Flipping the Classroom

in the Online Environment –

Having students create their own Learning Content

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Science
Back-Flipping (and Somersaulting) the Classroom in the Online Environment – Having students create their own Learning Content

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Flipping in the Classroom

- Level: Year 3 Level 7 class
- Module: Medical Device Technologies
- Cohort: Some transfer students from undenominated programmes and other colleges.
- Diverse group (socioeconomic, race, ethnicity, learning needs etc)
In Class Activities
The Pandemic...

Maslow’s Hierarchy of Needs


Abraham Maslow and the pyramid that beguiled business By William Kremer and Claudia Hammond
BBC World Service
Published 1 September 2013
Backflipping

- 3 hours timetabled
- 1 hour was dedicated to students watching pre-recorded content
- 2 hour session of active engagement
- Lots of breakout rooms!
- Some fun
What do we think is important to know:

- Advantages and Disadvantages
- FDA and how it differs from EU
- Are manufacturers with problem devices still manufacturing?
- Can HPRA stop products going on market in Ireland?

How are they tested? Different from pharma?

How they are approved

How long before they are toxic

Are there lawsuits?

Cons and are patients aware?

Diagnose, treat disease

Nebulizers, MRI, Bone pins, prosthetics, Enbrel injector pen, intraocular lens, scalpel, stents

Objects, devices

Braun

Discussion points today - 29Sep2020

Design considerations for heart valve - discussion point
Biggest challenge globally?
- Growth of emerging markets
- High production costs
- Industry

Lack of innovation
- Collaboration and Innovation
- Our location, we are in the middle of an ocean

Biggest Challenge Ireland
- Bigger companies abroad
- Biggest challenge for Irish medical device sector is Brexit

Artificial Intelligence
- Environment
- Low Corporation Tax

Regulatory body
- Material wear
- Production costs
- Can Doctors implant them correctly?
- Do they need to be replaced?

Make sure the products are actually effective
- Testing performed
- Make sure they've gone through successful trials
- Would they be rejected by the body in any case?
- Doesn't cause harm to the person who can get them?

Make sure it is accessible to everyone who will need it
- Heart valves should be resistant to the conditions of the body (Heat, corrosion, friction) and made of materials that will cause the least harm
- Will the heart perform at the same rate as it does now, does it provide any help to the patient?
- Are suitable for the environment of the body?
Group Mindmap

Introduction

Breakthroughs have been made in recent years in bioprocessing and analytical technologies which are in vaccine development. These developments are in the analytical techniques, particularly those involved in advancing consistent product purity and quality in a cost-effective manner. The two stages in the manufacturing and development of vaccines worldwide, however, this bioreactor industry is still increasingly complex and many challenges in it.

World Health Organization (WHO) has reported that from 2000 to 2015, the vaccine market grew from 4 billion U.S. dollars to 24 billion U.S. dollars (USD), which leads to a business model for increased sales, increasing vaccines, and attracting significant interest.

Challenges and Opportunities

- There is pressure related to risks in industry to produce and vaccinate vaccines
- Challenges to develop high-quality vaccines at lower cost and within shortened timelines

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- Process definition studies performed on critical unit operations and parameters using a design of experiments before scaling up to 200 L (phase 2)
- Followed by step-wise scale-up for production of good manufacturing practice (cGMP) materials for phase 3 clinical studies
- Before phase 3 (~2,000 L scale), process validation and engineering runs are required

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Somersaulting

New module with the same group in semester 2
3 hour sessions on Friday mornings!
Lots of breakout rooms!

Moodle™ screenshot

Group 3:

What are Mesenchymal Stem Cells? How and why are they differentiated into other adult cells at various timepoints (i.e. what triggers them?).

Describe 1-2 cell lineages (growth factors, transcription factors involved).

From the literature, described some MSC studies for treatment of disease / tissue engineering applications.
This can be due to a covalent modification of the actual DNA, a soluble signal.
Week 11 - 23rd April (In class assessment week)

Ethical and Regulatory Issues

- Extra reading - Ethical issues case study
- Lecture 11 slides

Assignment details are in the assessment section above.

- Ethics lecture - please watch before class
- Regulations lecture - please watch before class
- Some useful links

Groups 1, 2 and 3

The following is a link to the ‘clinicaltrials.gov’ registry which details a clinical trial currently recruiting participants, titled ‘Anti-CD5 CAR T Cells for Relapsed/Refractory T Cell Malignancies (CD5CAR-T)’


The study directors would have submitted an ethical approval application to their Ethics Review Board prior to obtaining clinical trial approval.

1. What are the main ethical issues that need to be considered for such a product at the (i) bench (ii) preclinical phase (iii) clinical phase? (3 slides)

2. In this study protocol summarised on the webpage, are the ethical considerations clear and would you have further questions / considerations for the study directors? (1 slide)

3. How would this product be classified and what regulation / guidance applies to it? (1 slide)

4. Detail the considerations for (i) starting and raw materials (ii) pharmacology and toxicology (iii) human safety studies according to the relevant regulation. (3 slides)

Total: 8-10 slides
Outcomes and Feedback

- As the weeks went on, students became more comfortable speaking in Teams and abandoned ‘chat’ function
- Got used to reading papers, dissecting information, sharing information
- Used multiple means of engagement, representation, action and expression

Active learning
- Whiteboards and Moodle quizzes
- Active conversation between the tutor and students
- A freedom of choice to do the project in a way I liked.

Flipped
- Youtube videos were a great help and the voice notes for feedback.
- The quizzes and breakout rooms were good for breaking up the material and helping further the learning

Breakout Rooms
- Talking in groups while having a task - very beneficial.
- More involved when we had to make flowcharts/brainstorm together in our small groups.
- Wasn’t so beneficial on discussing the topic but I enjoyed time on chatting on random things. This was also beneficial.
- Thinking more about the topics and seeing them from different perspectives.

In class assessment
- The group assignments were challenging but fun and I learnt loads learning with a group of people
- The presentations and group assessments were useful in my opinion.
Thank You

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