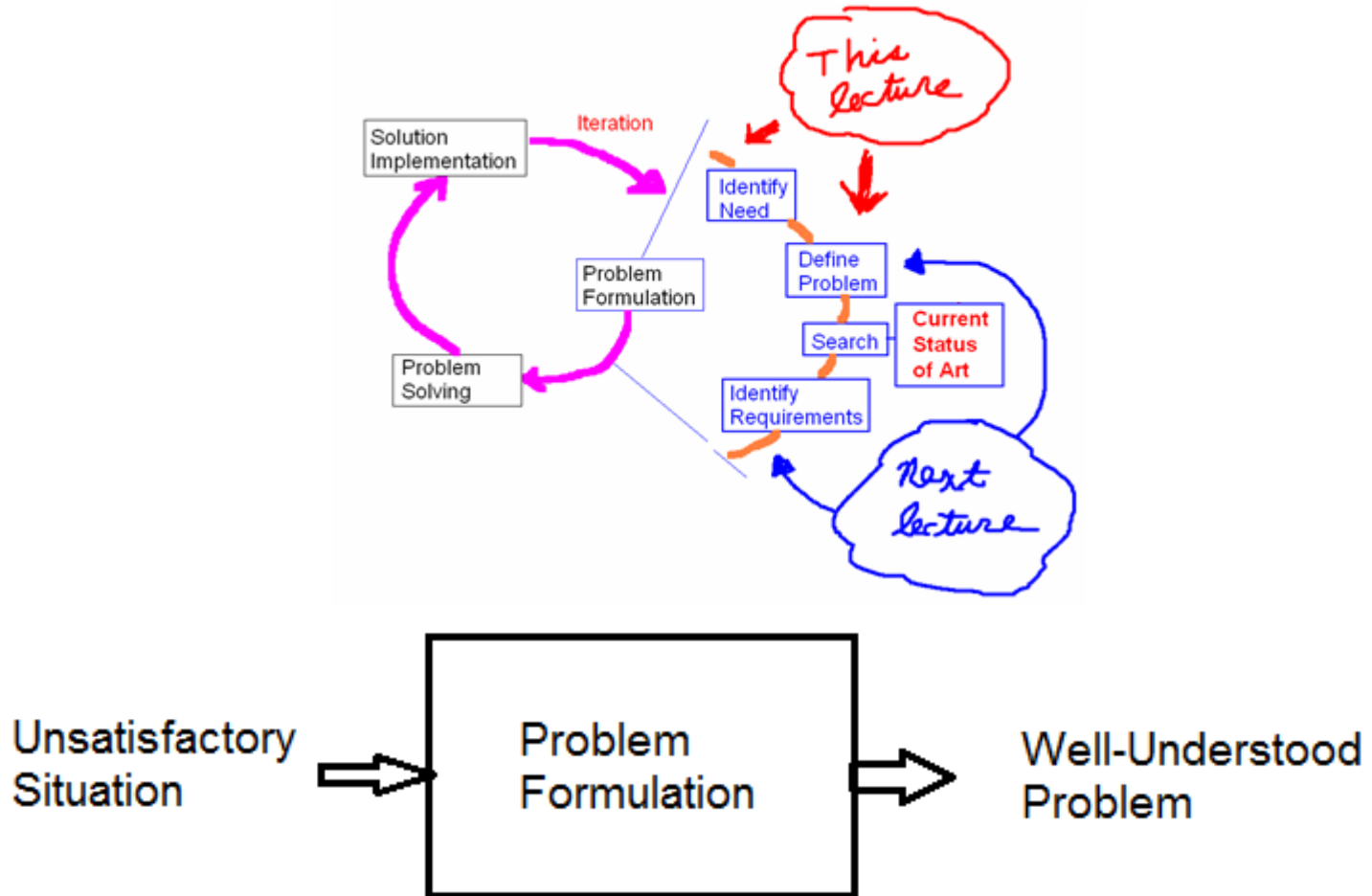


EECE401 Senior Design I

Problem Formulation



VIP Teams

First Meeting Status



Recap: Team is

- Team is
 - Formed by **Relationship** among team members
 - Guided by a vision and set of common **goals**
 - Functioned by roles of members to **accomplish tasks**
 - Run by following **agreed-upon rules and procedures**



Team Contract

- Team Name
- Project Title
- Goal/Objective/Final Product
- Expectations
- Rules and Policies
- Commitment

Team Contract
 For Senior Design Classes
 Department of Electrical and Computer Engineering
 Concord University

Team Name																
Team Description	The name of the team is:															
Goal	The goal(s) of the mission is:															
Expectations	The team's expectations with respect to issues such as attendance, ownership, level of participation, communication, productivity, etc. are as follows:															
Rules and Policies	The team's policies and procedures governing such things as tardiness, absences, task preparation, deadlines, quality of work, and conflict resolution, penalties and rewards are as follows:															
Commitment by Members	I am responsible for creating the vision and goals, rules, and procedures as stated in this contract. I understand that I am obligated to abide by these items and conditions. I understand that if I do not abide by these items and conditions, I will suffer the consequences as stated in this contract.															
	<table border="0" style="width: 100%;"> <tr> <td style="width: 33%; border-top: 1px solid black;">Name</td> <td style="width: 33%; border-top: 1px solid black;">Signature</td> <td style="width: 33%; border-top: 1px solid black;">Date</td> </tr> <tr> <td style="border-top: 1px solid black;"> </td> <td style="border-top: 1px solid black;"> </td> <td style="border-top: 1px solid black;"> </td> </tr> <tr> <td style="border-top: 1px solid black;"> </td> <td style="border-top: 1px solid black;"> </td> <td style="border-top: 1px solid black;"> </td> </tr> <tr> <td style="border-top: 1px solid black;"> </td> <td style="border-top: 1px solid black;"> </td> <td style="border-top: 1px solid black;"> </td> </tr> <tr> <td style="border-top: 1px solid black;"> </td> <td style="border-top: 1px solid black;"> </td> <td style="border-top: 1px solid black;"> </td> </tr> </table>	Name	Signature	Date												
Name	Signature	Date														

Team Contract: Goals and Expectations

- Project Title
- Goal Statement
 - Clear, measurable targets that indicates progress toward the purpose
- Expectation Statement
 - Team's expectation on team members in
 - Meeting attendance and on-time arrival
 - Activity participation
 - Communication
 - Productivity
 - Assigned task completion
 - Keep the deadline
 - Etc

Team Contract: Rules and Policies

- Rules and Policies
 - Ground rule for common area
 - Running of Meetings
 - Who runs the meeting?
 - Cell-phone policy
 - How team decisions and consensus will be reached
 - How meeting absenteeism and tardiness will be handled
 - Policies for missing one meeting or being late
 - Policies for contacting someone to contact
 - Expectations of quality works
 - How to handle late and incomplete work of a member?
 - How to reward team members who exceed expected performance
 - Relationship
 - What each member to bring to each meeting
 - Developing “can do” attitude
 - etc

Next Weekly Meeting Team Assignment

- Team Contract
- **Fillable pdf form** is available from the VIP Web page.

www.mwfr.com/VIPatHOWARD.html

schedule without additional financial. Howard University is a [VIP Consortium](#) mem

[What is VIP? 1 Sheet Summary](#)

[Building Faculty-Student Research Teams via VIP](#) -- Guest Lecture (Spetmebe

[VIP Orientation for EGPP students](#) for Fall 2015.

FORM: [Team Contract](#) (Fillable pdf file)

HOWARD VIP Teams - Fall 2015

Team Contract
For Senior Design Classes
Department of Electrical and Computer Engineering
Howard University

Team Name	
Team Description	For name of the team is
Goal Description	For goal/objective of the team is
Expectations Description	For team's expectations and anticipated outcomes such as attendance at meetings, level of participation, communication, productivity, etc. are as follows
Procedures and Policies Description	For team's policies and procedures governing such things as meetings, attendance, task delegation, deadlines, quality of work, and meeting conditions, penalties and rewards are as follows
Consent Statement by Members	<p>I participated in forming the team and goals, roles, and procedures as stated in the contract. I understand the consequences of failure to follow the contract and conditions. I will accept the consequences of failure to follow the contract.</p> <p>Name: _____ Signature: _____ Date: _____</p> <p>Name: _____ Signature: _____ Date: _____</p> <p>Name: _____ Signature: _____ Date: _____</p> <p>Name: _____ Signature: _____ Date: _____</p>

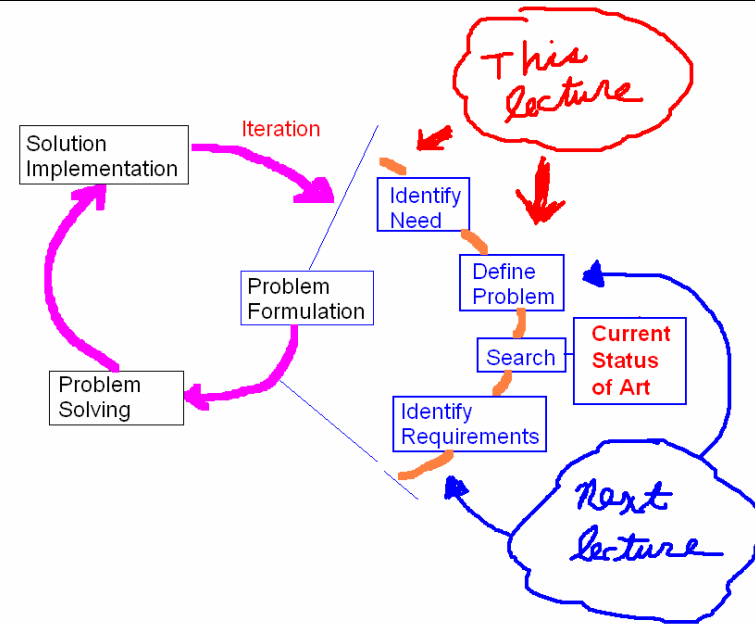
Problem Formulation

- **Contents**

- Identify Needs
- Define Problems
- Current Status of Art
- Identify Requirements

- **Goals**

- need identification and problem definition
- Strategies for gathering information about a problem
- Next Step: Develop a set of **requirements** for a problem



Problem Formulation in the Context of Value Proposition

- **“Value Proposition”**
 - Why I am the best person for the position
- **Contents: NABC**
 - Customer’s **N**eed
 - My **A**pproach
 - **B**enefits to the Customer
 - Why My approach is better than Alternatives and **C**ompetition’s
 - *Source: “Practice of Innovation” by C. R. Carlson

Example of Value Proposition - 1

- Paul Cook, a Silicon Valley Hall of Fame entrepreneur. It is the value proposition presented to a cable company executive for a video-on-demand system.
- “I understand that you are looking to expand your business. I think we might be able to help.
- **(Need)** Movie rentals represent a \$5 billion business opportunity that you currently cannot access. The only parts of rentals that people really dislike are the obligation to return the tapes plus the late fees. Customers find that it is inconvenient and wastes time.
- **(Approach)** We have developed a system that allows you to provide videos on demand to your customers using your cable system, with access to all the movies of Blockbuster. Our approach makes use of one of your currently unused channels, with no changes to your system. In addition, you do not need to invest any capital. Each movie costs your customers \$6.99, the same cost as a rental at a video store.
 - *Source: “Practice of Innovation” by C. R. Carlson

Example of Value Proposition - 1

- **(Benefits per costs)** You will receive \$5 of new revenue per movie rented, with a margin of 20 percent after paying for the movie costs. Your customers will have all the pause and fast forward functions of a VCR when watching the movie, and they do not have to return the movie when done. Late fees are gone. We estimate you could capture a market share of 20 percent.
- **(Competition)** Our system is patented, and it is the only one to include all of these features. Online rentals represent new competition for both you and us, but they have a handling-cost disadvantage of 75 cents per tape. Sending videos back is inconvenient, plus they cannot provide spontaneous purchases.

– *Source: “Practice of Innovation” by C. R. Carlson

Example of Value Proposition - 2

- **Hands-Free Car Phone**

- *Source: "Practice of Innovation" by C. R. Carlson

NEED

- Cell phones are difficult and dangerous to use when you are driving.
- There are more than 500 million cell phones in use around the world.
- Because of the driving risks, many U.S. states and other foreign governments are legislating against the use of cell phones by drivers of moving cars, which would limit cell phone usage in cars.
- Consumers want to continue to be able to use their phones while driving.

APPROACH

- Use voice-activated dialing with a headset.
- Provide additional software for existing phones.
- Make the software "downloadable" to existing phones with a \$10-per-year subscription for the "in-car service."

Example of Value Proposition - 2

- **Hands-Free Car Phone**

- *Source: "Practice of Innovation" by C. R. Carlson

CUSTOMER BENEFITS PER COSTS

- Convenience
 - Allows increased phone usage.
 - Safe, comfortable, and easy to use: does not require a new phone.
- Quality
 - Excellent speech recognition for voice-activated dialing: 99 percent accuracy with untrained users.
 - Supports twelve different languages.
 - Robust performance in noisy environments—better than human performance.
- New applications: the speech interface allows access to the Internet and other services.
- Cost: \$10 per phone per year.

Example of Value Proposition - 2

- **Hands-Free Car Phone**

- *Source: "Practice of Innovation" by C. R. Carlson

INVESTOR BENEFITS PER COSTS

- New product = increased sales.
 - Assume our available market share is 10 percent of the 500 million total market.
 - At \$10 each, then 50 million \times \$10 = \$500 million per year total revenue potential. • Initial investment needed: \$5,000,000
 - After three years, achieve revenue of \$50 million per year with a return on investment of 5:1.
- Other sources of revenue are available, because of the speech interface.
 - Initial discussions under way with other service providers.
 - Applications include: navigation, auto service, food.
 - Business model TBD.
- Hands-free auto use can reduce litigation, which may be another revenue opportunity.
 - Today the average cell phone car lawsuit is around \$50,000.
 - Opportunity for reduced auto insurance to the consumer
 - Business model TBD.
- Low product risk = prototype developed and demonstrated.

Example of Value Proposition - 2

- **Hands-Free Car Phone**

- *Source: "Practice of Innovation" by C. R. Carlson

COMPETITION AND ALTERNATIVES

- Existing phones, which must be used outside the car.
- Speech-activated phones built into the car.
 - More expensive at more than \$100 per car.
 - Less convenient for the consumer who wants to use a regular cell phone.
- Possible competitors: Intel, IBM, and Microsoft.
 - Our demonstrated 10 percent better speech quality and car noise insensitivity enables this application.
 - Intellectual property protection: we are protected by a family of fourteen patents.

Problem Formulation

- “The process of converting a dissatisfied situation into a well-understood problem”
 - Understanding the problem, Not finding solution (“Approach”) to the problem
 - Einstein: *“The mere formulation of a problem is far more essential than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old problems from a new angle requires creative imagination and marks real advances in science”*
 - It’s result?
 - Need Identification and Problem Definition
 - Clear set of Requirements that can guide the design process through to its completion



Identifying Needs and Defining Problem

- **Identify Needs**
 - Dissatisfied situation
 - Need exists
 - Don't consider Solution yet --- this is a trap !!!
- **No Rush to get a solution (“Approach”)** after Needs Identified:
 - A wrong problem may be solved!
 - A symptom may be solved!
 - **A part** of the problem may be solved!
 - Or a partial solution is obtained

The Blind Men and the Elephant

- Pillar? Rope?
Tree branch?
Hand fan?
Wall? Pipe?
- Parts vs. Whole
- Need of communication



Problem Definition Exercise 1

- **Needs from customer:**
 - “Actually, we need help.... it’s”
- Process of Defining Problem
 - Outline why the present situation is so dissatisfying
 - Asking questions about it
 - Comparing it to other situations that are familiar or where experience already exists
 - Gaining and understanding what caused it.
 - Then “*one sentence problem statement*” which includes every element – complete set of customer needs
- And your problem statement (Need) is?
 - **Specific, Quantitative, and Illustrative**
- Exercise: Write “Problem Statement”



Problem Definition

- **Problem Definition Example:**
 - “The customers need to rearrange the contents of the room in such a way as to increase the efficiency of space usage and the convenience of item location”

Problem Formulation Group Activity - 1

- Subject: Jimmy Hendrix and Eric Clapton said “I want my guitar amp wireless-ed”
- FOCUS: Gathering Information from within the team (10 minutes)
 - Draw insight from previous experiences (in other industries or situations) to understand the need
 - Focus on customers needs; NOT your own needs
 - Use Creativity
- Then, write a 1-sentence **problem statement**, covering the complete set of the customer needs (10 minutes)
 - Specific, Quantitative, and Illustrative
- Submit with all team member names



What is your team's Problem Statement?

- **Identify Needs**
 - Dissatisfied situation
 - Need exists
 - Don't consider Solution yet --- this is a trap !!!
- **Identify inconvenient situation/product**
- **Identify unaffordable situation/product**
- **No Rush to get a solution (“Approach”)** after Needs Identified:
 - A wrong problem may be solved!
 - A symptom may be solved!
 - **A part** of the problem may be solved!
 - Or a partial solution is obtained
 - Comprehensive!
- Write a 1-sentence **“problem statement”** of your project
- Discuss this Problem Statement in your VIP Weekly meeting