Life Cycle Management in Industry

Motivation, pedagogical approach, contents and experience from two years of lecturing LCM at the Technical University of Denmark

10th NorLCA Symposium in Reykjavik

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Thursday, 2. October 2014
Outline

1. **Background** for developing the Life Cycle Management course
2. **Facts** about the course as it is today
3. **Course contents**, incl. 1 case example
4. **Experience** after two years of running the course
5. **Future options** and plans
6. **Conclusions**
Background

• The course “Life Cycle Management in Industry” was established in 2012 and run for the first time in 2013
• It replaced two other DTU courses that had a related content
• Main aim: Enable participants to demonstrate a broad understanding of the life cycle approach used for analysis and synthesis of solutions and management of these, in order to minimize the environmental and socio-economic effects that products and product portfolios lead to throughout their life cycle and across the value chain.
Facts

- Course 42377 “Life Cycle Management in Industry”
- 5-ECTS Master level course taught in Spring semester (February to May)
- Students enrolled: 46 in 2013, 108 in 2014 …and more expected in 2015
- From different study lines: mostly Engineering Management, then Design & Innovation. Also e.g. Wind Energy, Sustainable Energy, Environmental Engineering, Computer Sciences, Building Design, and Mathematical Modelling (maybe 30% Danish students, rest international)
- Technological Specialization course for the top-2 above-mentioned study lines.
- Format:
  - Theory, methods and many examples taught in class
  - Parallel group work (applying the learnt theories/methods)
  - Students develop a new sustainability strategy for an organisation, incl. KPIs to manage and measure success
- Examination: Individual grades from combination of
  - Individual Multiple Choice test(s),
  - Group report, and
  - Group presentation
Course contents

Preconditions:
• Large students numbers
• Close link to industrial context

1. Introduction
2. Stakeholders
3. Plan-Do-Check-Act
4. Strategy (External)
5. LCA and standards
6. Industry case (External)
7. Key performance indicators
8. Social LCA
9. Eco design Maturity Model
10. Total LCM (Case study)
Case Study – applying Life Cycle Management

- One of the main competitors implemented a new lighting technology (LED). It seems, that customers are actually interested in this trendy and bright lighting.
- Question: Should your company follow this trend?

- Class separated into two groups, each group is divided into 5 sub-groups (Marketing, Product, Production, Financial, Environment)
- Election of board members (making final decision and head of the board presenting it in front of the whole class)
- 1.5 hours of case work:
  - 20 min: Get familiar with the product
  - 30 min: Discussion within the sub-group (supported by tutors)
  - 10 min: Break
  - 20 min: Meeting of the board and decision making
  - 10 min: Presentation
Experience after two years

- Course **works well overall** – also according to student evaluations, mainly due to
  - “Real life” closeness (through examples, cases and guest lecturers)
  - Group work
- Possible improvement areas
  - Total **work load for students can be higher** (students’ view! 😊)
  - Workload for students can be more spread over time
- We see challenges regarding examination: **Hard task!** due to
  - Many students paired with focus on their individual argumentation
  - Chosen exam format of making group presentations
  => Last time, three exam days had to be used!

- **Multiple Choice tests work well too**, due to electronic system at DTU

Therefore, planned action: **More Multiple Choice tests along the course!**
Thus increased deeper learning and lowered work load at end (for all parts)
Future options

- Some **10% higher student workload**
- **Three Multiple Choice (MC) tests** spread over entire course duration
- More distinct separation of **modules/themes followed by MC assessments**
- Optional **group presentation about half-way**, i.e. more Student-to-student explaining practice (and deeper learning)
Conclusions

• From a students’ perspective:
  – Importance and diversity of Life Cycle Management is being recognised
  – Increasing participant numbers
  – Very positive response on application of learnings in individual group case work

• From guest lecturers’ perspective:
  – Positive response on the students’ critical, active participation
  – Especially KPI development is appreciated, since this is industry practice

• From DTU lecturers’ perspective:
  – Very dynamic and active students (Friday afternoons, still at least 50 students show up!)
  – A lot of students (about 10%) are asking for MSc thesis options or other activities subsequent to the course
  – Challenge, how to acknowledge in the grading the very important individual argumentation combined with large student numbers
Mange tak! Þakka þér! Thanks!