Virtual Worlds: It’s About the Learning
EAHCS 2014
• No conflicts of interest to disclose
The Monotilllation of Traxoline

• It is very important that you learn about traxoline. Traxoline is a new form of zionter. It is monotilled in Ceristanna. The Ceristannians gristerlate large amounts of fevon and then bracter it to quasel traxoline. Traxoline may well be one of our most lukised snezlaus in the future because of our zionter lescelidge.

1. What is traxoline?
2. Where is traxoline monotilled?
3. How is traxoline quaselled?
4. Why is traxoline important?
What was your favorite non-science lesson like?
What was your favorite science/medical lesson (from K-today)
A science lesson where you learned the most
Your favorite teacher (K-today)

What was your favorite non-science lesson like?
What was your favorite science lesson like?
Was it a lecture?
What did you do to learn the most?
What made your favorite teacher your favorite?
Making Learning Objectives/Outcomes

- Imagine you are going on a trip. Where are you going? How are you going to get there? How will you know when you arrive?

- Objectives or Outcomes guide instruction
  - What learning (knowledge and skills) will your students have when they have successfully completed an activity or course? (Outcome)
  - How will they get there? (Activities, lecture, etc)
  - How will you know if they arrived? (Assessment)
Bloom’s Taxonomy of the Cognitive Domain (revised)
<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Understand</th>
<th>Apply</th>
<th>Analyze</th>
<th>Evaluate</th>
<th>Create</th>
</tr>
</thead>
<tbody>
<tr>
<td>define</td>
<td>explain</td>
<td>solve</td>
<td>analyze</td>
<td>reframe</td>
<td>design</td>
</tr>
<tr>
<td>identify</td>
<td>describe</td>
<td>apply</td>
<td>compare</td>
<td>criticize</td>
<td>compose</td>
</tr>
<tr>
<td>describe</td>
<td>interpret</td>
<td>illustrate</td>
<td>classify</td>
<td>evaluate</td>
<td>create</td>
</tr>
<tr>
<td>label</td>
<td>paraphrase</td>
<td>modify</td>
<td>contrast</td>
<td>order</td>
<td>plan</td>
</tr>
<tr>
<td>list</td>
<td>summarize</td>
<td>use</td>
<td>distinguish</td>
<td>appraise</td>
<td>combine</td>
</tr>
<tr>
<td>name</td>
<td>classify</td>
<td>calculate</td>
<td>infer</td>
<td>judge</td>
<td>formulate</td>
</tr>
<tr>
<td>state</td>
<td>compare</td>
<td>change</td>
<td>separate</td>
<td>support</td>
<td>invent</td>
</tr>
<tr>
<td>match</td>
<td>differentiate</td>
<td>choose</td>
<td>explain</td>
<td>compare</td>
<td>hypothesize</td>
</tr>
<tr>
<td>recognize</td>
<td>discuss</td>
<td>demonstrate</td>
<td>select</td>
<td>decide</td>
<td>substitute</td>
</tr>
<tr>
<td>select</td>
<td>distinguish</td>
<td>discover</td>
<td>categorize</td>
<td>discriminate</td>
<td>write</td>
</tr>
<tr>
<td>examine</td>
<td>extend</td>
<td>experiment</td>
<td>connect</td>
<td>recommend</td>
<td>compile</td>
</tr>
<tr>
<td>locate</td>
<td>predict</td>
<td>relate</td>
<td>differentiate</td>
<td>summarize</td>
<td>construct</td>
</tr>
<tr>
<td>memorize</td>
<td>associate</td>
<td>show</td>
<td>discriminate</td>
<td>assess</td>
<td>develop</td>
</tr>
<tr>
<td>quote</td>
<td>contrast</td>
<td>sketch</td>
<td>divide</td>
<td>choose</td>
<td>generalize</td>
</tr>
</tbody>
</table>

Examples of Virtual Environment Objectives/Outcomes

• The student will be able to create a tour guide through the cell explaining the organelles and their functions.
• The student will analyze a scenario and evaluate whether the environment presented is a healthy one.
• The student will design and create a virtual habitat demonstrating the requirements needed to maintain life in a closed environment.
Teaching thoughts

- Tell me, I (might) remember.
- Show me I’ll probably remember.
- Let me do it and I know I’ll remember and I can use it.
Learning Strategies

• Active Learning Strategies
  • Problem-based or case-based learning
  • Collaborative learning
  • Experiential learning
  • Skill acquisition activities
  • Active discussion
  • Discussion during a lecture (back-chat).
  • Technology

• Passive Learning Strategies
  • Lecture (including podcasts)
  • Passive reading
Why technology?

• You can do things you can’t do otherwise.
• Your students have to be active learners.
• Believe it or not, they struggle a bit (Vygotsky’s Zone of Proximal Development) – that’s not bad.
• It’s fast (where did people get answers BG)?
• Other?
Types of technology-based learning

• Reference (Google, TED talks, YouTube)
• Apps
• Simulations
• Course Management Systems
• Virtual environments (Virtual worlds)
Web 2.0 Technologies

The online teacher kit: Course management systems

Blackboard
moodle
Desire2Learn
NIXTY
INSTRUCTURE
Edvance360
INSTRUCTURE
Canvas
ATutor
Joomla
Social Media
ONCOURSE
collaboration & learning
ON Teaching Online

/em>
For technology to be effective…

- The activity must match the desired outcomes.
- The students need to know what the outcomes are and how the activity achieves them.
- The technology must function correctly.
- Directions must be readily available and clear.
- Instructors need to provide guidance and support throughout.
- Students need to be given time to learn the skills.
Why THIS technology?
Virtual Worlds

- Subset of Virtual Reality applications
- Online computer-generated environments
- Users can be in different locations
- Real-time interaction in the same 3D space
- *Habitat* (1987) - first 2D virtual world
Terminology

- Virtual worlds
- Immersive learning environments
- Multi-user virtual environments
- Virtual simulations
- Virtual environments
- Screen-based simulations
Types

- Viewer-based simulations
- Browser-based simulations
• **Viewer-based environments**
  – Open source or commercial e.g. Kitely, Open simulator, Second Life
  – Requires a viewer program to access simulation
  – Regions arranged in grid
  – Instructor and learners can make changes to environment in real-time
• **Browser-based environments**
  – Single user or multi-user proprietary platforms e.g. Unity3D, Avaya Webalive, Protosphere
  – Accessible through a web browser
  – Good fidelity but requires professional graphics design
  – Cannot modify in real-time
Active Users
Technology Trends

Application of 3D Virtual Worlds in Health Care

Academic Education

Medical Education:
- Simulation

Safety:
- Construction Safety

Higher Education:
- Distance Education

Pharmacy:
- Drug Safety

Home Assessment:
- Decision-Making

Public Health:
- Public Health

Nursing:
- Public Health
- Academic Courses
- Patient Safety Simulation
- Nutrition
- Clinical Simulation
- Postpartum Haemorrhage Simulation
- Emergency
- Disaster Scenario
- ICU Shift Handover
- Rapid Sequence Intubation (RSI)

Emergency:
- Accident Rescue
- Trauma Management
- Nursing Response
- Pre-Hospital CPR Training
- Cardiopulmonary Resuscitation
- Managing Emergencies and Disasters

Ghanbarzadeh et al., 2014
Application of 3D Virtual Worlds in Health Care

Professional Education

Communication:
- Counselling
- Delivering Bad News

Nursing:
- Facilitate Nursing Journal Clubs

Public Health:
- Sexual Health
- Bio-terrorism Defence

Radiotherapy:
- Cancer Care

Clinical Medical:
- Diabetes

Laboratory:
- Animal Care

Higher Education:
- Patient Safety

Ghanbarzadeh et al., 2014
Ghanbarzadeh et al., 2014
3-D VIRTUAL LEARNING ENVIRONMENTS

Representational fidelity
- Realistic display of environment
- Smooth display of view changes and object motion
- Consistency of object behaviour
- User representation
- Spatial audio
- Kinaesthetic and tactile force feedback

Learner interaction
- Embodied actions
- Embodied verbal and non-verbal communication
- Control of environment attributes and behaviour
- Construction/scripting of objects and behaviours

(Dalgarno & Lee, 2010)
Representational fidelity

- Realistic display of environment
- Smooth display of view changes and object motion
- Consistency of object behaviour
- User representation
- Spatial audio
- Kinaesthetic and tactile force feedback

(Dalgarno & Lee, 2010)
VIRTUAL LEARNING ENVIRONMENTS

Learner interaction

- Embodied actions
- Embodied verbal and non-verbal communication
- Control of environment attributes and behaviour
- Construction/scripting of objects and behaviours

Functional fidelity

- Haptic rendering of environment
- Changes and object motion
- Object behaviour
- Visual presentation
- Real and virtual audio
- Tactile force feedback

(Dalgarno & Lee, 2010)
3-D VIRTUAL LEARNING ENVIRONMENTS

Representational fidelity

- Realistic display of environment
- Smooth display of view changes and object motion
- Consistency of object behaviour
- User representation
- Spatial audio
- Kinaesthetic and tactile force feedback

Learner interaction

- Embodied actions
- Embodied verbal and non-verbal communication
- Control of environment attributes and behaviour
- Construction/scripting of objects and behaviours

Construction of identity

Sense of presence

Co-presence

(Dalgarno & Lee, 2010)
Construction of identity → Sense of presence → Co-presence → Afforded learning tasks → Learning benefits

Spatial knowledge representation, Experiential learning, Engagement, Contextual learning, Collaborative learning

(Dalgarno & Lee, 2010)
Challenges

• Orientation is needed for learners
• Instructors need training on how to create learning modules
  – For best results, content experts should partner with computer scientists and graphic artists
• Affordable, but cost is still an issue
• Technical Needs – newer computer and high speed internet connection
• Expanding field with theoretical frameworks and evidence to support learning still being defined

(Butina et al, 2013)
Benefits

• Engages learners
• Helps explain difficult concepts
• Allows for simulations too costly, difficult, unethical or hazardous in the real world
• Allows integration of artificial intelligence

Savin-Baden M, 2010; Brydges R, 2010; Palmer, E 2011; Chapman, D 2010
Benefits

• More efficient use of clinical sites
• Availability through the internet
• Standardization of learning experiences
• Ease the learners’ transition to manikin-based sim and clinical practice
• Student assessment tool

Savin-Baden M, 2010; Brydges R, 2010; Palmer, E 2011; Chapman, D 2010
Questions?
Where Are You with Virtual Environments?

• Who has used virtual environments for learning or teaching?
• Who has headed an e-learning project?
• Who has designed an e-learning or simulation course?
• Who has conducted an e-learning or simulation course?
• Who has participated in an e-learning or simulation course?
• Who knows about e-learning but has not participated in a course?
• Who can use the internet?