

## EE415 Writing Assignment 2: Impact Analysis

### Purpose and Objectives

The second stage of the design process is the impact analysis where your team begins to consider potential consequences of your design. The objectives of the impact analysis are to help your team a) explore usability issues, b) consider important intended user characteristics/tasks/ environments; and c) specify potential unintended impacts so appropriate action can be taken early in the design process before selecting a concept and making a commitment to your client. You can find more about the expectations for the impact analysis by referring to the course's engineering design rubric.

### Audiences

1) EE415 evaluation panel (course instructors and TA) and 2) your team

### Task

Conduct an impact analysis by building a series of use case scenarios. Use case scenario building offers a rapid and inexpensive way of visualizing early design ideas and examining them in context. Like modeling or interaction design prototypes, scenarios offer team members a concrete reference around which to focus discussion about design impacts. Scenario building encourages exploration and representation of how a product will impact ethical, economic, environmental, global, and societal/cultural contexts. The intention of scenario building is to consider a variety of possible futures that include uncertainties, rather than to focus on the accurate prediction of a single possible future. Use case scenarios (sometimes referred to as use cases) can also describe a system from the user's point of view and/or user interface with a process and/or product.

Usually, scenario builders start by determining a set of focal questions or issues in conjunction with their primary stakeholders beyond the client. The focal questions often revolve around key uncertainties or unknowns in the system. The next step is to build scenarios by projecting these questions into the future. There are many different approaches to scenario building. Below is one simple 4-step process:

#### 1. Define:

- What is/are the primary problem/s?
- What are the primary needs/constraints?
- Who are the stakeholders and what are their perspectives or contexts?

#### 2. Explore

- What are the major uncertainties?
- Plot on an Uncertainty Axis (see example on p. 2).
- Use the four quadrants of the Uncertainty Axis to situate possible scenarios.

#### 3. Build

- Choose the most feasible scenarios and begin fleshing them out using the stakeholders, constraints and other considerations surfaced during the "Define" step.
- Write or map out scenarios.

#### 4. Use

- Use the scenarios to consider the impact of various design ideas.
- Scenarios can also help the team during the concept generation and concept selection stages.

## Specifications

*Due date:* March 1 by 1 pm. Length: a minimum of three robust scenarios; additional visuals, graphs, charts, algorithms as needed. *Document Type:* Your Choice [there are a wealth of collaborative writing tools freely available on the web; you can also choose to use traditional tools, such as a PDF or Word Doc. Use whatever works best for your team to fulfill the assignment's objectives]. *Grading Details:* 10% of Course Grade. The Engineering Design Rubric Competencies 2 & 7 (Impact analysis/Communication) will be used. *Submit Your Work:* Please send your report to your instructor (jdelgado@eecs.wsu.edu).

## Four Use Case Scenario Examples

**Example A:** a scenario built around potential impacts that electrical vehicles have on the power grid.

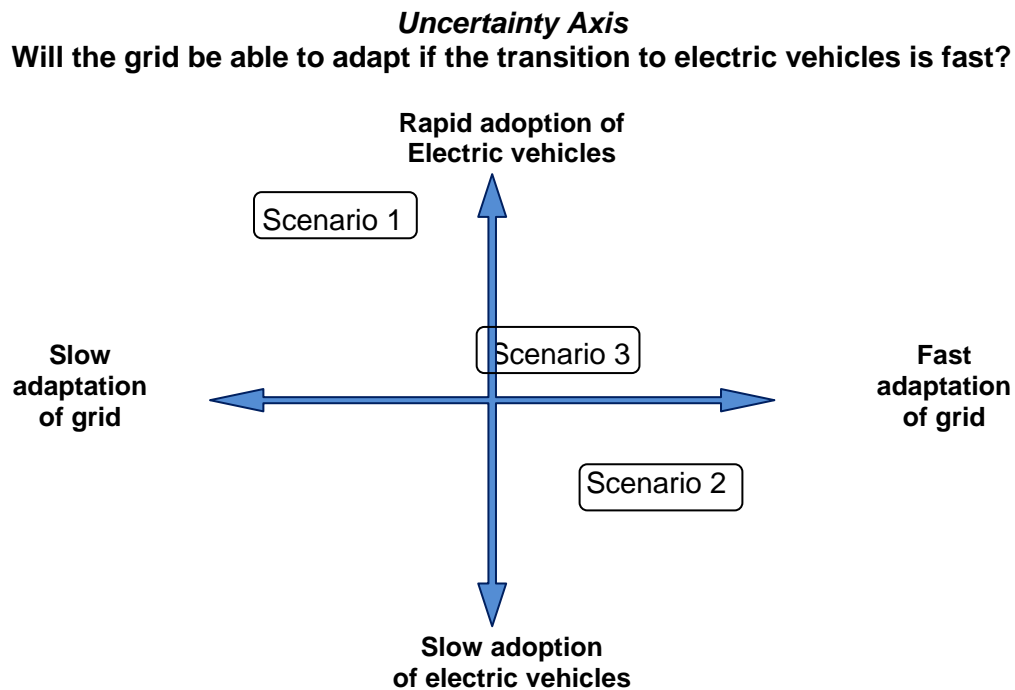
### 1. Define:

*Primary Problem:* Meeting the demand for more energy in an environmentally friendly way.

*Stakeholders:* consumers; energy companies; oil companies; car manufacturers; coal industry/miners/nearby residents; electric motor companies; battery producers; manufacturers of car body materials and suppliers of those materials.

### 2. Explore:

*Unknowns:* How fast will electric vehicles be adopted? Will the electric grid be able to handle increasing demand?



**3. Build:** Scenario 1: "If the adoption of electric vehicles is faster than can be accommodated by the electric grid, consumers may.... which might cause energy companies to...The effect on residents close to coal mines might...etc.

**4. Use:** “In designing the....for the electric vehicle project we decided against a design that used....in favor of a model that would be more adaptable to...etc.”

**Example B:** A series of use case scenarios exploring possible software failures (buried alarm, missed alarm, alarm calibration error) in the BP Deepwater Horizon oil disaster:

<http://www.computer.org/portal/web/computingnow/bp-spill>

**Examples C:** 2010 senior design student team reports for examples of good impact analyses. These examples will help you to write your impact analysis report.

### **Potential Pitfalls of Scenario Building**

Despite the best intentions it is possible to fall into some traps in scenario building. Here are important issues to watch out for:

- *The rosy story:* scenarios can end up too simple and easy. Remember to reflect the complexity of real world interactions. Build in the issues you need to deal with.
- *Stereotypical situations and contexts:* it's important to question your assumptions about the people and contexts you will be using to construct your scenario stories.
- *The single scenario:* the power of scenarios is to represent alternatives, explore boundary conditions and enable comparisons. Create multiple scenarios.
- *Losing focus:* scenario building is a balancing act between extending the story and focusing on the key issues.
- *Confirming weak ideas:* since this is "fiction," it is easy to alter situations to make a bad idea work. It's important to stay honest and use this opportunity to challenge ideas and improve them.

### **EXERPTED AND ADAPTED FROM:**

Fulton Suri, J., & Marsh, M. (2000). Scenario building as an ergonomics method in consumer product design. *Applied Ergonomics*, 31(2), 151-157.

Lebel, L., Thongbai, P., Kok, K. (2006). Sub-global scenarios. In *Ecosystems and human wellbeing*. Retrieved from:

<http://www.worldagroforestry.org/downloads/publications/PDFS/bc05143.pdf>

Gordon, A. (2008). *How to Build Scenarios*. PPT Retrieved January 29, 2010, from <http://www.slideshare.net/adgo/scenario-building-workshop-how-to-build-and-use-scenarios>