montoro et al., 2016; Wood et al., 2007).

Current therapies for FM include pharmacological and lifestyle interventions, however the pharmacological treatments only treat the symptoms of the disease and not the underlying problem. This causes many FM patients to become unemployed and place a substantial financial burden on society through disability benefits and low productivity (Al-Allaf, 2007). Current
How enjoyable did you find the Dragons’ Den project?

- Very unenjoyable
- Not very enjoyable
- Neutral
- Somewhat enjoyable
- Very enjoyable

0 1 2 3 4 5

Feedback
How well did your group work together to complete the Dragons’ Den project?

- Many challenges
- Some challenges
- Sufficiently
- Well
- Very well

Feedback
learning

creative

individual + group

Design Process
Learning Theories
Dragon’s Den
Sample Projects
Feedback
<table>
<thead>
<tr>
<th>Advantages</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>Group work dynamics</td>
</tr>
<tr>
<td>Ownership</td>
<td>Identifying the problem</td>
</tr>
<tr>
<td>Authenticity</td>
<td>Equitable assessment</td>
</tr>
<tr>
<td>Collaboration</td>
<td></td>
</tr>
</tbody>
</table>
Future Directions

1. Evaluation of “quality” and feasibility of idea
2. More opportunity for peer feedback and evaluation
References


Images:

http://www.citsu.ie/alcohol-and-drug-awareness