# Examining the Use of a Flipped Classroom Course Redesign to Support Anatomy Teaching

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**School of Rehabilitation Therapy, Occupational Therapy Program**

No conflict of interests

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## Learning Outcomes

1. Articulate and describe three approaches to support active learning (for anatomy instruction).

2. Identify strategies to support a flipped classroom approach within your own teaching.

## Outline

1. Overview of anatomy instruction a Queen's

2. Review literature on anatomy teac and learning

3. Review flipped classroom, blendin learning and case-based learning

4. Introduce anatomy modules and course context

5. Present results of evaluation

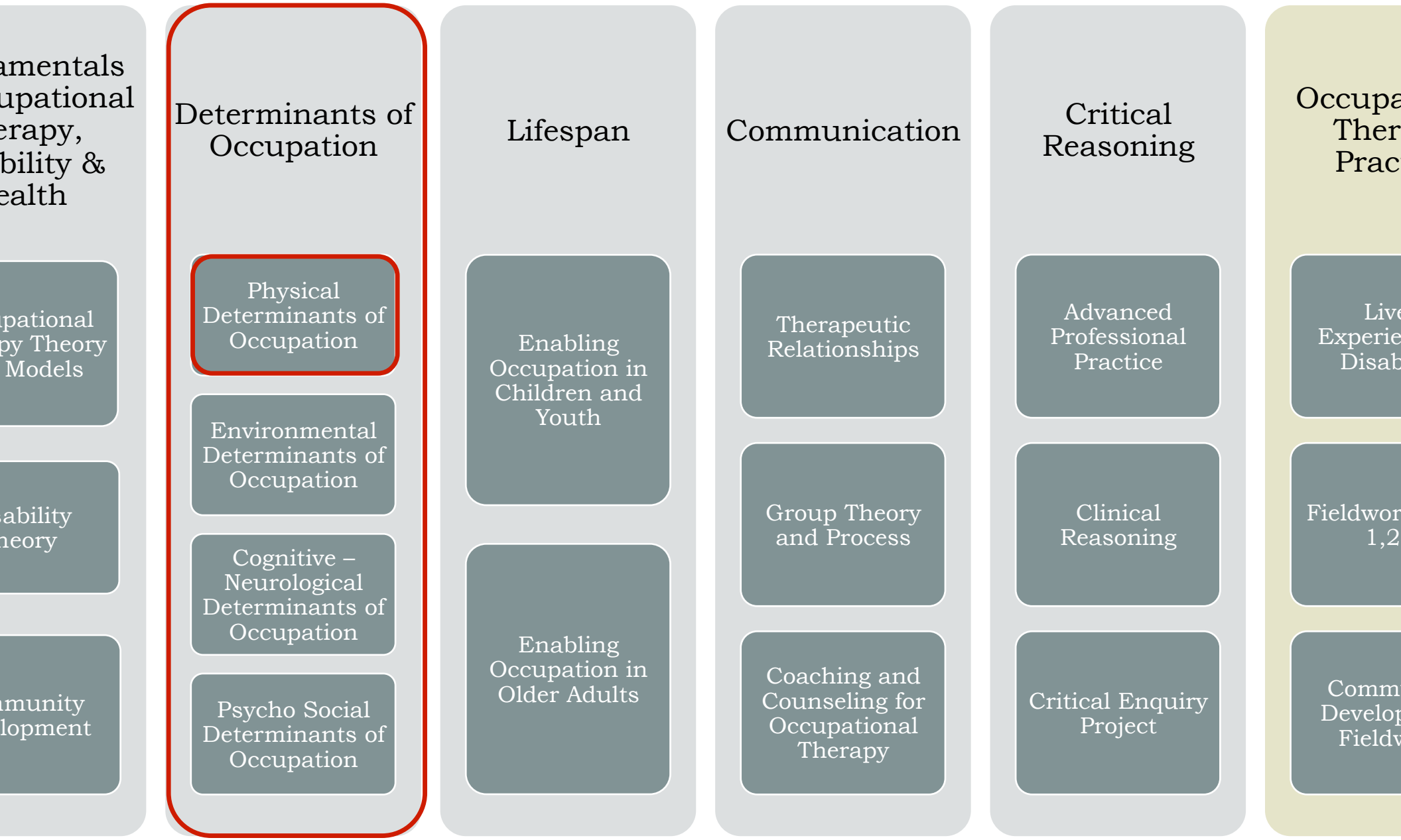
**How did each of you learn anatomy?**

**Thoughts/reflections on this experience?**

# The Course:
# Physical Determinants of Occupation

This course will **introduce students** to the study of movement of the human body as it relates to occupation. It will have an emphasis on the biomechanics and the components of the motor system as determinants of motor performance in occupation. **Evaluation methods and modalities** used in physical rehabilitation will be studied. The course will also focus on the application of physical rehabilitation methods used in occupational therapy practice by understanding musculoskeletal conditions and **occupational therapy interventions** at the level of impairment and activity limitations.

| **Module 2: Shoulder and Proximal Upper Extremity** | | |
|---|---|---|
| Anatomy Lecture<br><br>Introduction to the musculoskeletal system, shoulder & proximal upper extremity | Functional Movements of the Shoulder and Proximal Extremity<br><br>Scott | Anatomy Lab<br><br>Introduction to the musculoskeletal system, shoulder & proximal upper extremity |
| Grand Rounds: Linda | Arthritis: The Lived Experience | Clinical Skills Lab (CEC) Upper Extremity ROM and Strength Evaluation<br><br>*Self-Study Component – Review of Online videos and textbook materials to be completed prior to clinical skills lab. |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Psycho Social Determinants of Occupation
Lifespan
Enabling Occupation in Children and Youth
Enabling Occupation in Older Adults
Communication
Therapeutic Relationships
Group Theory and Process
Coaching and Counseling for Occupational Therapy
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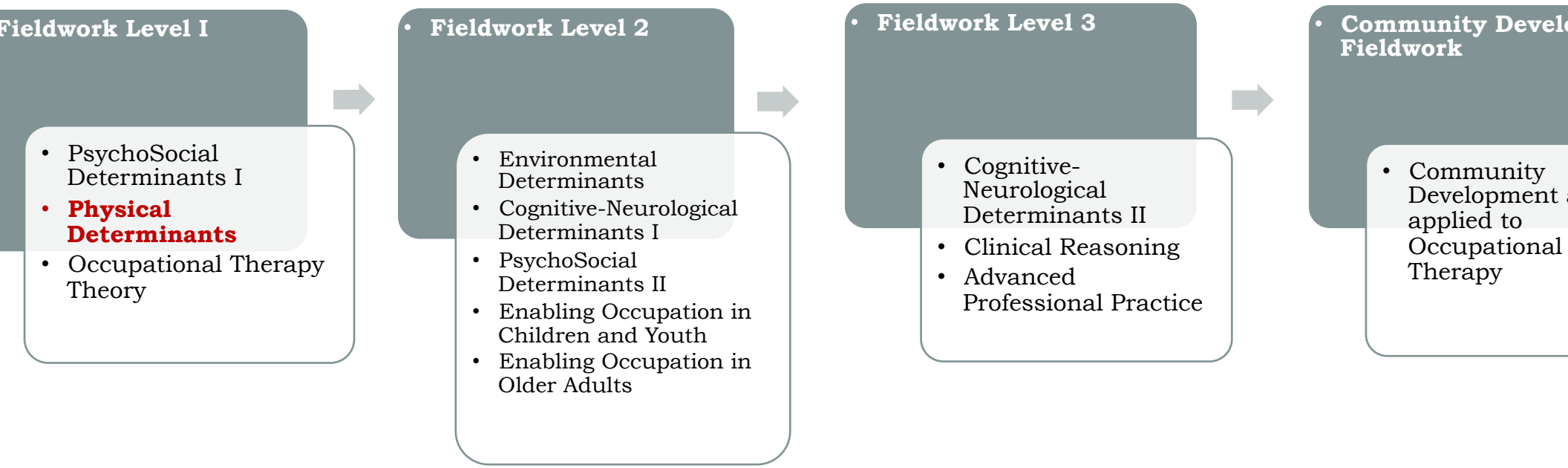



**r 1 -Fall** **Year 1 - Winter** **Year 2 - Fall** **Year 2 – Spring - Sumr**

# The Issue(s):

1. Wide variability in anatomy/science knowledge on entry
2. 1.0 course in 1 term = 6 hours/week
3. Content too intensive and heavy

4. Unable to integrate clinical experiences to apply foundational knowledge
5. Lack of continuity of content throughout the program

# Anatomy @ Queen's

- **Health Sciences**; undergraduate – online – 500+ students. No lab
- **Life Science**; undergraduate (including **nursing**) – didactic classroom/self-directed labs. No dissection or prosecution
- **Medicine**; didactic/self-directed labs. 12 students selected to dissect
- **Physical Therapy**; 2 week intensive; self-directed anatomy labs/guided clinically applied labs
- **Occupational Therapy**; embedded in larger MSK course; online modules/ guided 'micro-teaching' labs

# Anatomy Education




- Didactic lectures and dissection
- Increasingly less time on anatomy education. = “anatomical ignorance”
- Multi-medial and alternatives
- Need for multi-modal approaches
  - Surface vs deep learning
  - Active learning

Estai & Bunt, 2016; Johnston et al, 2012; Sugand et al., 2010


Dissection
Prosection
Plastination

Interactive multimedia

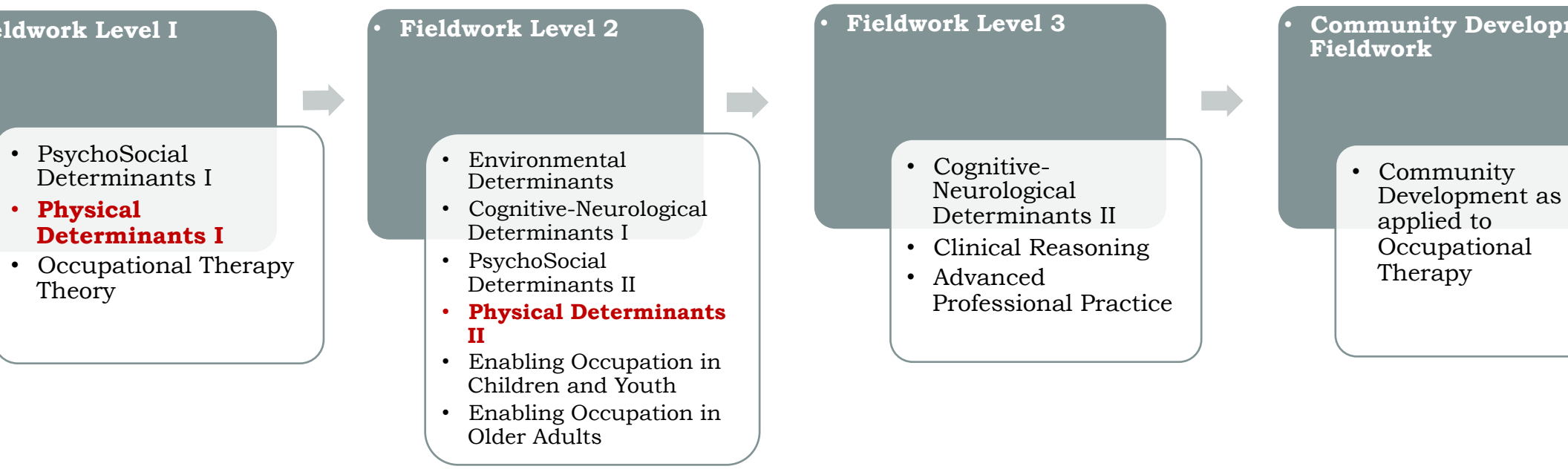
Surface anatomy

Clinical anatomy

Imaging

Estai & Bunt, 2016; Sugand et al., 2010

# The Solution:

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# The solution

| | Semester 1 | Semester 2 | Semester 3 |
|---|---|---|---|
| r 1 | Physical Determinants 1<br><br>**Assessment**<br>**Modular format**<br>**Anatomy - Foundational knowledge** | Fieldwork | Coursework |
| r 2 | Physical Determinants 11<br><br>**Intervention**<br>**Modular format**<br>**Anatomy – Applied knowledge** | Coursework | Fieldwork |

# Physical Determinants I & 2

*This course **introduces students** to human occupation from the perspective of its anatomical, physiological and biomechanical dimensions. Theoretical frameworks and evidence –informed practice approaches and interventions will be addressed in class and weekly lab sessions, with a focus on **assessment** methods for musculoskeletal conditions.*

*This course **analyzes human occupation** from the perspective of its anatomical, physiological and biomechanical dimensions. The course will focus on **intervention** methods used in physical rehabilitation to enable occupation in musculoskeletal conditions. This course is designed to build on concepts introduced in OT881 and will use an **integrated case study format** to further **develop an understanding of movement of the human body as it relates to occupation.** Theoretical frameworks and evidence- informed practice approaches and interventions will be addressed in class and weekly lab sessions.*

## Part 1
## 2 weeks – 6 modules

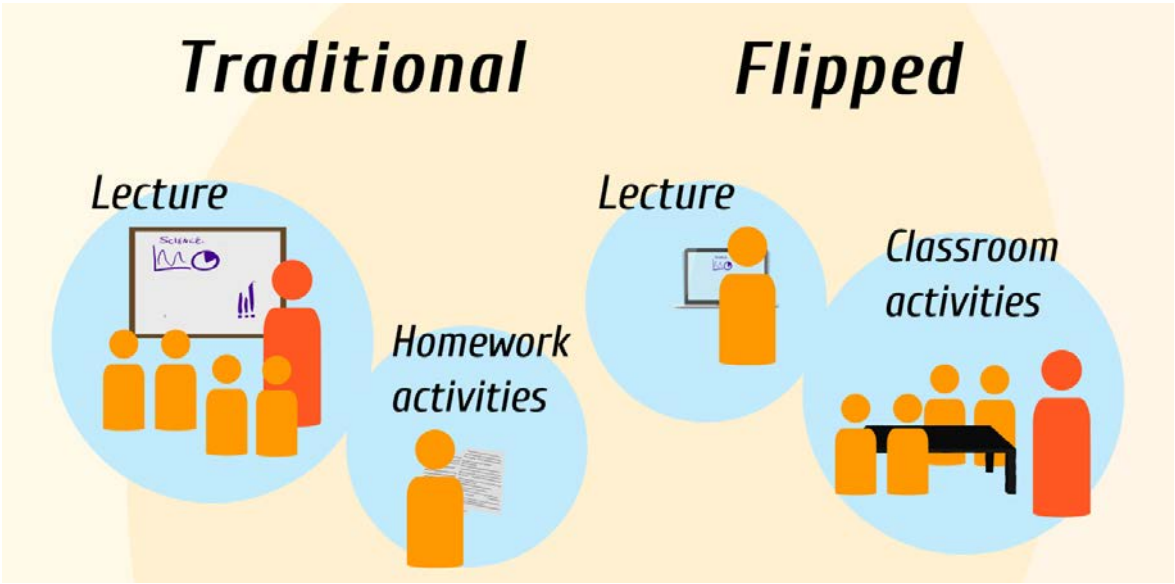
| | |
|---|---|
| d Anatomy<br>e – focus on<br>sment | Anatomy lab |
| Experience or<br>Application | Clinical skills lab |

## Part21
## 6 weeks – 6 module

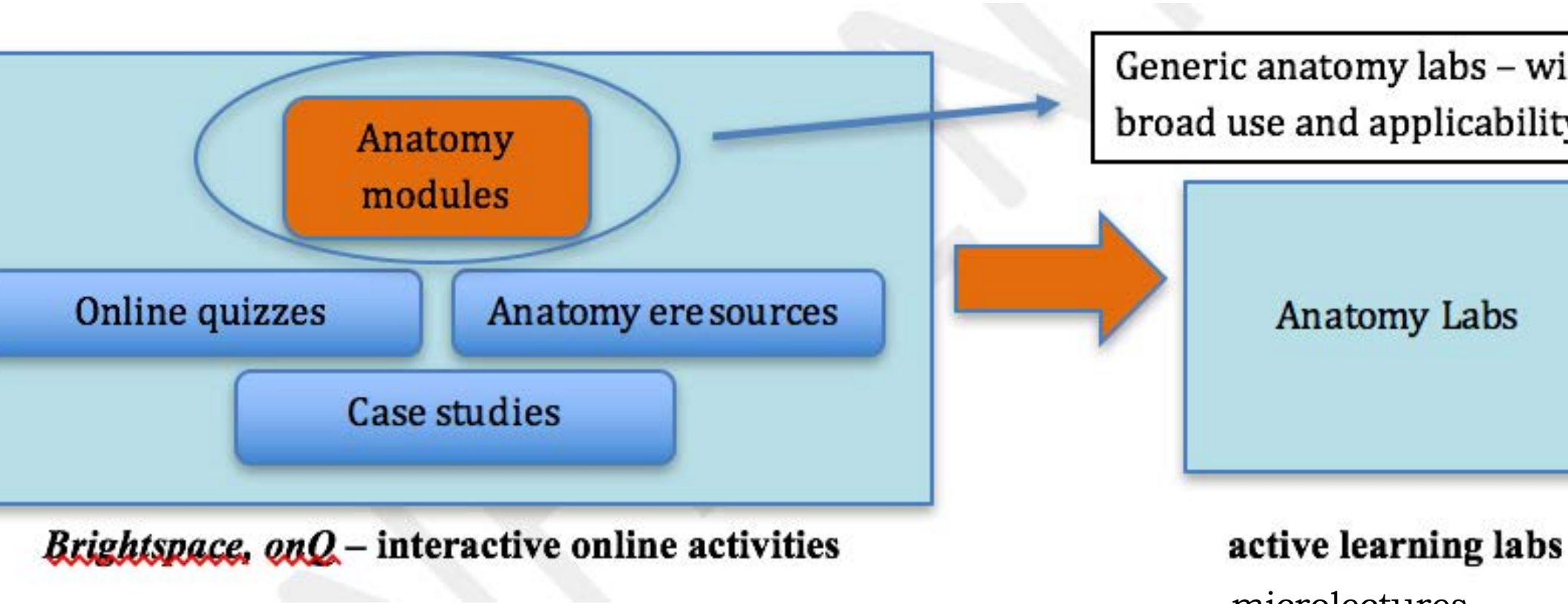
| Theory | Application | Skills |
|---|---|---|

# Approaches

- **Flipped Classroom** (Morton & Colbert-Getz, 2016; Critz & Knight, 2013; McLughlin et al, 2104; Gilboy et al, 2015; O'Flaherty & Phillips, 2015)




- Blended learning (Means et al., 2010)
- Case-based learning
- Team-based learning (Burgess et al., 2014; Emke et al., 2016)

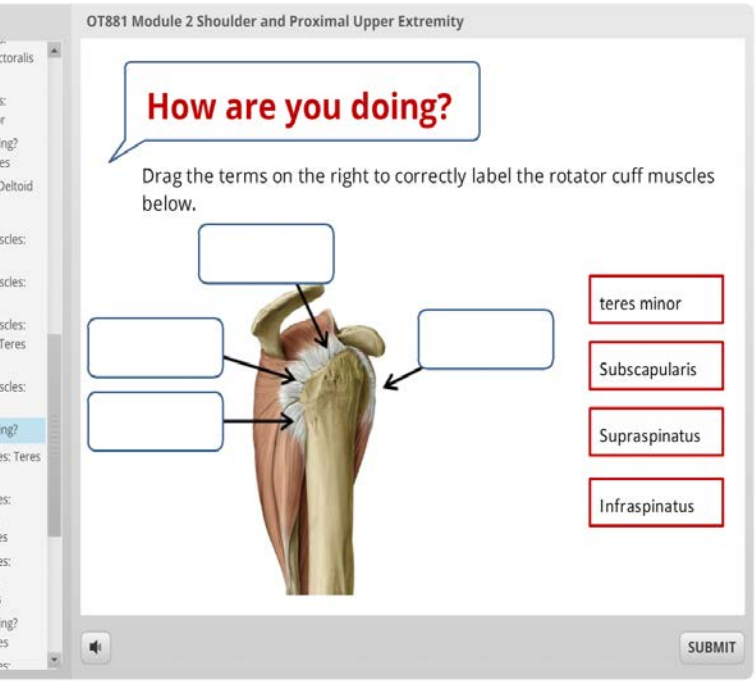


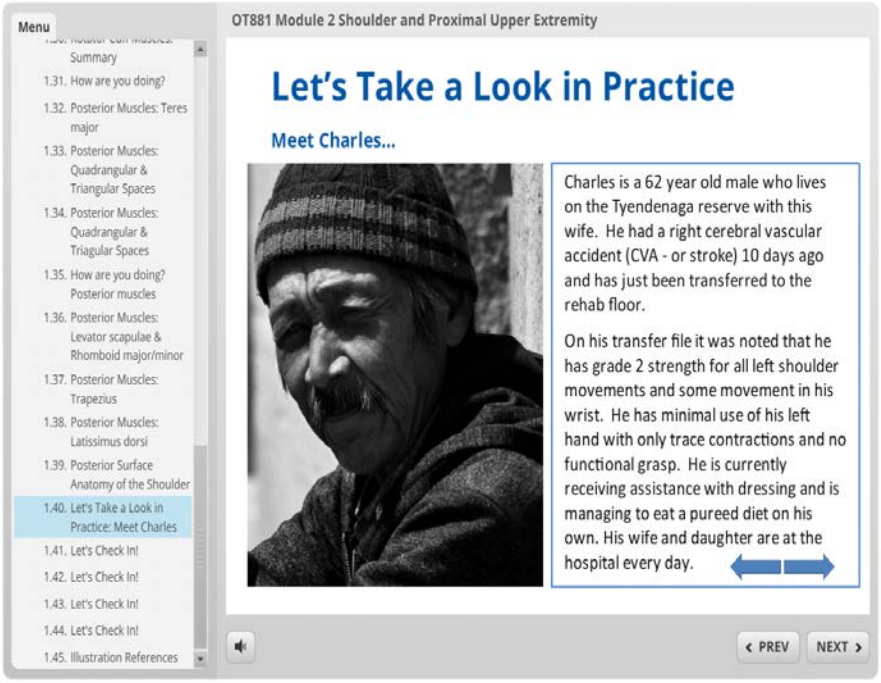

***Brightspace, onQ*** **– interactive online activities**

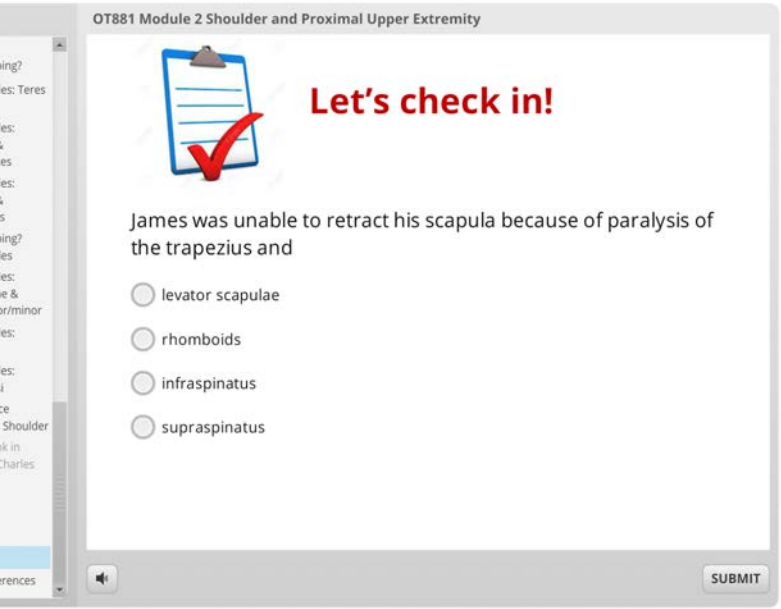
**active learning labs**

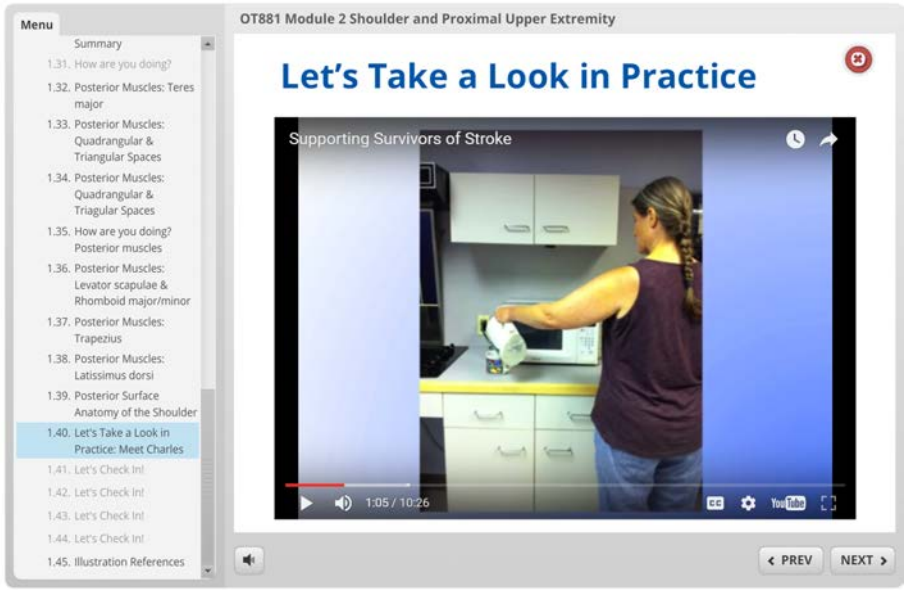
microlectures

# MPLE: Module 2 - Impact of the shoulder on occupation – Online module – self-st



# MPLE Module 2 - Interactive omy Lab Station – "Microteaching"

**N 4 - PALPATIONS (Tutorial led by C. Donnelly 2 - teams/station)**

oppenfeld's *Physical Examination of the Spine and Extremities* as a guide, palpate the natomical features listed below on yourself or a partner.

**l examination of the shoulder**

elf or a partner, locate and palpate the following anatomical features:

uprasternal notch of manubrium
lavicle (*note the concavity and convexity*)
capula
pine
oracoid process
Iedial and lateral borders
nferior angle
nterior aspect of the acromion
reater tuberosity of the humerus

# EXAMPLE: Module 2 – Interactive Cli Skills Lab. Integration of anatomy.

**Lab Procedure:**
**8:30-11:30**
Each learning team will be assigned to an examination room in the CEC. Students will spend practicing ROM and MMT of the shoulder, elbow, wrist and hand. Instructors will circulate a feedback and small group demonstration.

Important considerations for this lab:

1) Bring your Trombly textbook and goniometers
2) Dress appropriately in comfortable clothes that enable movement and ability to obs landmarks for ROM assessment.

**PART 1**
**Range of Motion Testing: Shoulder**
1. On your partner, identify the following landmarks required to accurately assess shoulder ROM:

- Glenohumeral joint
- Acromion process
- Humerus
- Olecranon process of the ulna
- Lateral epicondyle of the humerus
- Ulnar and radial borders of the forearm

2. Before you begin you ROM testing become familiar with the movements of the shoulder. few minutes going through the movements of the shoulder with your partner.

# Evaluation Questions

What was the student experience of learning using a flipped classroom approach?

In what ways did the flipped classroom support the understanding and application of anatomy knowledge upon course completion, and 1 year later?

# Evaluation Design

st test design with a comparison group

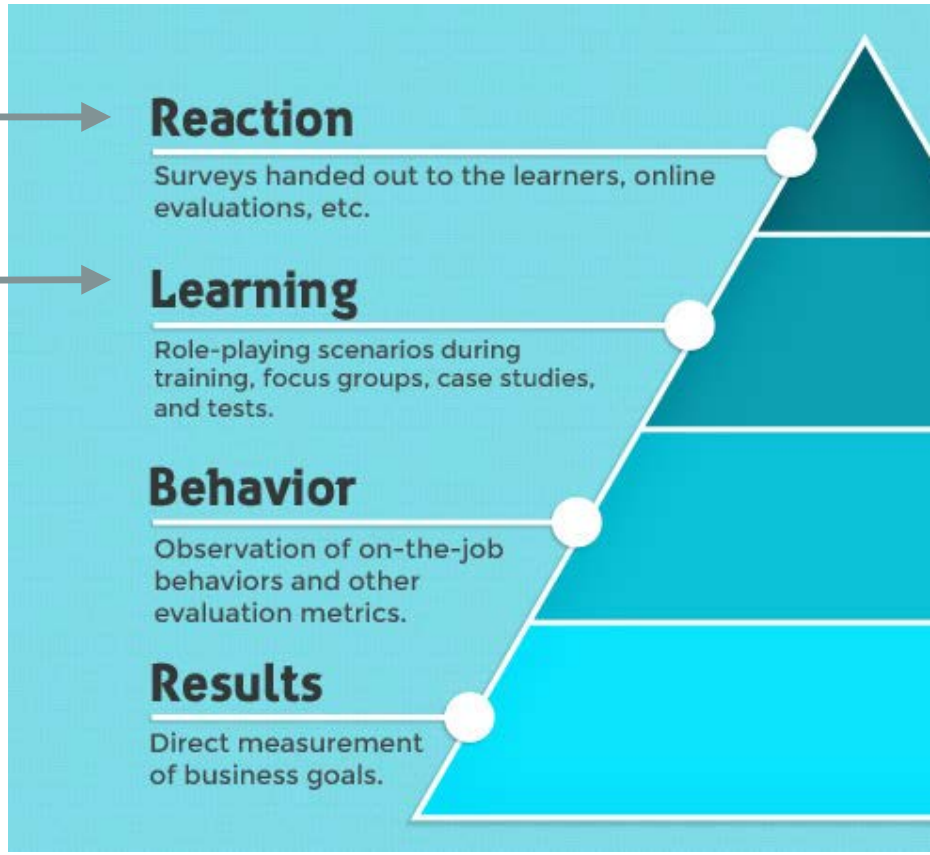
methodologies
ine survey to determine student
erience (open/closed questions)

tomy quizzes and final exam results
ine cohort compared to traditional
ort)

ention quiz 1 year post-course
pletion (online versus traditional)

***'s ethics received***

Kirkpatrick's model



# Student experience

The good… the bad .. and the ugly ☺

# Online Survey

| | |
|---|---|
| Overall feedback on the modules | 8.1 |
| The modules were easy to understand | 7.2 |
| The overall experience of the modules | 7.4 |
| The modules were easy to navigate | 9.0 |
| The modules enhances my confidence in anatomy | 6.1 |
| Overall integration of the modules within the course | 7.9 |

*I myself have come from a psychology background with one physiolog course under my belt - which I now know is NOT anatomy. I felt overwhelmed at the beginning of the semester having 0 knowledge of anatomy/anatomical terms but I remember feeling excited that in 4 short months I would have a general understanding of the body as it pertains to occupational therapy. I managed to make my way through it with much help from the anatomy modules, and I expect I will refer back to them in the future as a refresher. Thank you for inputting countless hours into making these modules...and bonus thank-you fo that pause button!!*

*the convenience of being able to pause to take notes and to watch anywhere*

*Overall, I really enjoyed the anatomy modules. As a first time anatom student, I found the content to be daunting at times. However, this w more due to how new the content was for me, and less about how the modules were structured. I also enjoyed how I was able to do the modules on my own time, and own pace.*

*n actual class. I took ANAT 315 and 316 at queen's in my undergrad.*
*ney were amazing classes and I felt a learnt so much more in them! W*
*ad weekly labs that were totally self- learning and were great.*

*ne in practice part didn't really seem to connect or add a lot to it becau*
*ere were no outcomes for assessments and interventions*

*Take time during lab sessions to go through things, teach things as though we have no knowledge so then when we do the modules we can reflect on the time in lab to consolidate learning, then maybe have review in the next lab. This sounds time consuming. But anatomy is a fascinating and challenging topic, and to rush through it or facilitate stress doesn't facilitate learning, it facilitates memorizing facts to regurgitate on a test and forget about because they are associated with stress*

*t would have been nice to go over the anatomy in lecture before getting into the case studies. In some cases I hadn't even watched the module yet before we talked about it in class.*

# Student Outcomes On completion

| | **OT843 (Classroom) (n=72)** | **OT881 (Modules) (n=75)** |
|---|---|---|
| -weekly atomy quizzes | 92% | 94% |
| nal anatomy llringer | 54% | 66% |

# Student Outcomes
# Retention

| | |
|---|---|
| T 843 (Classroom) (n=27) | 11.9/21. (56.7%) |
| T881 (Modules) (n= 17) | 11.7/21 (55.7%) |

# Acknowledgements

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