



# Introduction to Technology Battles

I&E Basics/IBICT 2019

7th October 2019



# What is a battle?





# What is a battle?

- In essence, it is made of two elements:
  - Analysis of “real life” examples (aka Case study)
    - Competing innovations
    - Competing entrepreneurs
    - Ethical dilemmas
    - Scientific debates
    - ...
  - Through enacted dialectics (aka British Parliament model)



# Case Studies





# Case Studies

- Widespread methodology for education in business
- Used in MIT, Stanford, Harvard, Oxford, Cambridge...
- They combine
  - Induction (learning from examples)
  - Deduction (learning from theory)



# Induction





# Induction

- Learning from examples, creating generalizations
- In mathematics
  - Applied to natural numbers, it allows to prove that:
    - If a certain property is valid for the first number - a “base case”  $n = 0$  or  $n = 1$
    - And assuming that it is valid for  $n$ , the same property holds for  $n+1$
    - Then it is valid for all natural numbers
- ...more concretely in our real life
  - Allows us to say that if something has always been a certain way, it will likely stay that way unless something external happens
    - I have seen the Sun rising every day, and always from the East
    - I have seen hundreds of swans in my life, and they're all white
    - I am alive today, so I'll be alive tomorrow..? (this might be problematic)



# Induction fallacies

- Hasty induction leads to mistakes
- Take the statement from before:
  - I am alive today, so I'll be alive tomorrow
- The induction does not go on indefinitely, and we cannot know when it stops
- So we need to be conscientious about using induction
- We can combine induction with deduction





# Deduction





# Deduction

- Learning from theory, verifying (or better, falsifying — see Popper) it in the world
- In philosophy, syllogisms:
  - If Socrates is a man
  - and if all men are mortal (notice this is induction!)
  - it logically follows that Socrates is mortal
- In science, theoretical physics, or cosmology
- Main problem: might take years, centuries, millennia to falsify a deduction...



# British Parliament





[https://www.youtube.com/watch?v=QnKKPwEX\\_ac](https://www.youtube.com/watch?v=QnKKPwEX_ac)



# Why the British Parliament?





# British Parliament

- Soft skills are part of the debate (and thus the class)
  - Leadership
  - Presentation
  - Public speaking
  - Negotiation
  - ...
- Also, these elements
  - Facts and fact-checking
  - Non-factual argumentation aka “b.s.”
  - Self-arbitration
  - Oversight from a neutral 3rd party



# Why use battles to teach I&E?





# Innovation







# Innovation

- The debate structure shows how innovation is not “hard facts”, but the composition of many “soft” factors
- Learning is done through exploration rather than exploitation (see bibliography)
- If innovation is about being “out of the box” → We have to teach in out of the box ways



# Entrepreneurship





# Entrepreneurship

- The soft skills required to debate are the same that compose an entrepreneur's toolkit...
- But more than this, even just the organization of the battles requires you to be entrepreneurial



# Open and closed debates





# Open and closed debates

- Through battles, we analyze both “closed” debates (i.e., cases in which we already know who won) and “open” debates (i.e., matters that the society has not yet settled upon)
- Example of “closed” debates:
  - Is the Earth at the centre of the Universe?
  - Which is the superior plane between Boeing 747 and Concorde?
- Example of “open” debates:
  - Is copyright a good thing or a bad thing?
  - Does mass immigration help a country's economy?



# Example: Star Wars

- We take the famous movie Star Wars
- We show how one storyline can be seen as an open or a closed debate
- This also has an impact on our reasoning
- How we perceive the debate changes how free we are to draw conclusions

# Star Wars: Constructing a prequel



I



II



III



IV



V



VI





# Retrospective reasoning

- This is how the Star Wars movies were filmed
- Ep. 4 starts “in medias res”, and does not resolve the main storyline
- By Ep. 6, the story is closed
- By setting the grounds in Ep. 1, the stories of Ep. 2 and 3 are “forced”
- This allows us to maintain internal coherence to the universe (i.e., Ep. 4-6)
- This is an example of retrospective reasoning, which is based on justification of previous actions



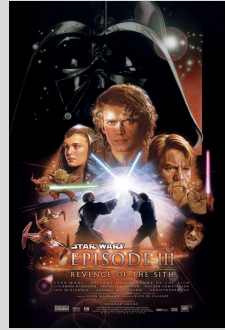
# Star Wars: Constructing a sequel



**I**



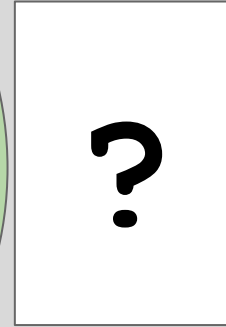
**II**



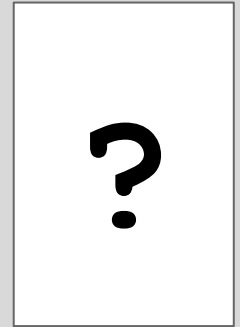
**III**



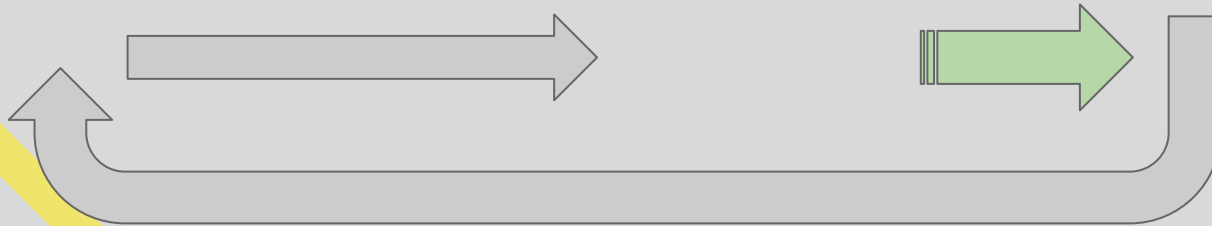
**IV**



**V**



**VI**





# Prospective reasoning

- This is an alternative way to see the Star Wars universe
- Assume Lucas filmed Ep. 4, then went back to make the original trilogy
- How do Ep. 5 and 6 go?
- This is hard to reasonably guess, and represents an unexplored realm of possibility
- This exemplifies prospective reasoning, based on speculation, hypotheticals and a combination of induction and deduction



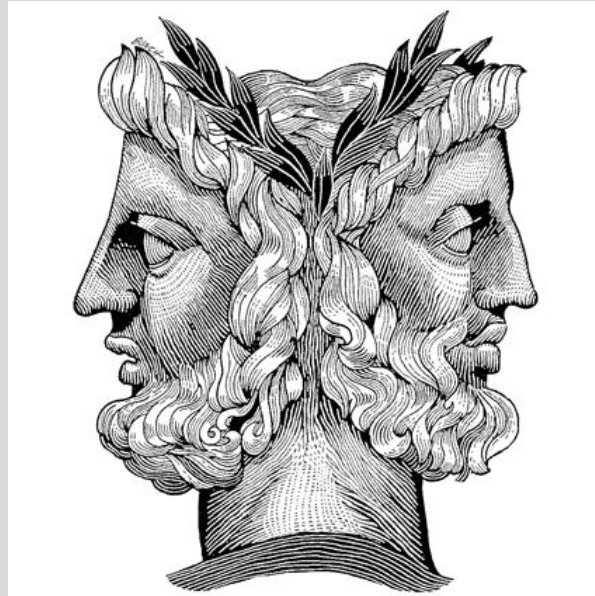
# Retrospective vs prospective

- Each type of reasoning naturally work better with open or closed debates
- 
- To go deeper in the concept, we will compare them directly

# Retrospective vs prospective

given the current state of the world, how did we get here?

Retrospective case studies



GIVEN AN ALTERNATE BEGINNING, HOW COULD IT END?

Prospective case studies



# Retrospective reasoning



**Goal: Retrospectively find answers**



# Prospective reasoning



**Goal: Create questions; affect final result**



# The class framework

- We have seen the two “modes” in which we can conduct case studies, but how do these interact with the British Parliament model?
- Most of all, this requires to change the core framework of the class...



# Conflict and Competition







# Who wins a battle?





# And the winner is...

- We are in the British Parliament, which allows direct confrontation
- The winner is found during the debate, not several years after
- We don't have the luxury of retrospective and hindsight
- Therefore, your goal is to be convincing, grounded, visionary
- The winner is the most **plausible**, not the most **right**



# Content





# Battle content

- Each battle has three main levels
- Horizontal content
  - Social/Economic context
  - Broader perspective
- Vertical content
  - Domain-specific content of the class
- Scenario (only for I&E Basics)
  - Usually a science fiction/fantasy story
  - Allows to abstract from the real world and explore more freely



# Horizontal Content





# Horizontal Content

- We call “horizontal” content those elements in the battle discussion that could be applied to any battle
- Examples of these are societal impacts, reflections on economic viability, ethical concerns...
- These go across battles, and allow to provide a coherent “context” throughout the course



# Vertical Content





# Vertical Content

- We call “vertical” content those elements specific to the debate in a battle
- Examples of these are comparisons of space tech in a battle on the 1960s/1970s “space race”, or of magnetic tapes in VHS vs Betamax
- These are isolated to one battle, and give the “core matter of fact” of each debate





# Scenario

(mostly relevant to I&E Basics...)



# Scenario

- Scenarios allow to abstract from history/state of the matter to have a broader vision of a topic
- Scenarios are *counterfactual*, and based on a “what if..?” question
- This allows to reopen closed debates
- An example of this is the rewriting of history (What if barbarians didn’t invade Rome?) or alternate presents (What if tomorrow we were to get in contact with another civilization?)



# Battle themes





# Battle topics

- Steve Jobs vs Bill Gates
- Uber vs Taxis
- Realpolitik vs Ideology
- Tesla vs Edison
- Robots vs Cyborgs
- Reforming the EU's Copyright Law
- ...



# “Dissecting” a battle

- Taking one of the above scenarios, here is how it is decomposed in the three elements
- Wikileaks good vs bad:
  - Scenario: A secret document is found that would invalidate the election of Angela Merkel in the 2018 elections. Should Wikileaks publish it, at the cost of jeopardizing the equilibrium of Europe?
  - Horizontal content: Social impact of politics
  - Vertical content: Security vs privacy debate; discussions about Wikileaks as a platform



# Class flow





# Battles as Blended Learning

- Battles are a Blended Learning methodology
- Each battle is done across three main moments:
  - Pre-class
    - Done by students and teachers before the battle itself
  - In-class
    - Actual run of the battle
  - Post-class
    - Follow-up to the class activity
- We will analyze each of them in the next slides...



# Pre-Class







# Pre-Class

- “Battle preparation”
  - Involves the two battle teams, the critical minds and the teachers
  - Each battle is introduced two weeks in advance
  - The meeting lasts ~1hr
  - Typical time: last part of the class (Mon ~5PM)
  - Teachers present the scenario and take questions
  - Students negotiate the “battleground” i.e., what is in and out of scope for discussion
  - Students prepare the battle autonomously



# In-Class





# In-Class - Anatomy of a Battle

- 10' per team → Opening statement
- 40' → Rebuttals, cross-examination, audience interventions
- 10' break
- 40' → More cross-examination
- 5' per team → Closing statement



# Post-Class





# Post-Class

## — “Battle Report”

- “Word-like” document, around 10/12 pages
- Written jointly by the two opposing teams
- Summarizes scenario and theory background
- Explains each team’s point of view
- Finally, provides a reconciliation/conclusion
- Reconciliation is a synthesis → More than the sum of two parts!
- Template published around Nov 1st



# In short

- Battles are **case studies** based on **debates**
- Debates can be **retrospective** or **prospective**
- Focus is on **plausibility** over facts-of-the-matter
- Content is both **horizontal** and **vertical**
- Wrapping and abstraction is done through **scenarios**



# What next?

- Wednesday, Oct 7th from 14:30 to 16:30 in **A205**
- Topics:
  - Skills for Innovation





# Bibliography

- Methodological introduction: Bonifacio, Angeli, Stoycheva; Enacting Divergent Learning Dynamics in Teamworking: The Case of Technology Battles; Proceedings of EduLearn 2017 <http://dx.doi.org/10.21125/edulearn.2017.2416>
- On open and closed debates: Latour; Science in Action; Harvard University Press 1987; Chapter 1
- On induction: <https://plato.stanford.edu/entries/induction-problem/>
- On exploration: March; Exploration and Exploitation in Organizational Learning; Organization Science, Vol. 2, No. 1 (1991); <https://doi.org/10.1287/orsc.2.1.71>





# Questions?

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