2008 LISTERIOSIS OUTBREAK:
BALANCING OPENNESS AND PRESCRIPTION IN TECHNICAL ELECTIVES

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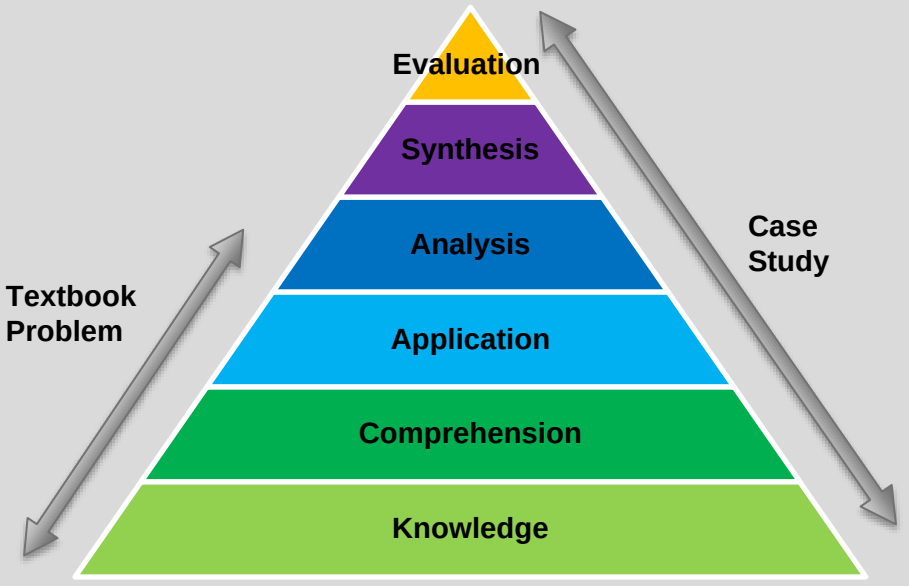
WHAT IS A CASE STUDY?

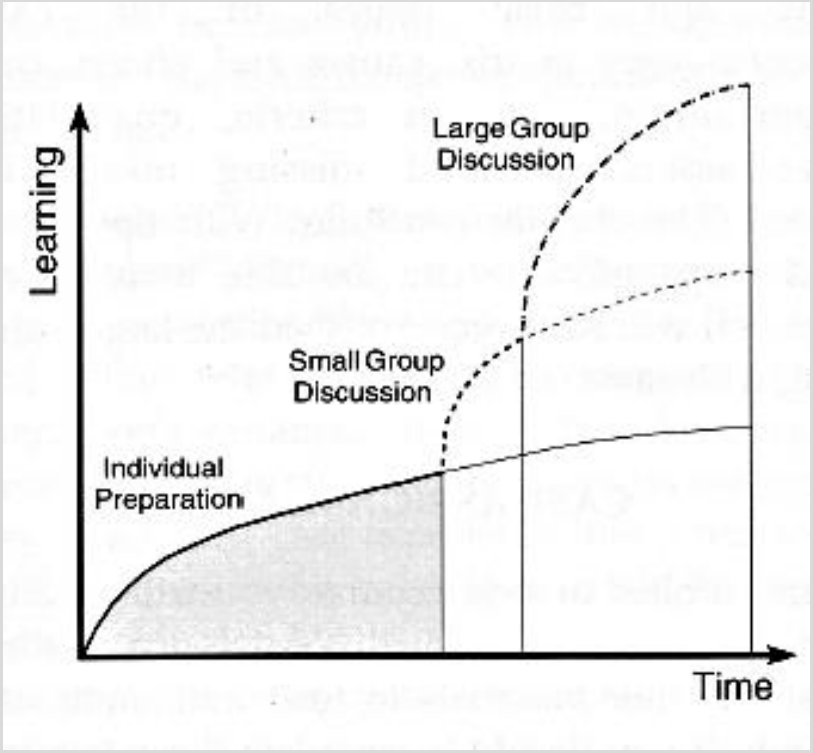
- A case study is a description outlining the complexity and context of a real-world challenge faced by a particular decision maker[1]
  - » Often ambiguous, uncertain, incomplete, inherently complex
  - » Often multidisciplinary
  - » Includes important context
  - » Authentic
  - » Key decision points
  - » Provides students the opportunity to 'live' the challenge



Meeting Higher-Order Learning Objectives

[1] Maufette-Leenders L.A., Erskine J.A. and Leenders M.R., "Learning with Cases", Richard Ivey School of Business, 2005

THE CASE METHOD



Maufette-Leenders L.A., Erskine J.A. and Leenders M.R., "Learning with Cases", Richard Ivey School of Business, 2005

- Connects theory and concepts to practice while engaging students
- Develops skills:
  - » Analytical, critical thinking
  - » Applications, using various tools
  - » Evaluative skills and time management
  - » Communication
  - » Decision-making and problem-solving
- Students responsible for their learning
- Case-Based Learning (CBL) versus Problem-Based Learning (PBL)
  - » CBL = guided inquiry
    - Instructor takes the role of a guide
  - » PBL = open inquiry
    - Instructor takes a passive role

CASES IN ENGINEERING ARE LESS COMMON

- “Applied Science” but let co-op be source of the application

- ChE564 – Food Process Engineering
  - » 4th year technical elective
  - » Content: Food characteristics, processing methods, preservation techniques, food safety
  - » Why here: legislation, food safety, engineering design of processes and products, direct contact with humans

2008 CANADIAN LISTERIOSIS OUTBREAK – A CASE STUDY

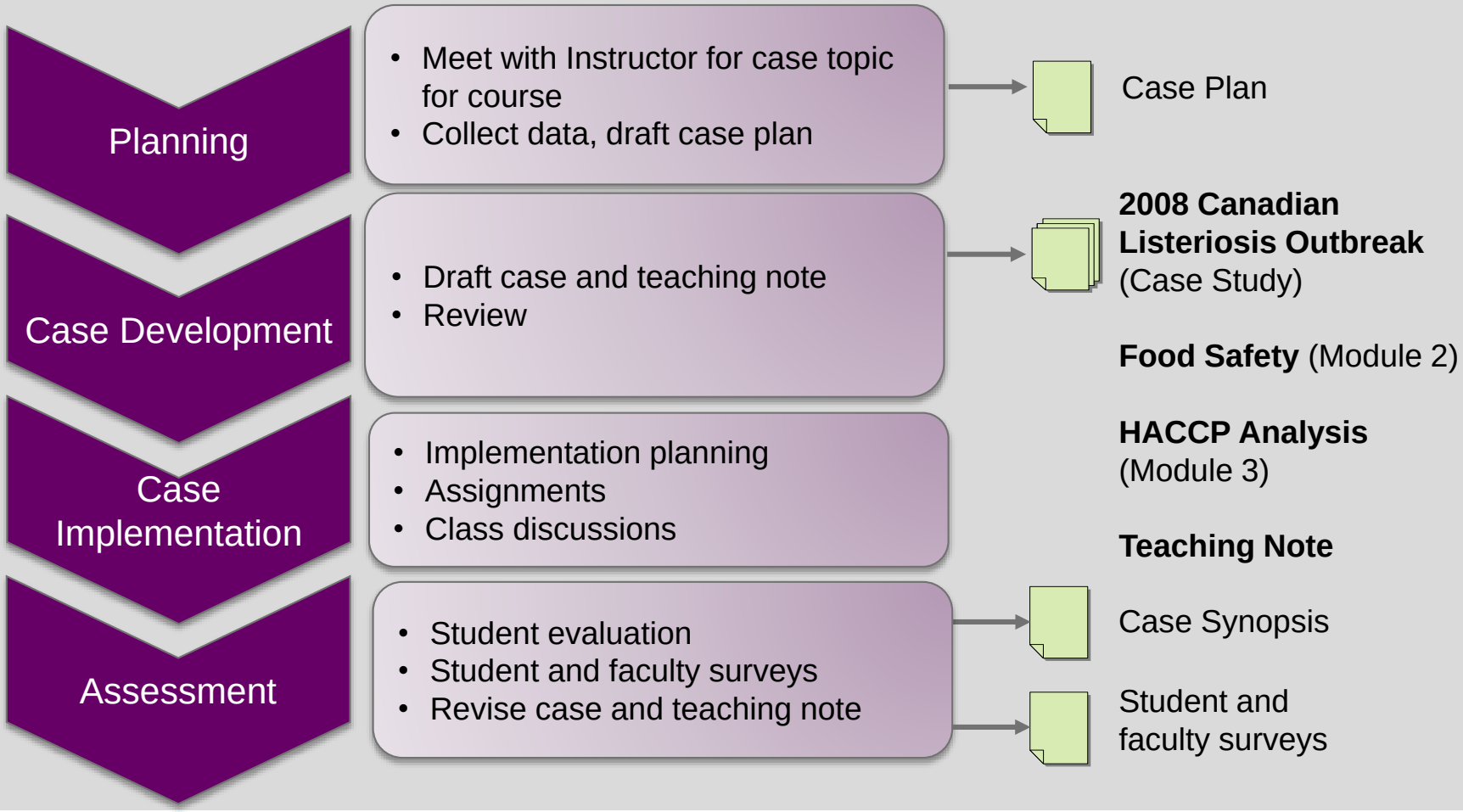
- In August 2008, deli products were contaminated with *Listeria monocytogenes*
  - » 22 deaths; 57 confirmed cases
- Products were primarily distributed to hospitals
- Massive recall of 191 products
- Shortfalls in the food safety system at Maple Leaf contributed to the outbreak

http://www.businessreviewcanada.ca/finance/498/Maple-Leaf-Foods-Announces-Major-Restructuring

Maple Leaf Foods CEO Michael McCain

CASE DEVELOPMENT METHODOLOGY

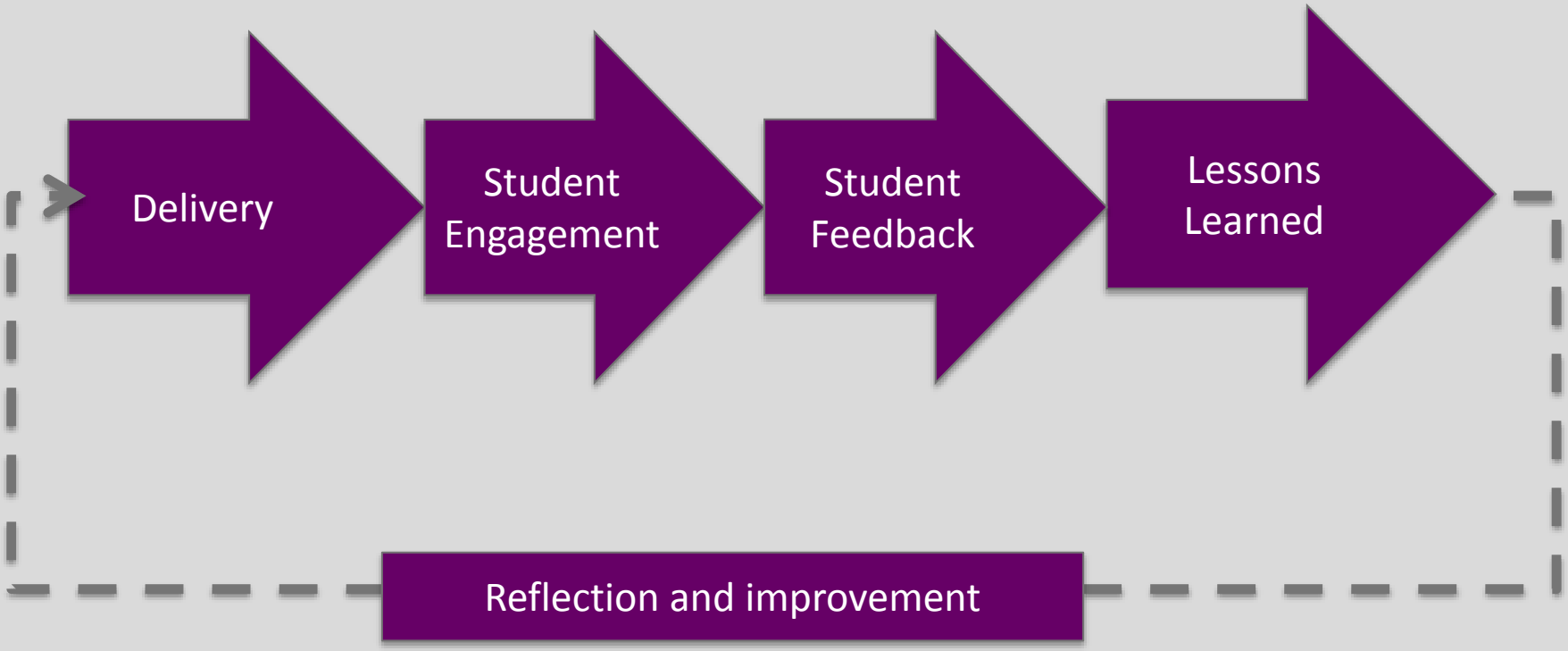
WATERLOO CASES IN DESIGN ENGINEERING



2008 CANADIAN LISTERIOSIS OUTBREAK – A CASE STUDY

- Case developed from publically available information
- Case developed specifically for ChE564
- Learning Objectives
  - » To conduct a critical analysis of the manufacture of ready-to-eat meat products by considering the case study with respect to the following topics:
    - Listeria growth prediction
    - Environmental testing
    - Meat equipment operation and cleaning
    - Hazard Analysis Critical Control Point (HACCP)
- Implementation method: course instructor

IMPLEMENTATION



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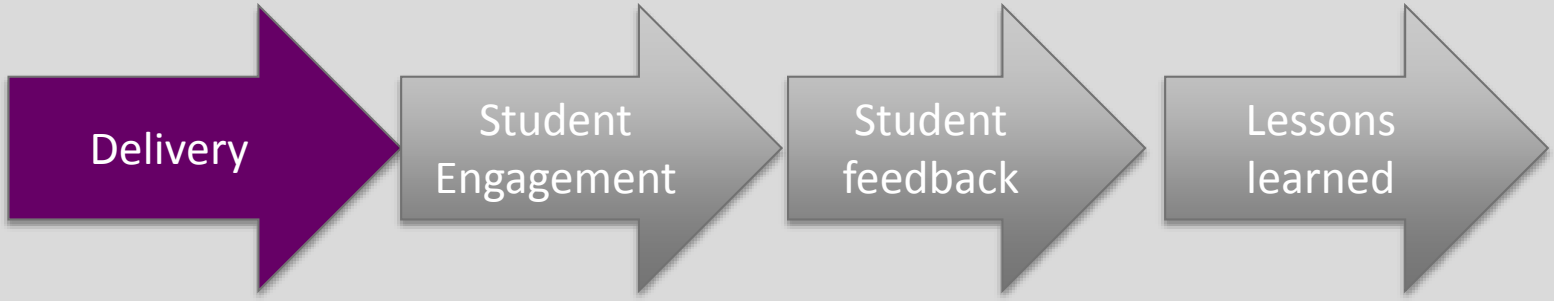
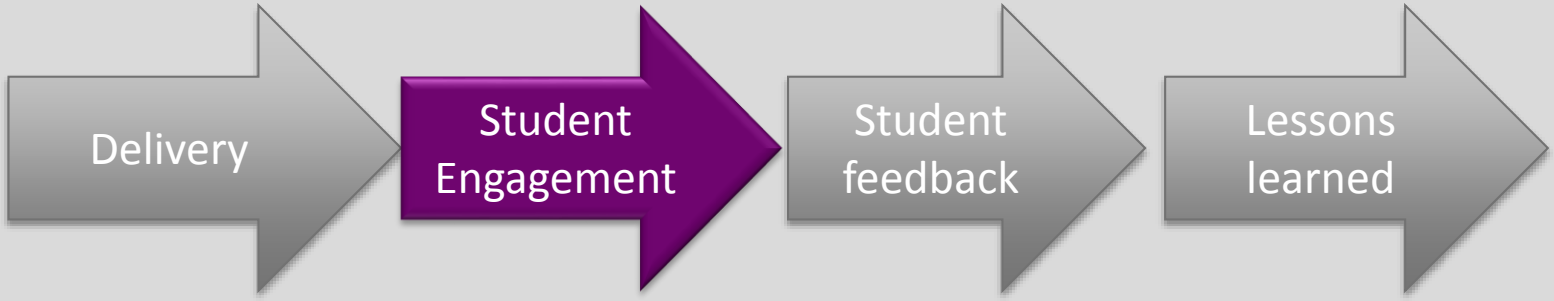
FIRST OFFERING –2013



- Students provided with case-study document
- Self-selection – group (3 students max) and specific topic (max 2 groups/topic)
- Presentation -preparation and submission prior to class
- 10 minute in-class group presentation – same topic presented twice (different perspectives)
- Follow-up with in class paper survey

FIRST OFFERING –2013

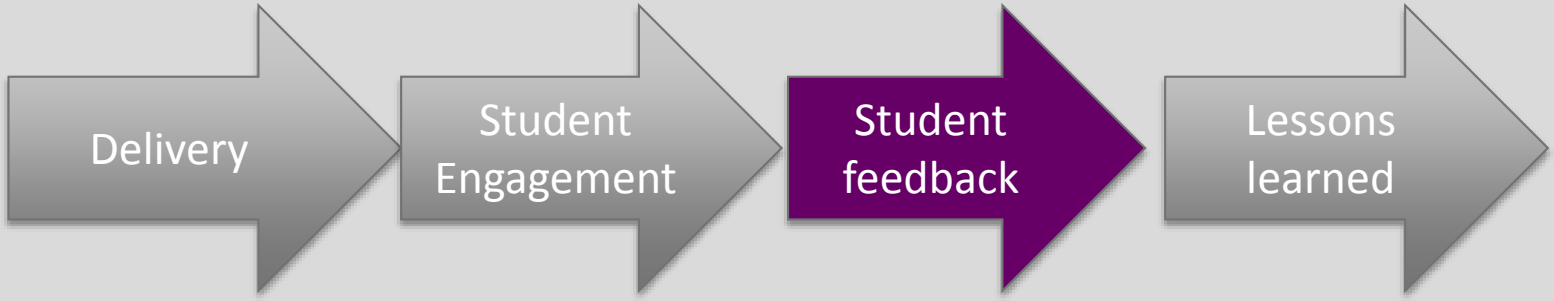


- Student engagement was topic specific and/or group specific
- Presentations reflected:
  - Grasp of previous in class HACPP example (one of the 4 topics)
  - Previous co-op experience
  - Limited connection with specific courses (two of the 4 topics)

SURVEY INPUT FROM STUDENTS FIRST OFFERING

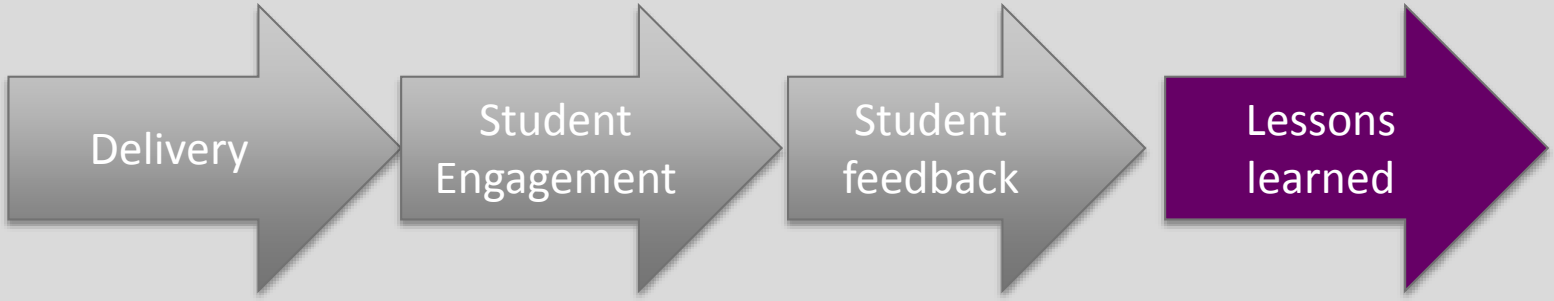
- ***17/18 students completed*** the survey
- ***88% agree/strongly agree*** "This Case Study was an ***engaging application*** of these specific topics."
- ***100% agree/strongly agree*** "This Case Study ***improved my appreciation of the relevance*** of these specific course topics."
- ***100% agree/strongly agree*** "This Case Study ***helped me understand*** these specific course topics."
- ***76% agree/strongly agree*** – "***Small group discussion(s)*** of the Case Study helped me understand these specific course topics."

FIRST OFFERING –2013



- "Good way of learning through other people's mistakes and applying our classroom knowledge to a real life case"
- "Really opened my eyes to the importance of safety and compliance in the work force"
- "Group discussion really helped to gain a full understanding and see topic from multiple points of view"

FIRST OFFERING –2013

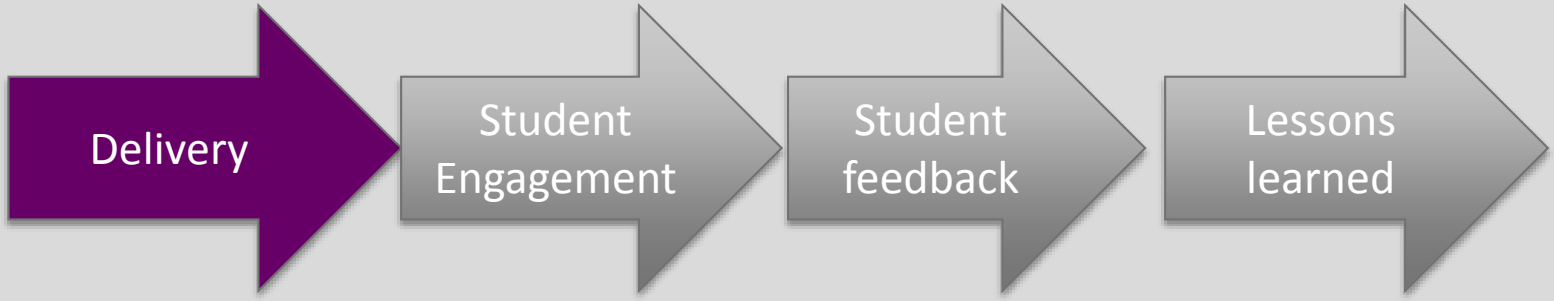


- Different comfort in relating to co-op experience than course knowledge
- Do not assume that all students have the ability to relate back to their prior knowledge
- Open ended nature of critical analysis can be challenging
- Benefits from classmates experience was reported

CHRISTINE'S REFLECTIONS (AFTER 1 OFFERING)

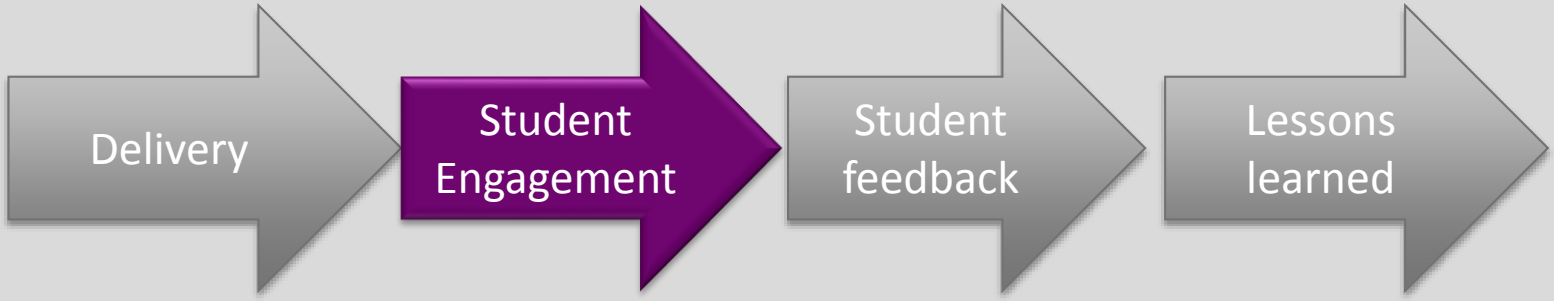
- Keep doing Listeriosis case study
- Keep in-class oral presentation format
- Provide more directions to ensure that expected knowledge is presented
- Increase connectivity between presentations

SECOND OFFERING –2014



- Students provided with case-study document ***(added one reference per topic)***
- Self-selection - groups (3 students maximum) and specific topic ***(maximum of 3 groups/topic)***
- Presentation - Preparation and submission prior to class
- ***8 minute*** in-class group presentation – same topic presented max of 3 times (different perspectives); ***assign group for questioning***
- Follow-up with in class paper survey

SECOND OFFERING –2014

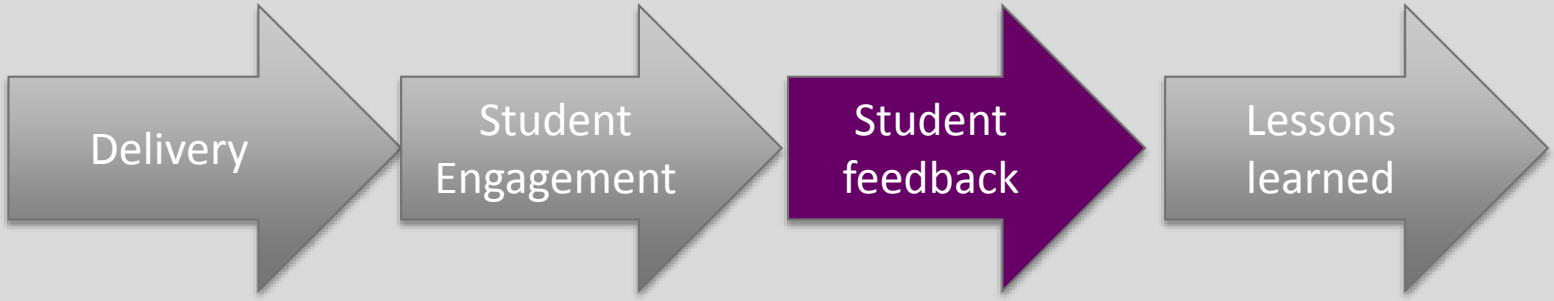


- Student engagement was topic specific and/or group specific
- Presentations reflected:
  - ***Improved understanding of topics and connection within specific topic***
  - Grasp of previous in class HACPP example (one of the 4 topics)
  - Previous co-op experience

SURVEY INPUT FROM STUDENTS SECOND OFFERING

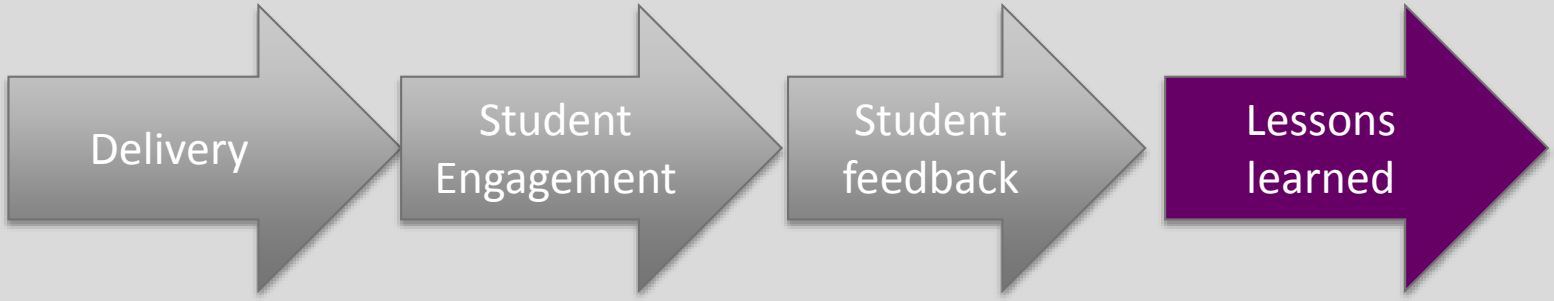
- ***24/32 students completed*** the survey
- ***88% agree/strongly agree*** "This Case Study was an engaging application of these specific topics."
- ***92% agree/strongly agree*** "This Case Study improved my appreciation of the relevance of these specific course topics."
- ***92% agree/strongly agree*** "This Case Study helped me understand these specific course topics."
- ***30% agree/strongly agree*** – "***Questions*** addressed to the presenters helped me understand these specific course topics."

SECOND OFFERING –2014



- "Very interesting real life scenario where so much of our chemical engineering knowledge could be applied"
- "I learn better when I have the context of the problem; it's even better when that context is taken from an actual event"
- "Presentation was a good format; multiple presentations on same topic could get repetitive but also allows for various concepts to be explored"

SECOND OFFERING –2014

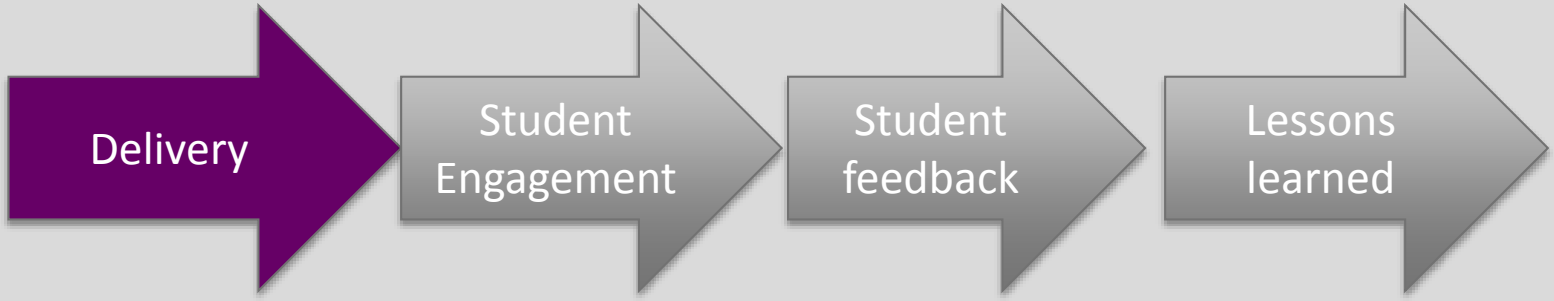


- Providing initial reference improved technical content
- Being more prescriptive with questioning increased perspectives within same topic
- Multiple oral presentations of same topic is not optimal

CHRISTINE'S REFLECTIONS (AFTER 2 OFFERING)

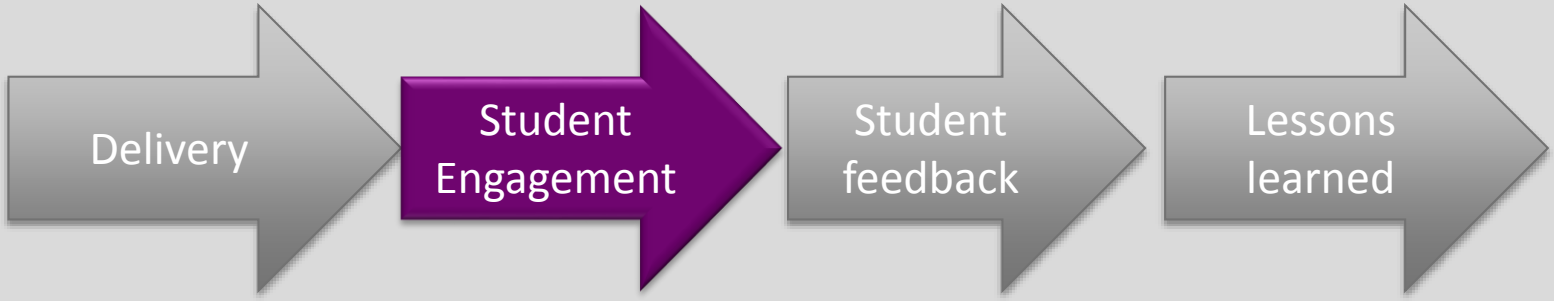
- Keep doing Listeriosis case study
- Revisit format of class activity
  - » Other platform
  - » Increase student role within/across topics

THIRD OFFERING –2015



- Students provided with case-study document
- Students self-selected into groups of 2-3 to research 1 of 4 subject areas and produce a 2-page research paper
  - 5-6 references required
  - Provided with a starting point paper
- Research papers posted on LEARN for all students to read before in-class discussion
  - Students to complete “reading questions” before in-class discussion, individually or in groups
- 2-hour in-class, moderated discussion
- Follow-up survey

THIRD OFFERING –2015

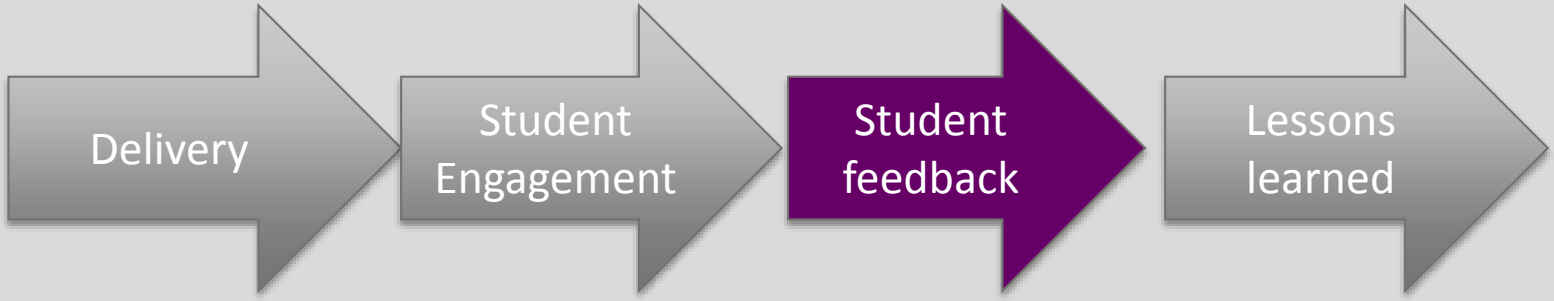


- All groups submitted research papers
- All students completed reading questions
  - Varying levels of work produced
- Majority of class attended and participated in the group discussion
  - Monday February 2, 8.30-10.30am

SURVEY INPUT FROM STUDENTS THIRD OFFERING

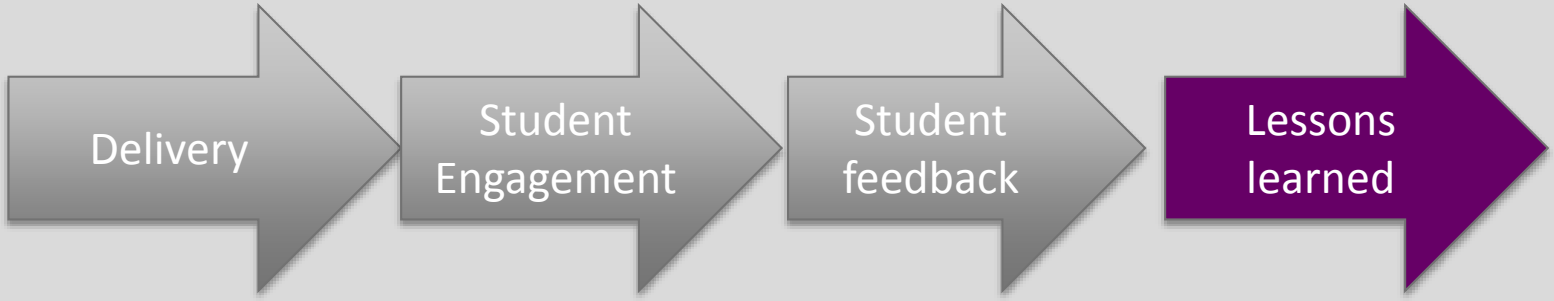
- **22/29 students** completed the survey
- ***90% agree/strongly agree*** "I think that the Listeriosis Case Study **should be used in future offerings of ChE 564**."
- ***80% agree/strongly agree*** "I feel that the **research portion of this case study** (researching and preparing the mini-report) **was beneficial to my learning**."
- ***80% agree/strongly agree*** "I feel that the **preparation before the in-class discussion** (reading reports and answering questions) **was beneficial to my learning**."
- ***65% agree/strongly agree*** "I feel that the **in-class discussion was beneficial to my learning**."
- ***70% agree/strongly agree*** "I **prefer this style of case study to a traditional assignment**."

THIRD OFFERING –2015



- “I have never worked in the food industry before and didn't realize the high level of risk that exists”
- “definitely made me think a lot more than if I was just told to read the case study.”
- “it's nice to have real-world applications of what we are learning to keep things in perspective.”
- “as an engineer, always voice my concerns no matter how small it seems, and always think about customer and employee safety.”

THIRD OFFERING –2015



- Importance of giving starting point papers
- Balance between clearly communicating expectations VS open-endedness for research papers
- Final survey to encourage reflection

MARY'S REFLECTIONS (AFTER 3 OFFERINGS)

- Keep using case study in ChE564
- Encourage addition of case to other courses
- Consider format of case study
  - » Individual/small group aspect
    - Set clear expectations and/or give a starting point
    - Leave open-ended so students can add their own twist
  - » Group/whole class aspect
    - If a group discussion, how it is moderated?
    - Space considerations – round table?
    - How to adapt based on number of students?
    - How will repetition be handled?
  - » Encourage reflection on the experience

AND THEN…

- Teaching 2016…
- Keep Listeriosis case study and open ended structure
- Keep group work; research question format; in class discussion format
- Add class example for potentially difficult to grasp concepts (growth prediction; environmental testing; equipment cleaning)
- Ensure to have follow up assessment: e.g. questions on final exam

CONTACT INFORMATION

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