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COLLEGE OF ENGINEERING

# **Problem Definition: User Persona & Pains and Technical Communication**

Project 03



# Today's Plan

1. Review Project Deliverables
2. Technical Communication
3. Problem Definition
  - Define User Value
  - Create User Persona
  - Brainstorm Tasks & Pains



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# **Project Deliverables & Engineering Technical Communication**



# ENGR 1182 Design Project

- ❑ A semester-long team design project
- ❑ Engineering mindset learning framework
  - ❑ User-centered
  - ❑ Led by curiosity
  - ❑ Connections with new perspectives and skills
  - ❑ Leads to the creation of something valuable

- ❑ Three Phases:
- ❑ Problem Definition
  - ❑ Research, user needs, market character
- ❑ Conceptual Design
  - ❑ R&D, concept selection, prototype requirements
- ❑ Detailed Design
  - ❑ Prototyping, verification & validation



# Final Deliverables

1. Prototype Working Drawings Packet
2. Final Verification Testing of Prototype
3. Oral Presentation (pitch to incubator company)
4. Technical Design Review (TDR)
  - Includes PDR, CDR, and DDR

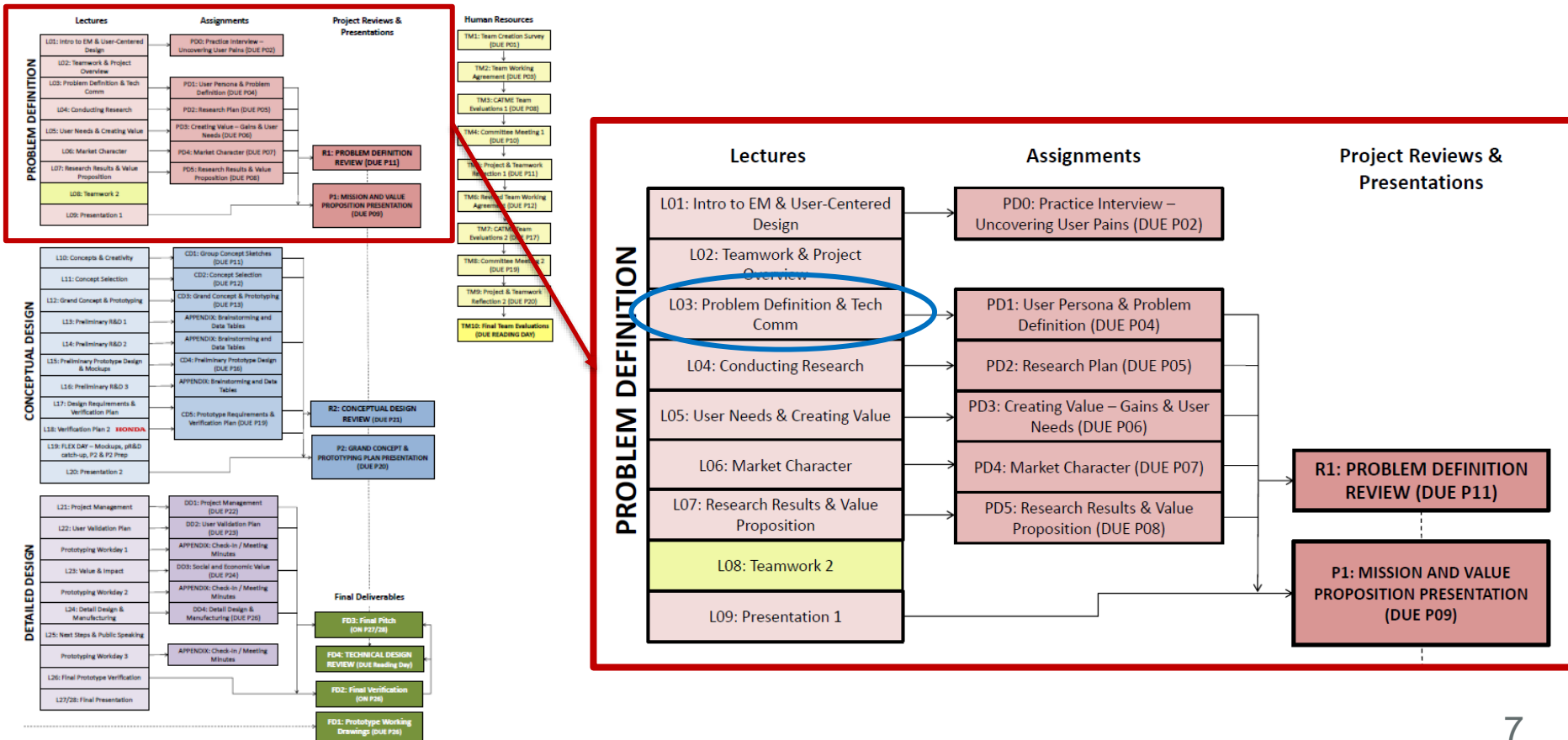


# Technical Design Review

## Integrated and Scaffolded Design Document

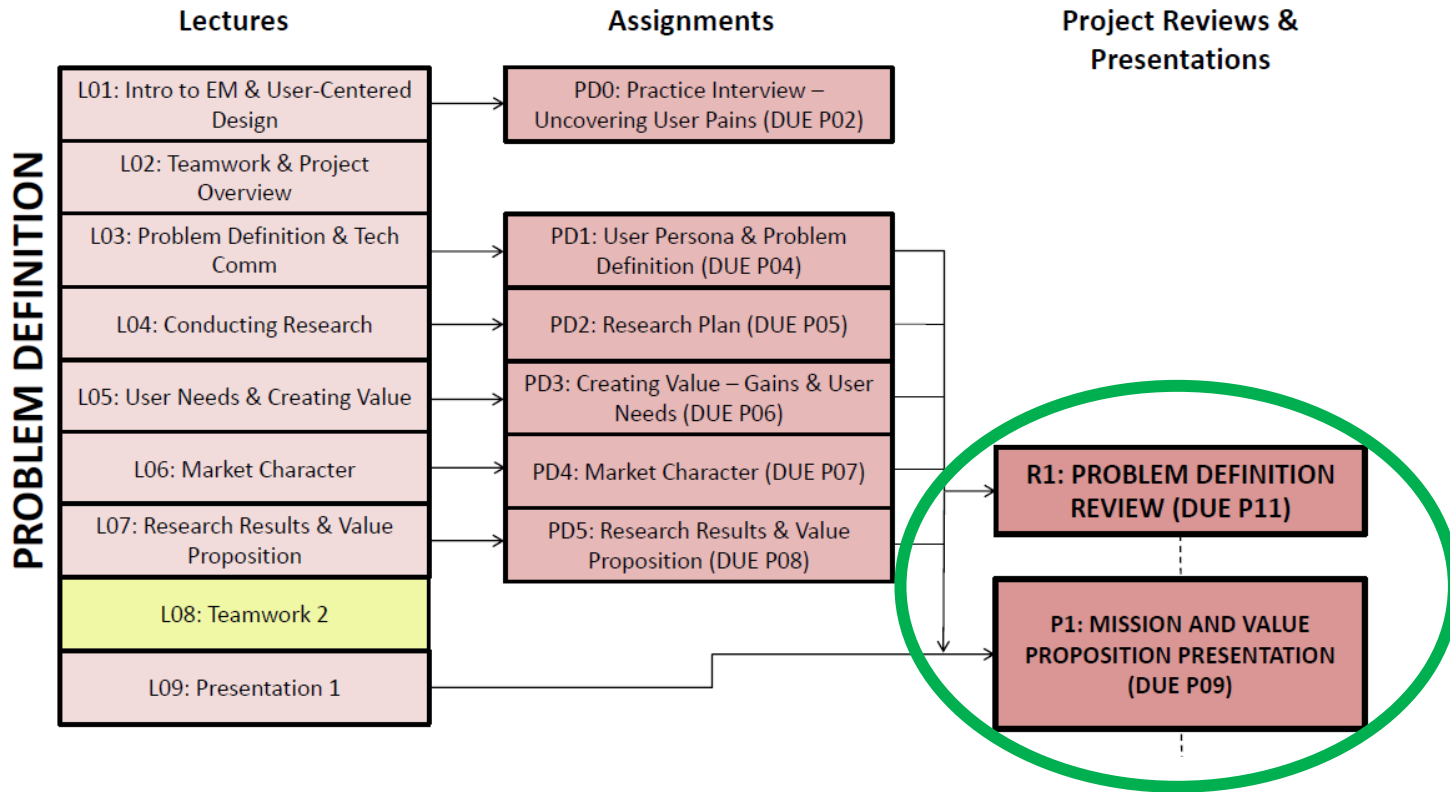
- Produce one final document
- Create in phases and link sections
- Produce a logical, flowing story
- Use good technical communication skills







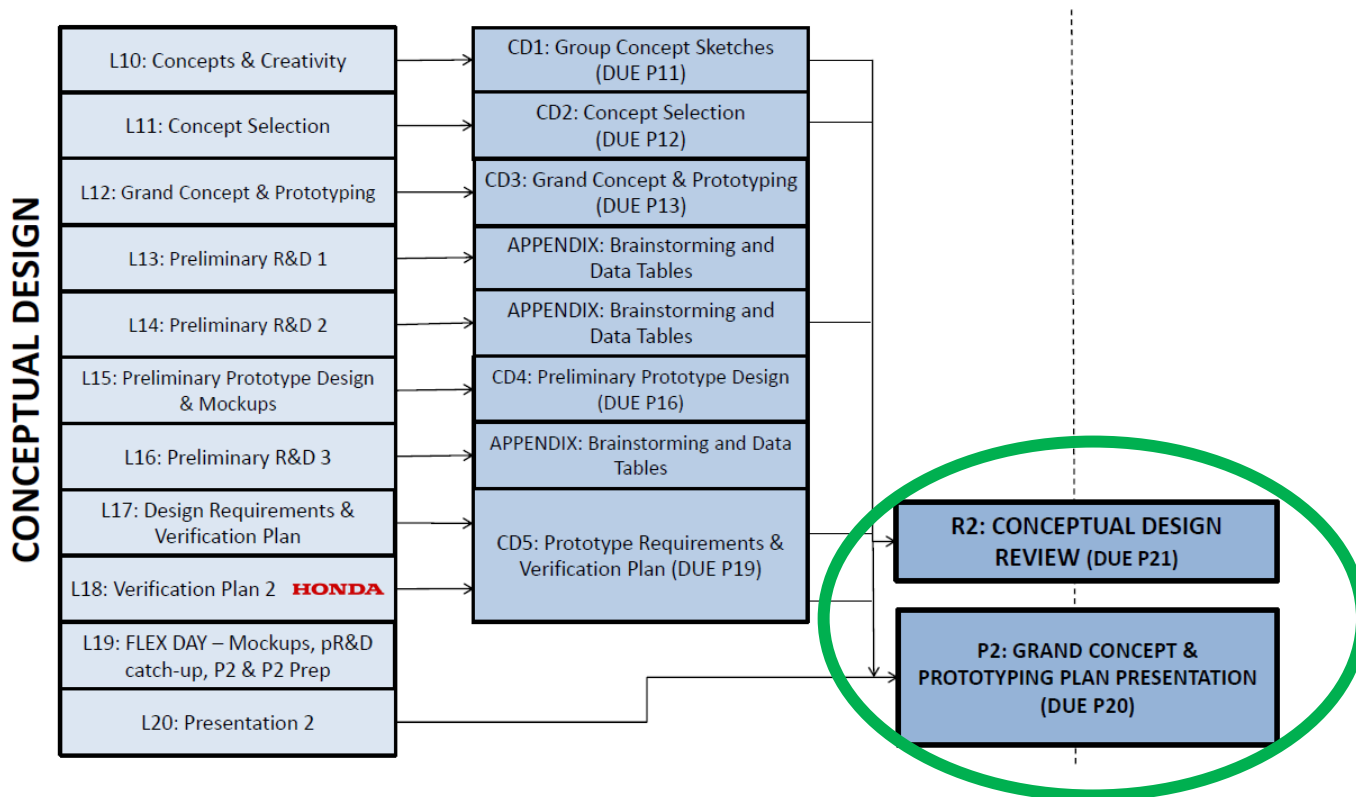
# Problem Definition Phase





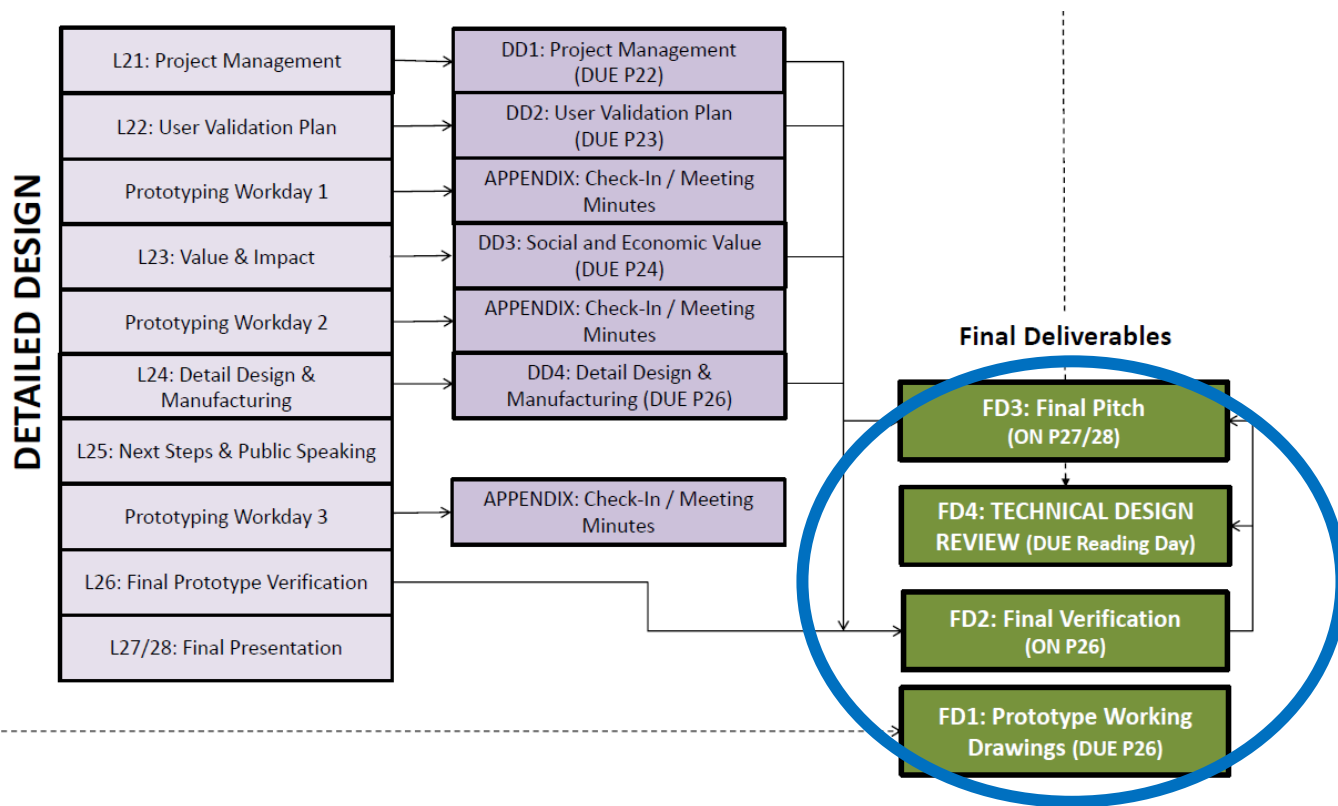


# Conceptual Design Phase





# Detailed Design Phase



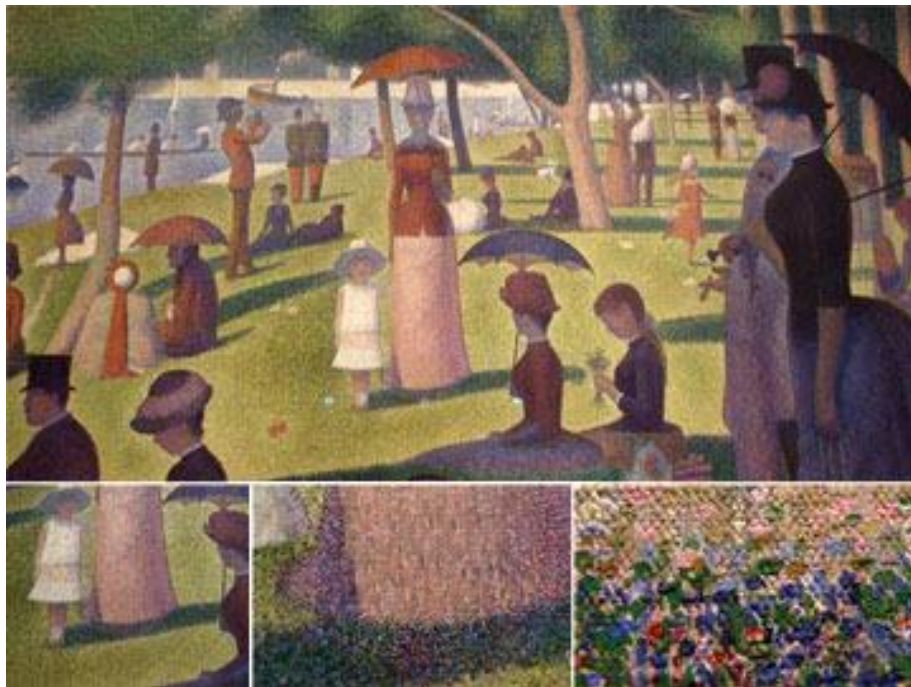


# Technical Design Review (TDR) Outline

1. Executive Summary
2. Problem Definition Review
3. Conceptual Design Review
4. Detailed Design Review
  - References
  - Appendix

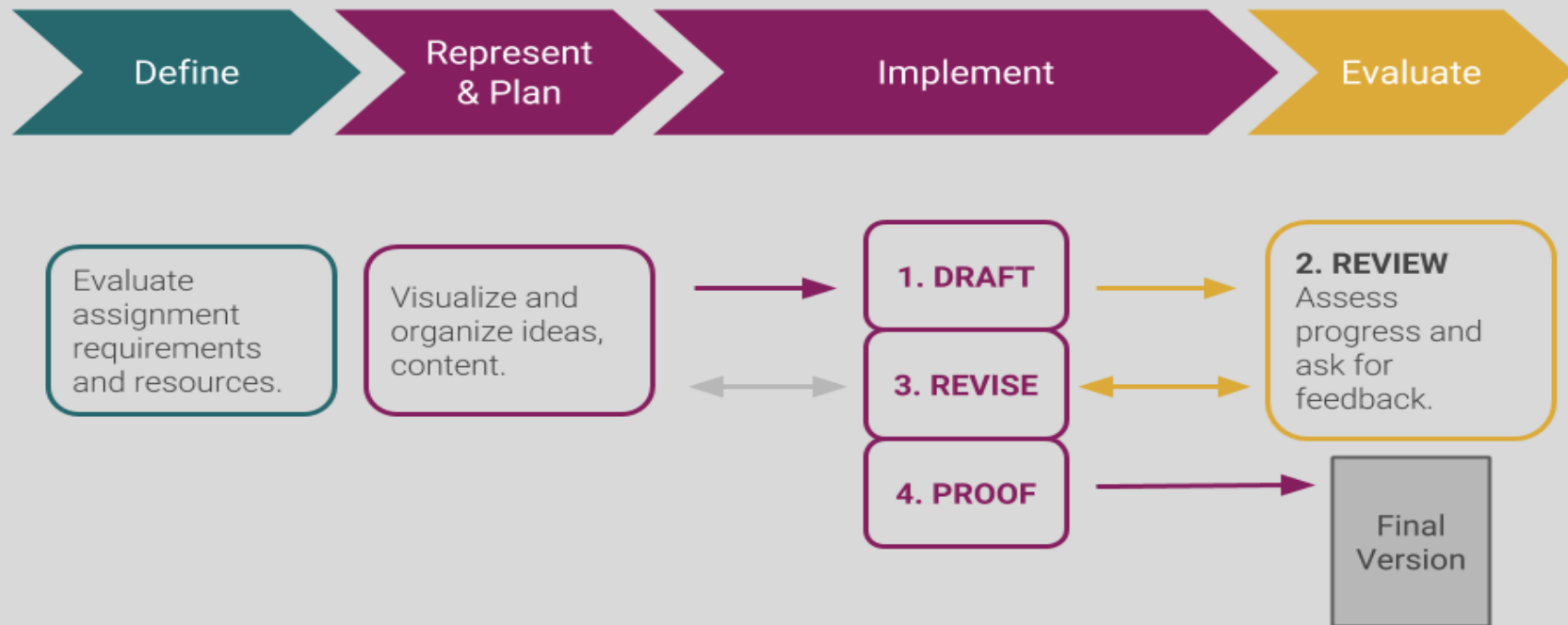
# Writing Process & Feedback

- Define
- Plan
- Draft
- Review
- Revise
- Proofread
- Evaluate





## DR PIE → Writing Process





# Receiving Feedback

- Rubric
- Rubric Comments
- Assignment Comments
- Document Comments

The screenshot displays a Blackboard LMS interface for a document titled "SUM 3 - Vehicle Design and Final Test Plan". The document is on page 21 of 31. The sidebar on the right contains the following sections:

- Feedback:** A comment from a peer reviewer stating: "labeled, successfully emphasize the main findings, and can be understood independently of the document. All Tables and Figures, along with their labels should be centered on a page. I did not take any points, but in the future I may have to, so please please center them." The score is 5 / 5 pts.
- Automatic Points:** A section showing a score of 24 / 24 pts with a link to "view longer description".
- Assignment Comments:** A section with a blue header and a text box containing "Add a Comment".
- Comments:** A section stating "All comments are sent to the whole group" with icons for adding, deleting, and replying to comments.
- Download Submission Comments:** A link to download the submission comments.

At the bottom right of the sidebar, there is a red "Submit" button. The total points for the assignment are 89.



## Key Concepts

**Audience:** The person or people, real or imagined, for whom a communication (written or verbal) has been created.

**Purpose:** The purpose or goal a writer or speaker aims to achieve through their writing or speech.

**Context:** The background factors that influence how the writer might adapt content, organization, or writing style to achieve their purpose with their audience.







# Audience & Purpose in STEM Communication

- **What** you say, **when** you say it, and **how** you say it are all dependent on your purpose or goal, your audience, and their expectations and needs
- Effective and audience appropriate communication depends on using the appropriate **level of technicality** for the purpose/audience
- Teaching **generic conventions** in relation to how they are used by a reader can help clarify why particular styles or formats are used



## Final Deliverables: Audience & Purpose

Deliverable	Audience	Purpose
Final Verification Testing <i>No written deliverable</i>	Internal Audience: You and your team	Gather data, document key information
Technical Design Review	Technical Audience: Other engineers, supervisors	Document process, justify decisions
Final Working Drawings	Specialized Technical Audience: Manufacturer	Communicate specifications for production
Final Pitch	Business-oriented Audience: Incubator company	Persuade that your design solves a problem / meets a need and merits \$\$

Think – Pair – Share: How will the language, format and word choice change based on audience and purpose?



# Written Report Hints

- Read Assignment Prompt
- Write your documents as a team
- Tell an interesting and compelling story (or part of story)
- Treat your audience as uninformed\*
- Use present tense and active voice
- Use transitions between sections
- Be clear & concise – but don't leave out important details!

\*While they will be uninformed on your area of expertise, they may not be uninformed regarding basic science and engineering concepts (so be careful not to be condescending)

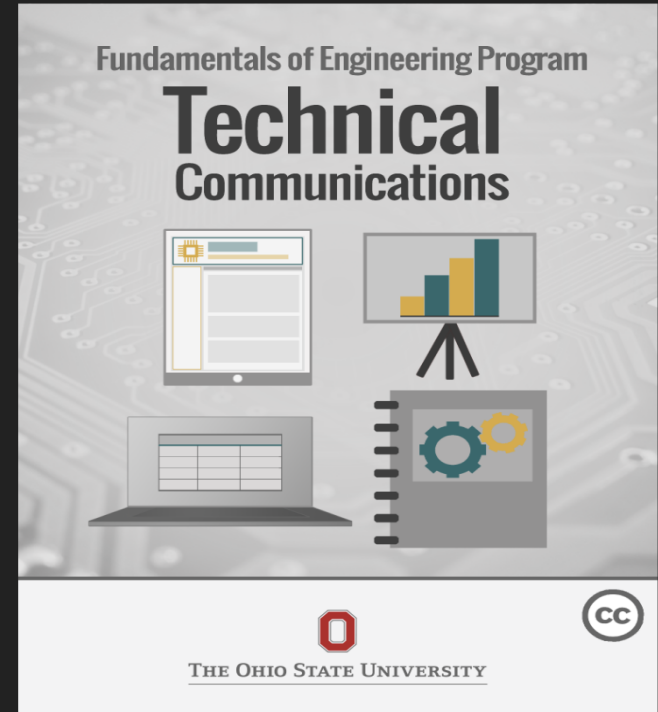
# Fundamentals of Engineering Technical Communications

A Resource & Writing Guide for the  
Fundamentals of Engineering Program

Leah Wahlin

 Creative Commons Attribution NonCommercial

[READ BOOK](#)



**PDR Template is also available for organization/formatting!**



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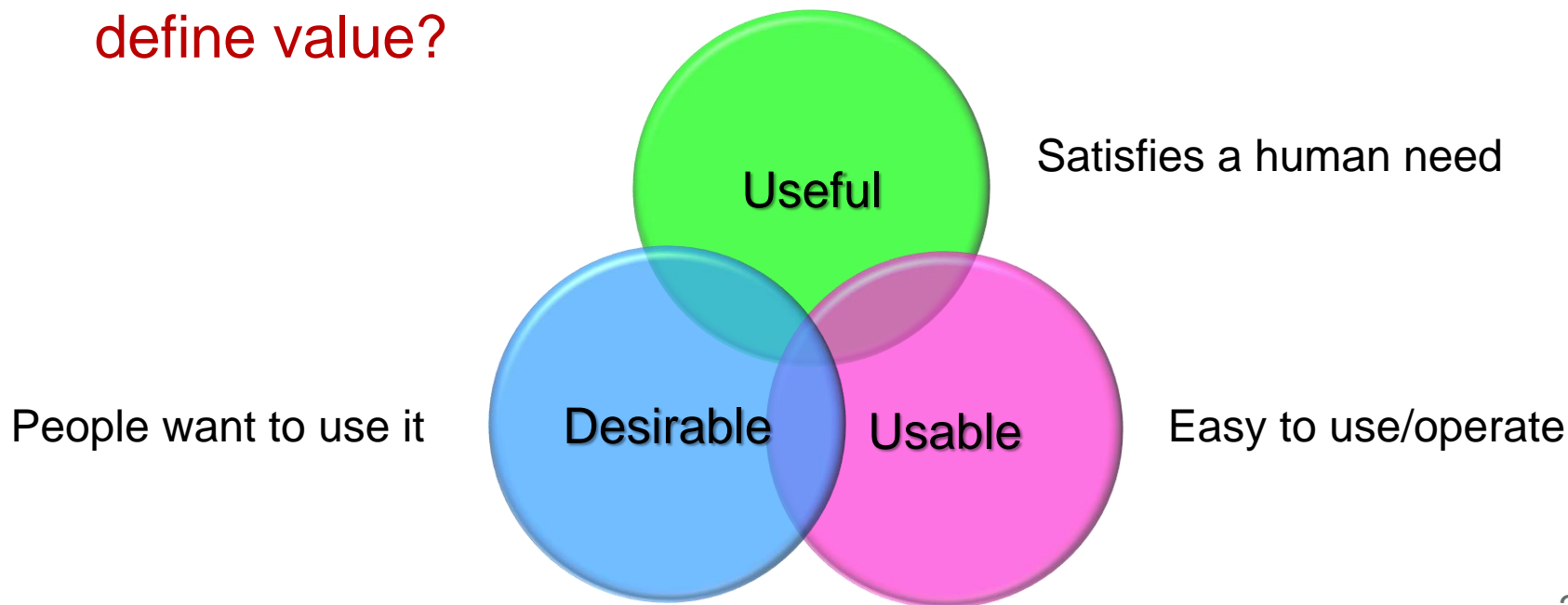
# **Problem Definition**

## **An Opportunity to Create Value**



# Defining User Value

Ultimately, we hope to create something of value. How do we define value?

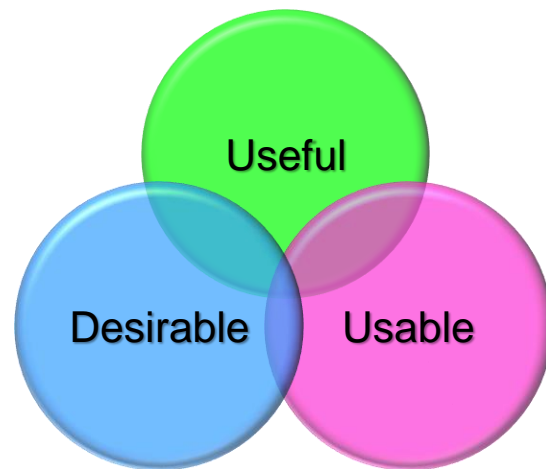




# Elements of Commercial Value

(Three types of fit)

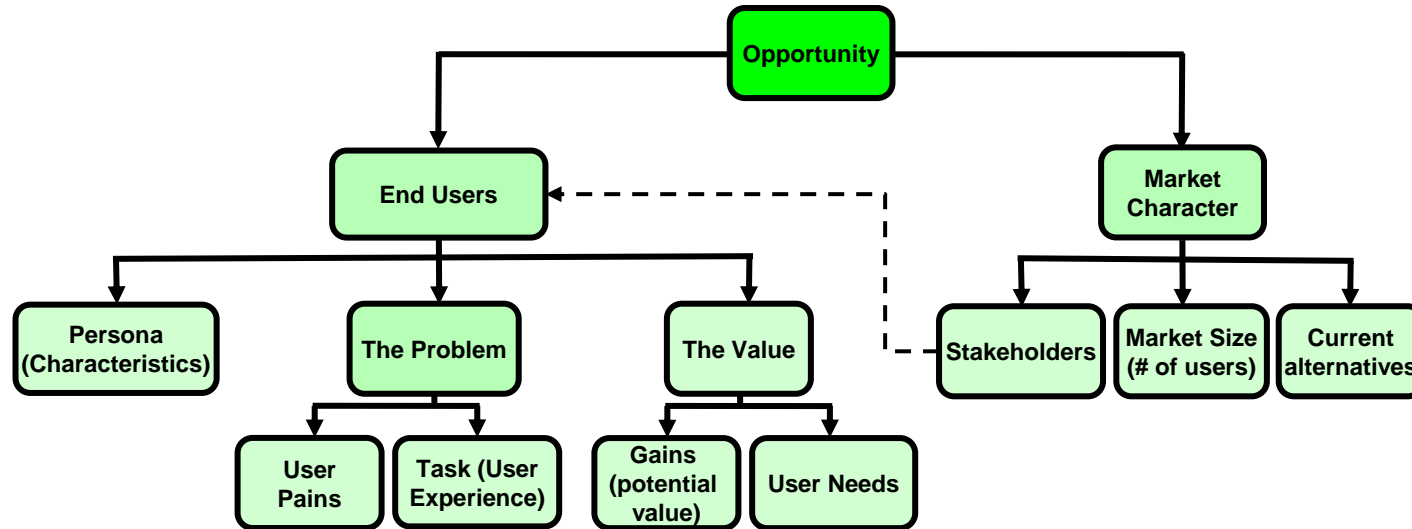
1. On paper — a solution that works
2. In the market — people will use it
3. In the bank/society — it has economic and/or social value





# Problem Definition

## An Opportunity to Create Value







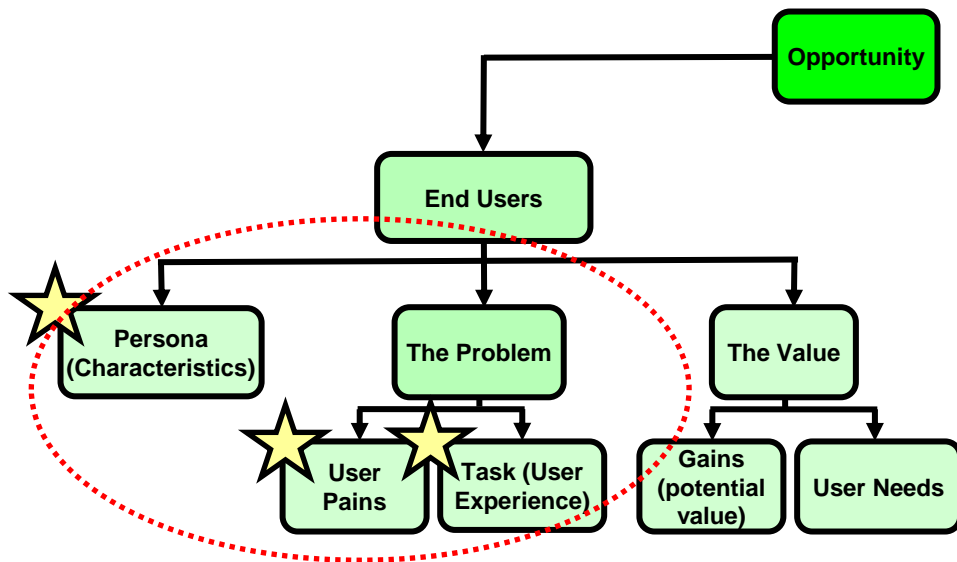
# Summary of Opportunity Definition

- What are the characteristics of your end user?
- What are pains they experience in their daily life?
- What is the task/job most closely associated with user pains?
- What are potential gains (value created) by alleviating pains?
- Define user needs (ways to alleviate pains)
- If you solve this problem, who does it impact?
  - Stakeholders
  - End Users
- How big is the problem? How many users?
- What current alternatives exist?



# Problem Definition

## An Opportunity to Create Value



### Steps:

1. Understand the User. (Who is your User? What is their perspective?)
2. Collect information about current User Pains in their lived experience.
3. Define Tasks associated with the User Pains.



We will start here to ensure user-centered design.



# Design Project End Users



## Design Project Themes

- ❑ Some jumping off points:
  - Under-served, marginalized, at-risk, forgotten groups of people.
  - Dangerous, high-risk occupations.
  - Vulnerable stages of life (e.g., infants, elderly, illness)
  - Universal design (accessibility for the poor, the disabled – for those who are historically left out of design considerations).
- ❑ Your goal is to create value – social value, financial value, environmental value, or all of these!



# Understanding End Users

Within the Engineering Mindset Framework, we will learn about (and document) end user perceptions:

- ❑ **Graphical Persona**  **We'll start here today!**
  - Builds an empathetic snapshot of our users
- ❑ **User Pains** 
  - Components of a task that are frustrating, time-consuming, expensive, inefficient, or otherwise unpleasant.
- ❑ **User Gains**
  - The value created by alleviating pains
- ❑ **User Needs Chart**
  - A weighted list of needs that a useful, desirable, usable solution would satisfy
- ❑ **Pairwise Comparison Chart**
  - A tool to systematically rank user needs



# What are Personas

1. Graphical representation of someone in your user group
2. Someone to connect with, have **empathy** for
3. Create as you carry out your qualitative research
4. Represents the needs, pains, goals of target user
5. Persona generally includes:
  - Name and pronouns
  - Age, gender
  - Marital/partnership status
  - Occupation/salary
  - Hobbies/habits
  - Technological familiarity
  - Devices used
  - Pains/tasks



# Michael Torres

**AGE** 22

**OCCUPATION** Student

**STATUS** Single

**GPA** 3.02

**MAJOR** Electrical Engineering

**PHONE USAGE** 3-4 hours per day

Simple

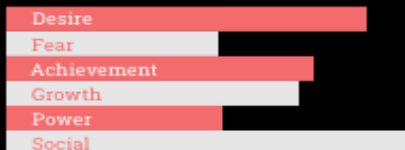
Relaxed

Amiable



"I want to do well in school, but I also feel that I should enjoy being a young, college student. Enjoying myself is important."

## MOTIVATIONS



## GOALS

- To lower his phone usage
- Keep in touch with friends as much as possible
- To not get anything lower than a B in any of his classes this semester

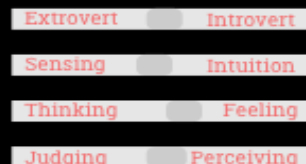
## FRUSTRATIONS

- Lacking sleep due to being on phone for too long
- Phone sometimes dies when he most needs it
- When other people are not paying attention to Michael and the conversation due to phones

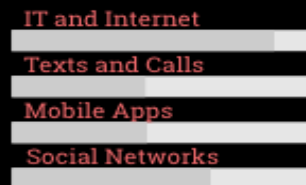
## BIO

Michael is easy to please; if he is having a good time with his friends and passing his classes, he is happy. He likes to surf the internet a lot, and often discusses things he found on the internet with his friends. He wants to enjoy himself the most he can, so he sometimes prioritizes fun instead of doing his work.

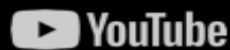
## PERSONALITY



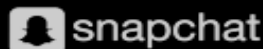
## TECHNOLOGIES USED



## MOST USED APPS



facebook.



# Jill Anderson



*"I'm looking for a site that will simplify the planning of my business trips."*

AGE: 35

WORK: Regional Director

FAMILY: Married, 1 Child

LOCATION: Austin, Tx

ARCHETYPE: The Frequent Flyer

Organized

Practical

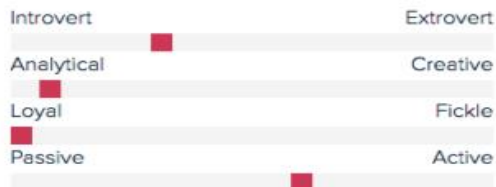
Protective

Hardworking

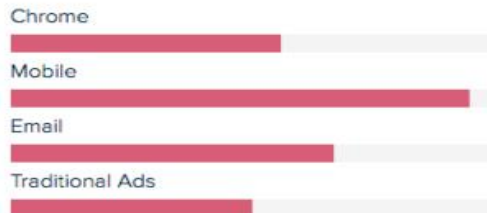
## Bio

Jill is a Regional Director who travels 4-8 times each month for work. She has a specific region in which she travels, and she often visits the same cities and stays at the same hotel. She is frustrated by the fact that no matter how frequently she takes similar trips, she spends hours of her day booking travel. She expects her travel solutions to be as organized as she is.

## Personality



## Preferred Channels



## Goals

- To spend less time booking travel
- To narrow her options quickly

## Frustrations

- Too much time spent booking - she's busy!
- Too many websites visited per trip
- Not terribly tech savvy - doesn't like the process

## Motivations

Price

Comfort

Convenience

Speed

Loyalty/Miles

## Brands

KAYAK Expedia

ACE HOTEL Lyft



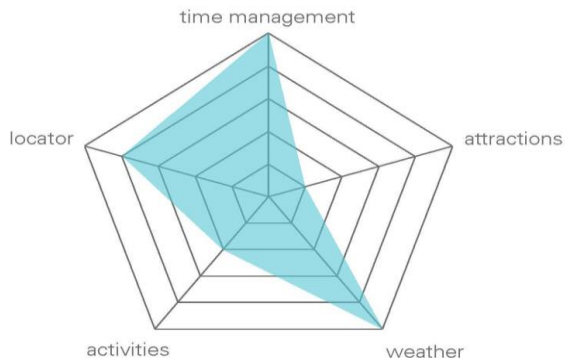


# Joshua Miller

financial analyst at Fujitsu  
near Coal Harbour

**26** single  
Downtown Vancouver, BC

Bachelors of Software Engineering  
at University of Waterloo



App Usage

CYCLING  
JOGGING  
TECHNOLOGY  
HANGING OUT AT BARS  
MEETING NEW PEOPLE  
RAMEN  
LONG DRIVES

## Never Without:

Fujitsu's STYLISTIC Q702 tablet  
iPhone 5

Grew up in Vancouver, but moved to Ontario to attend university; after earning his degree, he moved back to Vancouver

Lives in an apartment near Coal Harbor. After moving back to Vancouver, often takes drives to North Vancouver and the Squamish for site seeing.

Being an active person, during his lunch break he would often take the short walk down to the seawall to enjoy scenery.

Technology fanatic with the love for sports.

# Amanda

**Age:** 26

**Occupation:** Interior Designer

**Status:** Single

**Location:** Redmond, WA

**Tier:** Professional

**Archetype:** The Artist

Amanda is a passionate interior designer and opened her business in 2013. She approaches each project as a puzzle and believes her job is to create spaces that bend beauty, function and practicality to achieve the best look for the budget and way of life.

## Favorite Brands:



My greatest joy, is to help home owners achieve their desire of living in their dream home environment.

Dependable | Organized | Friendly

## Personality:

Extrovert

Introvert

Sensing

Intuition

Thinking

Feeling

Judging

Perceiving

## Motivations:

Designer Products

Eco Friendly

Personalization

Low Prices

Convenience



- Social Media
- Wine Tasting
- Girlfriends
- Her Kitten

## Goals:

- To grow a strong industry reputation
- To build long-term client relationships
- To grow her business with more leads

## Frustrations:

- Poor marketing results
- Competition with established designers
- Keeping in touch with clients & prospects

# DAVID

**Age:** 32

**Family:** Wife & 2 kids

**Location:** Palo Alto, CA

**Occupation:**

Environmental Researcher  
for Tesla

**Education:** BA of  
Environmental Engineering  
from Stanford



<http://i.pinimg.com/736x/51/57/5157C087C2D957C8087C451531>

- Started skiing in middle school ski club
- Taught wife how to ski, plans to teach kids
- Ski trips with college friends a few times a winter (Utah/Colorado)



[coloradowatersports.com](http://coloradowatersports.com)



[Pinterest.com](http://Pinterest.com)



[Twitter.com](http://Twitter.com)



[Carlogos.org](http://Carlogos.org)

**Hobbies:** Canoeing,  
Fishing, Playing cards,  
Playing piano, Listening to  
U2



# Jonathan Wintergreen

42 Year Old Male



JohnnyTyronne.com



MemberPress.com



123RF.com

## Profile

- Lives a 30 minute drive from downtown Chicago
- Married 19 years to wife Samantha
- Has a son, 14, and a daughter, 10
- Owns his insurance franchise of a major company
- Cares about his reputation and appearance



Photo by Lawrence Okrent



BikesDirect.com

## Hobbies

- Paved-road cycling: 250 miles per week
- Home repair and maintenance
- Experiencing the outdoors with family

## Product Needs

- Maintain sleek appearance
- Keep bike lightweight
- Optional storage space



# Additional Persona Examples

- Your Industry Mentor bios!
- <https://venngage.com/blog/user-persona-examples/>



# Ethics to consider

## When creating Graphical Personas

- Use generic people photos
- Do not use pictures or names of actual users



# Team Brainstorming

“Group **brainstorming**, or collaboratively generating ideas through idea sharing, **demands diverse** contributions to spark more ideas and improve creativity.”

“Ideas in group brainstorming, then, are not only the *products*, but also the *inputs* for stimulating and moving the brainstorming cycle forward.”

(Wang, Fussell, & Cosley, 2011).



# Activity: Brainstorm Users, Pains, and Tasks

**Users** – the characteristic person (or group of people) you intend to help by designing a solution that alleviates their pains

**Pains** - components of a task that are frustrating, time-consuming, expensive, inefficient, or otherwise unpleasant. Think about barriers preventing or making it difficult to get a task done.

**Tasks** - A task can be functional, social, emotional, it can be a process, a specific action, it can be short, long, it can be anything a “user” does to achieve a goal. There are usually unwanted challenges associated with the task.



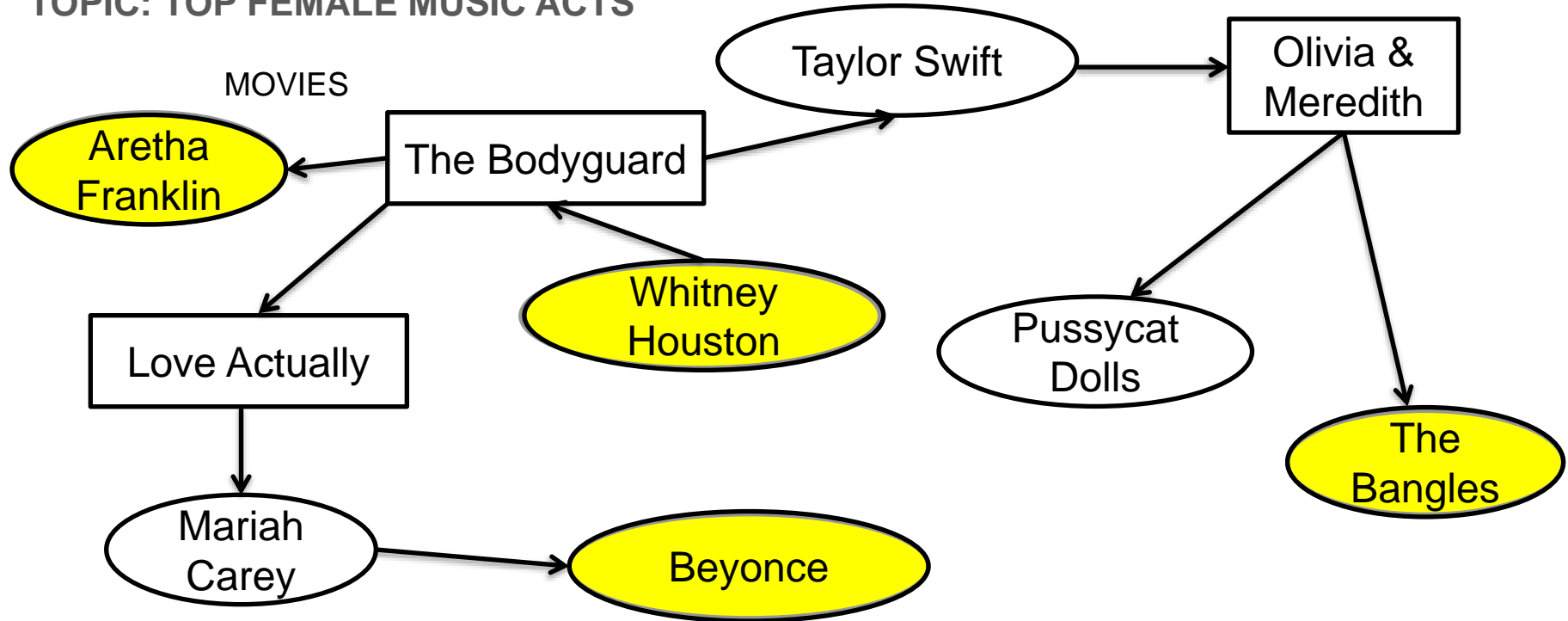


# Brainstorm tips:

1. Use a concept map
2. Write EVERYTHING down
3. Connect like ideas
4. Find common themes
5. After Brainstorm time is done, then (and only then) eliminate ideas



## BRAINSTORMING EXAMPLE TOPIC: TOP FEMALE MUSIC ACTS





# Brainstorm Session (10-min)

1. Each team member shares 1) the user you interviewed in PD0 (keep interviewee identities anonymous) and 2) one user characteristic you took away from your interview. (4 minutes)
2. Brainstorm pains that users either explicitly stated or alluded to in the PD0 interviews. Start to identify tasks associated with those pains. Use white boards on your desk! (3 minutes)
3. You will select ONE user group to focus on for the rest of this semester. Start to discuss which user group you'll focus on. (3 minutes)



## PD1 – Problem Definition: User Persona & Pains

### Understanding the end user:

1. Build upon the in-class brainstorming activity to select one user group.
2. Create a graphical person that depicts the characteristics of your end user.
3. Brainstorm to determine 3-5 user pains and the associated task(s)
4. Explain your teams' approach to items 1. through 3.
5. Put evidence of interviews and pain-storming in the Appendix.

**DUE P04 (next class)**

**Refer to the PDR Template for organization/formatting**