About Oral Exam

ELEC-E9900 Networked Partnering and Product Innovation - NEPPI

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Today's agenda

- To prototype the exam process
- Learn to prepare
    - Know the expected content
    - Know the expected approach

15 minutes of discussion

- Salu will present an IoT design concept
- You will **think as** the design business manager of the concept owning organisation.

The aim

- You will need **to prove** that you have understood the key ideas about IoT Innovation (i.e., the concept design of connected products).

- You will need to
    - 1) address each of the key ideas (on these slides)
    - 2) in a manner that is relevant to the product concept idea you are presented with.

The key ideas?

- Understanding, in principle, the key areas that must be studied in the context of user-centred innovation
  - User involvement   -> Desirability
  - Technology research   -> Feasibility
  - Business framing   -> Viability

The key ideas?

- Understanding, in principle, the key approach to developing novel ideas, i.e., **reflective prototyping**.

The key ideas?

- Understanding, in principle, the following areas for technology development in the context of IoT
    - Cloud
    - App
    - Networking
    - Thing

User Involvement

Why to involve users?

- User is a consumer – you get the money from them
- If it is easy for users to use, they maybe more likely to buy it
- To get feedback – either by testing, or talking about it
- You may get insights, and material for your design / ideation

When to involve users?

- Depends on the case – brainstorming, prototype testing, (minimal viable product) MVP user
  - From early phases to post-release phases

What to do with the users?

- User studies
  - Observation, show-me how it's done, let me do it
  - Interview, limited number of people, wide coverage of topics (themes)
  - Design probes (Tuuli Mattelmäki)
  - Focus groups
  - Survey

[Technology Research]

Why to study technology?

- For feasibility
  - Thinking about an idea that uses current technology… you need to know the basic science.. Initial basis to start with
- Technology-driven innovation
  - You cannot innovate here without knowing the tech
- Learn to work with the novel tech, set your assumptions

When to study technology?

- Ideation – to get technically more relevant ideas
- Later – dive deeper into tech to know how to implement stuff that works

What to do when studying technology?

- What effort will be needed to implement the product – so that you understand this a bit better

- Consult professionals

- Look at alternative technologies, there are many ways to achieve the same result

- Understanding what is possible with which tech.. Search what tech exists, study what functions they have, buy, test, experiment..

- Top-down approach – to split things into component parts

[Business Framing]

Why to do business framing?

- Money
- To plan how to bring the product to the market, positioning it right
- Business needs to be sustainable in order to be standing still next year
- Market validation
  - DO the user research, differs from case to case – services, find facts and figures.. Industry trends – listen to weak signals
- Meaningful impact
- To set expectations – for investors, for employees, for customers

When to do business framing?

- Continuous process that starts with ideation

What to do in the framing of (design) business?

- Market research / competitor analysis
  - Check the reference design
- Know what your stuff costs
  - Upfront cost is high with physical designs
  - (Grafana Edupack)
  - Know what parts you need
  - Know what are your recurring oosts, such as Cloud services, employees

How to address the 'partnering' part?

- Know your partners

Reflective Prototyping

What is a prototype?

- Prototype is anything that can effectively capture and communicate an iteration of your idea
- Prototype can be *tested*
  - Testing is a means to get feedback – "The world talks back to you" – Donald Schön (Reflective Practitioner)
  - Learn how your idea *works – expected or not*
- Make sense of what the feedback means for your project

What is reflective prototyping?

- Learning tool

When to prototype?

- All the time

Why to prototype?

- To learn

Need vs Experience as the driver

- Understand what is driving your design effort
- Is there a real need that needs to be addressed? A problem to be solved?
  - NEED is the driver   -> Study users first
- Are there new technical possibilities that enable new experiences, new interactions, new connections?
  - EXPERIENCE is the driver   -> Build a proto first

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Technology Components of IoT Products

[Cloud]

What is Cloud?

- It is like a service
- It is like a shared background

Why are Cloud services needed?

- So that devices can make decisions in real-time
  - All games have some sort of cloud. Real-time online multiplayer games provide a shared situation for everyone
- To store data
- To process data
- To share data

What Cloud services should we know?

- AWS (Amazon Web Services)
- Azure (Microsoft)
- Oracle
- IBM
- iCloud
- Steam

[App]

What is an App?

- Is a digital platform… we all know..
- In interface to communicate with the user
    - TO get feedback
- Runs on the user's (own) device

Why are Apps needed?

- App is an interface to communicate with the IoT service
  - Provide users with means to control the system and to get feedback
  - Apps can do also processing of data

What approaches to App development should we know?

- Native vs. web-based application
  - Native = Apple products (iOS), Google platform (Android)
  - Web-based
    - Use a Javascrtipt framework (React, Vue, Angular)

[Networking]

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Why is networking needed?

- Interaction through connections
  - You can upload data to the cloud, download it back
  - Interaction and networking adds value to the whole system

- Updating firmware

What networks IoT products use?

- Cellular - Internet

- WiFi - Internet

- Bluetooth – No internet

- NFC (Near field communication) – No internet

Router

* Interface between the local network and the internet (Cloud)

[Thing]

Why to create a physical thing?

- Physical devices can be more intuitive to use
- Can interact with the physical environment too

What to consider when creating a physical thing?

- Industrial designer
  - Form, shape, material, communication
  - Manufacturing methods
- Mechanical designer
  - Mechanics
- Electronics engineer
  - Embedded design – circuit board and peripherals
  - Embedded software – uploaded to the chip/microcontroller (firmware)

What needs to be covered next Monday?

- Working on the project

- More information about the report

- More about NEXPO

- Examples of how final oral exam could be answered

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Let's have enact a prototype of the oral exam