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ICT Innovation – Spring 2017

MSc in Computer Science and MEng Telecom. Engineering
EIT Masters ITA, S&P,SDE

Lecture 00 – Administrative Details

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https://securitylab.disi.unitn.it/doku.php?id=ict_innovation

Course Objective

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- **Myth:**
  - Product design and development is essentialy creative so it cannot be structured
  - It requires a talented individual (e.g. Steve Jobs)
  - The first inventor of a good-enough technology conquers the market
- **Reality (concise version)**
  - “Genius is 1% inspiration and 99% perspiration”. T.A. Edison (Quoted in the Harper’s Magazine)
- **Reality (extended version)**
  - Product development includes many steps that can be documented and analyzed. They can therefore be learned and, possibly, improved.
  - Product development requires a wide range of skills ranging from software engineers to marketers, from industrial designers to manufacturing engineers
  - The first-comer has an advantage ONLY if it keeps innovating its original product
- **Course Objectives**
  - Illustrate (some) steps of product design and developement and guide students, forming multi-disciplinary teams, into the development of a “product” as opposed to just a “project”.
- **Which steps we don’t do**
  - Complex Market, financial analysis etc. etc. → Business Development Lab Course

Course Structures

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- **Lectures on Product Design and Development**
  - Introduction
  - Product specifications
  - Concept (Mostly selection and testing)
  - Product architecture
  - Prototyping and robust design
  - Patents and intellectual property
  - Basic finances: net present value
- **The rest is team work**

Course Grading

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- **Creation: Research Canvas (up to 10/30 grade points)**
  - Each team will produce a research canvas to clarify the ideas on how to make it a product
- **Design: Product design and architecture (up to 10/30)**
  - Each team will produce a poster explaining how their product will work
- **Production: Product demonstration (up to 15/30)**
  - Each team will have a small budget for hardware/software and will have to actually present a working product
- **Advertising: Video and Documentation (Up to 4/30)**
  - Video and 4 pages product sheets describing key characteristics of the product, target customers, main usage model, tentative cost/ pricing structure
- **Participation to feedback sessions is mandatory**

Overarching Learning Objectives

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- **Course should develop and evaluate your abilities in**
  - Creativity
    - How to solve problems when not all steps are completely specified (this what you should try to do with your design/architectural result)
  - Intellectual Transformation
    - How to transform an idea into a product (the first “brainstorming” step is your research canvas, the last one is the final product)
  - Leadership
    - Organize yourselves into a team and arrive to make a final product (you should try to leverage on each other’s competences)
  - Making value judgement
    - Decide which parts are important and which are not so important based on ethical and social considerations

The “Idea”

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- **We have already the invention:**
  - A swarming fleet of inexpensive drones can be used for several purposes from crop monitoring in agriculture to surveillance of industrial facilities, etc.
    - See webpage for links.
- **Objections:**
  - I minght need a license to fly, how can it be a product?
    - Well, small drones requires an inexpensive license, and anyhow if you do it on your own field it’s fine, you are not very likely to be just near an airfield.
  - The idea is already described what else to do?
    - It is NOT a product. You can’t “search on Google to find the specs” of Parrot MACs. You need a proper Web Server addressing the market that you have. Equally you need a reliable way to hack cannot just “show you how to do it by typing commands on the shell”.
  - It is a lot of work to make it a product, how can we do it?
    - You are a team of 4+ people. You need to divide the work. If somebody really doesn’t work you come to see me and we discuss the issue F2F
- **What if we have “our product”?**
  - Convince me → must be (a) a physical product, and (b) a multidisciplinary team

Tentative Timing of Classes

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- **Lectures on Wednesday-Friday**
  - Fri, 3/Mar → What does it mean (in real life) to make a product?
- **Key Milestones**
  - *Fri. 24/Feb* → *Case study presentation*
  - *Fri. 17/Mar* → *Feedback Sessions*
  - **Fri. 24/Mar** → **Concept Canvas Show at CLC**
  - *April* → *Feedback Sessions*
  - **Fri. 5/May** → **Design Poster Show at CLC**
  - *May* → *Feedback Sessions*
  - **Fri. 16/Jun** → **Product ShowRoom at TDB**

(Grades are "won" at the ShowRoom)

Show Room dates to be confirmed

What's a ShowRoom at CLC?

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- **CLC=Co-Location Center at EIT Digital - Italy**
  - This is the main lobby
- **Each group will have a stand and we will pass around giving you a vote for your set up**
  - Concept Canvas → basically a poster with some key ideas
  - Design Poster → more details, clear architecture, how to solve steps etc.
  - Product → you'll have the product and should be able to do some demonstrations eg with a laptop, the keyboard etc,
    - Ehi it's drones flying! I need to find a place, last year we went to Italfly's main Hangar at the Caproni Airport.

It's a product…

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- **You must have a complete walk through for the "customer experience".**
  - You buy one, you set up the network, how do you register the drone/how do you set-up the web service (eg is it "a install on your machine", or it is "use a remote service")
  - It cannot be
    - "it works but only on our laptop using the shell".
    - "It worked perfecly this morning at 6am"
- **You have a budget for the actual hardware, or if you need Amazon WS etc.**
  - We pre-ordered some of the devices (drones, rapsberry pi and antennas) but you might have your own set-up.

Teams (1 S&P, 1 SDE + 1 ITA + mixed background)

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- **See the excel file on Google Drive**

Textbook

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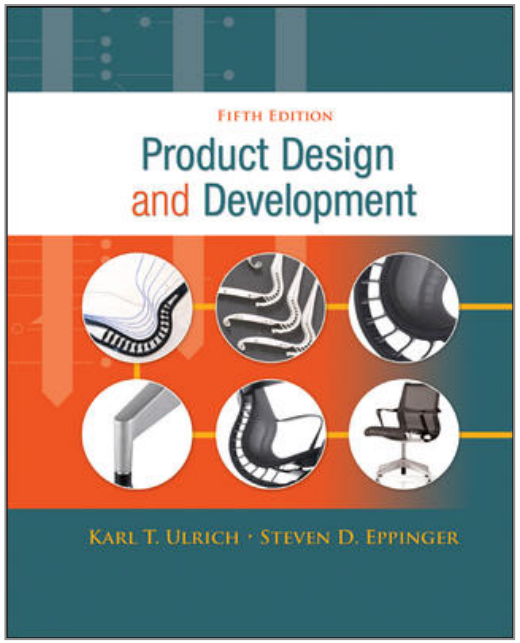
Product Design and Development

Karl T. Ulrich and Steven D. Eppinger

5th edition, Irwin McGraw-Hill, 2012.

1. Introduction
2. Development Processes and Organizations
3. Opportunity Identification
4. Product Planning
5. Identifying Customer Needs
6. Product Specifications
7. Concept Generation
8. Concept Selection
9. Concept Testing
10. Product Architecture
11. Industrial Design
12. Design for Environment
13. Design for Manufacturing
14. Prototyping
15. Robust Design
16. Patents and Intellectual Property
17. Product Development Economics
18. Managing Projects



Also as eBook with most chapters and far cheaper