Design-Informing Models
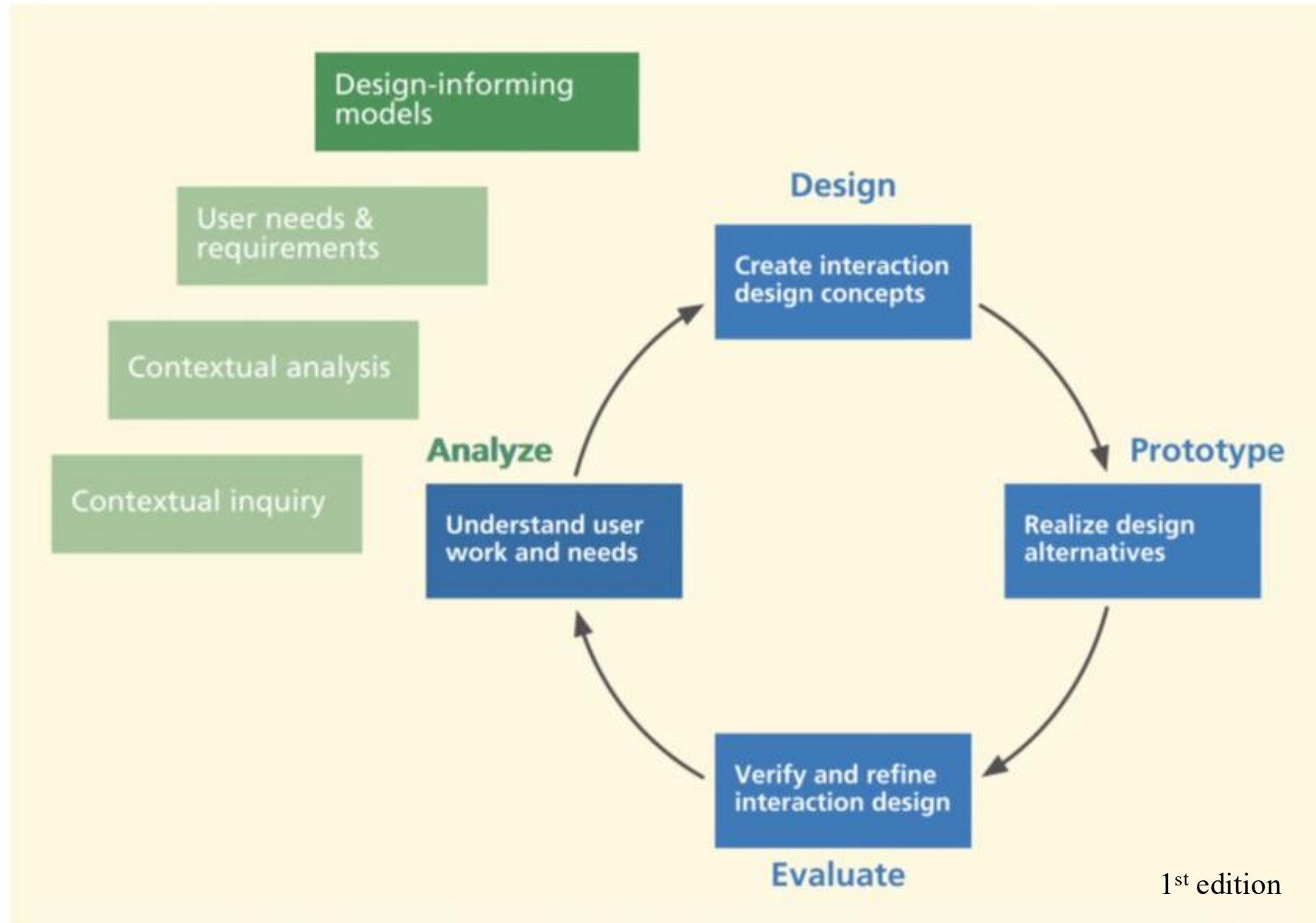
SWEN-444

Selected material from *The UX Book*, Hartson & Pyla

Design-informing models

User needs & requirements

Contextual analysis

Contextual inquiry

Analyze — Understand user work and needs

Design — Create interaction design concepts

Prototype — Realize design alternatives

Evaluate — Verify and refine interaction design

1st edition

Design-Informing Models

- Further **analysis** to **prepare for design** to understand …
  - Who the **users** are
  - How they **interact** with each other and their environment
  - A breakdown of the **work** they do normally
  - Work barriers and opportunities for **improvement**
- Start with the WAAD as it represents all you know so far

Interface Design as Story Telling

- The "**big picture**" view of the **scenarios** of how **work goals** are **accomplished** through **system interaction**
  - Work role responsibilities and interactions
  - Work environment
  - Work decomposition into sequences of system interactions
- **Design to support the story**

Design-Informing Models

- User models
- Flow models
- Social models
- Usage scenarios
- Task models (HTA)

User Models – Work Roles

- **Direct** "primary" users
- **Indirect** "secondary" users – affected by the system in some way
- Example – ATM
  - Direct roles – customer, service person
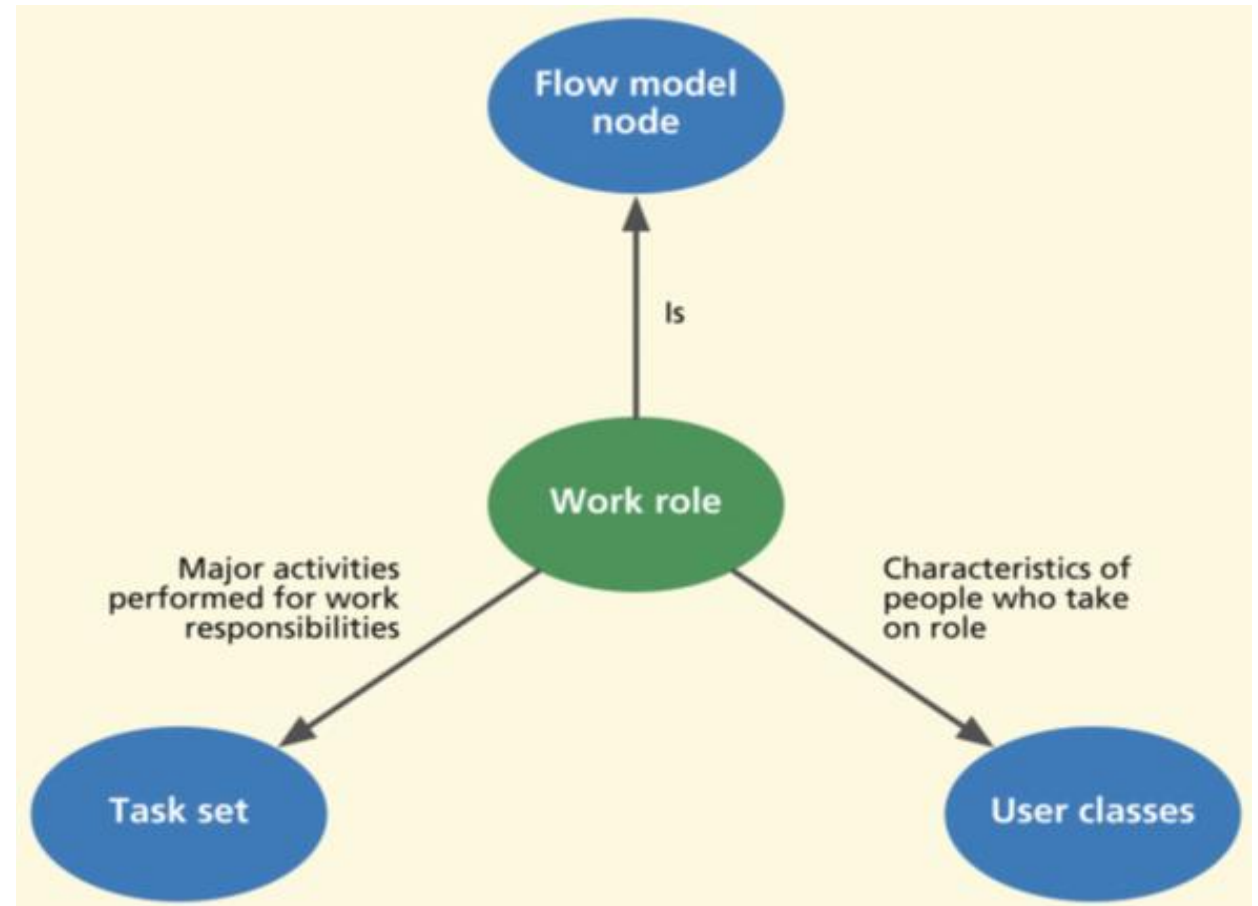 - Indirect role – bank security officer


Fig: Concepts defining and related to work roles

User Classes

- User role **profile** – characteristics of people who perform the work role; there may be sub-categories
- **Knowledge, skills, education** required to perform the job
- Physical and cognitive **abilities**
- **Personal data** – age range, locale, ethnicity, …
- **Experience level** – novice, intermediate, expert

Who do you design for?

Work Flow Models Revisited

- Refine the work flow model

- Scope is entire work practice and workflow environment

- Nodes for active entities

- Arcs for flow of work, information

- Include non-human entities
  - Example, central database and non-computer communication flow such as via email, telephone
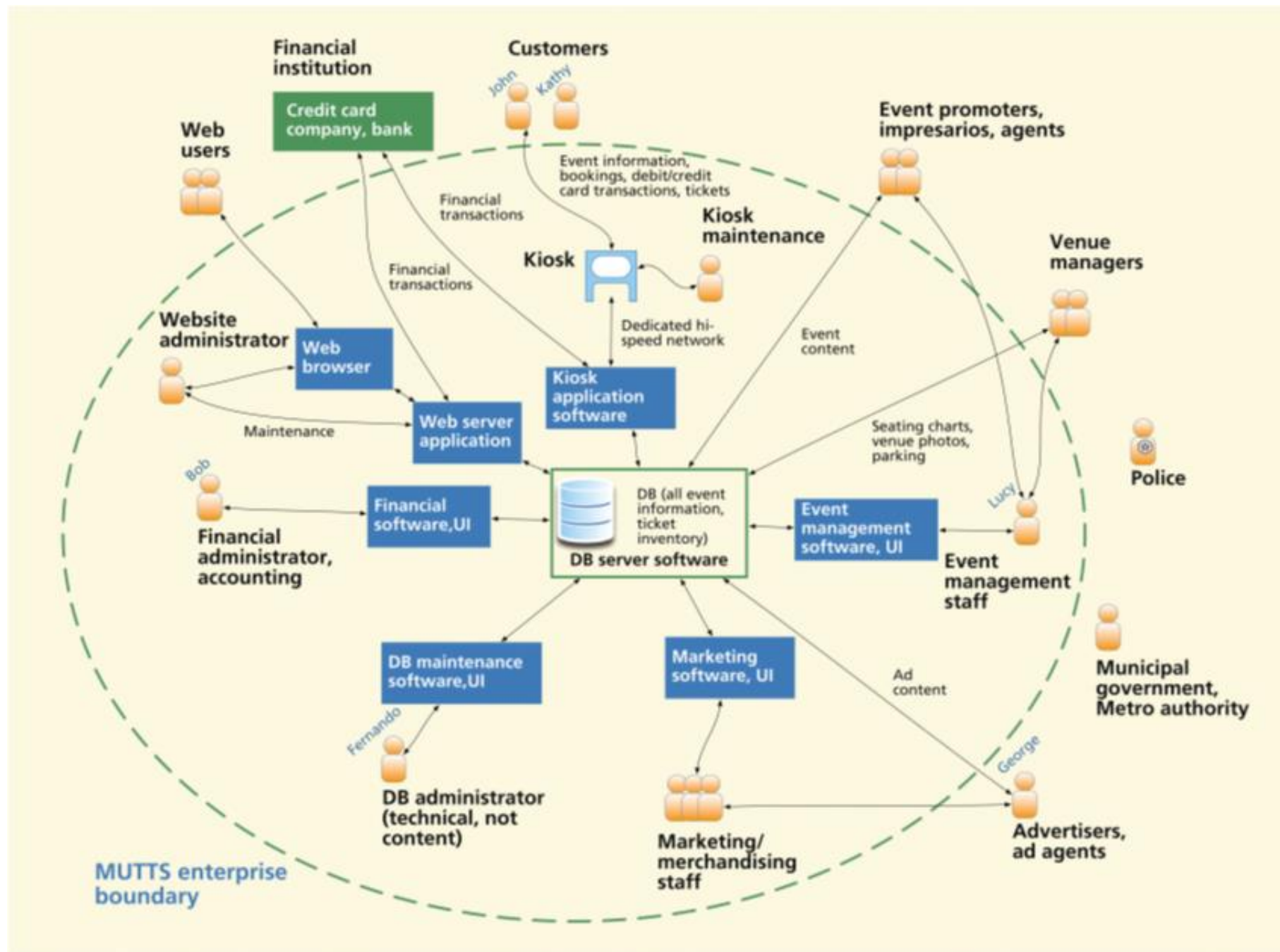
Social Models

- **Communal** aspects of the work environment …
- Work role related **concerns and perspectives**
    - Norms of behavior, influences, barriers, and pressures
    - Philosophy, mind-sets, feelings (**emotions**), attitudes
    - Environmental factors and ambiance
- Gain **empathy** for the feelings of users

Social Model Diagram

- Nodes – **work roles** and any **outside actors** (human and non-human) that interact with work roles
  - Group as appropriate (analogous to an organization chart)
  - Represent role related concerns and perspectives as node attributes
- **Workplace ambiance** – the "culture" of how work gets done
- **Constraints and influences** on work practice
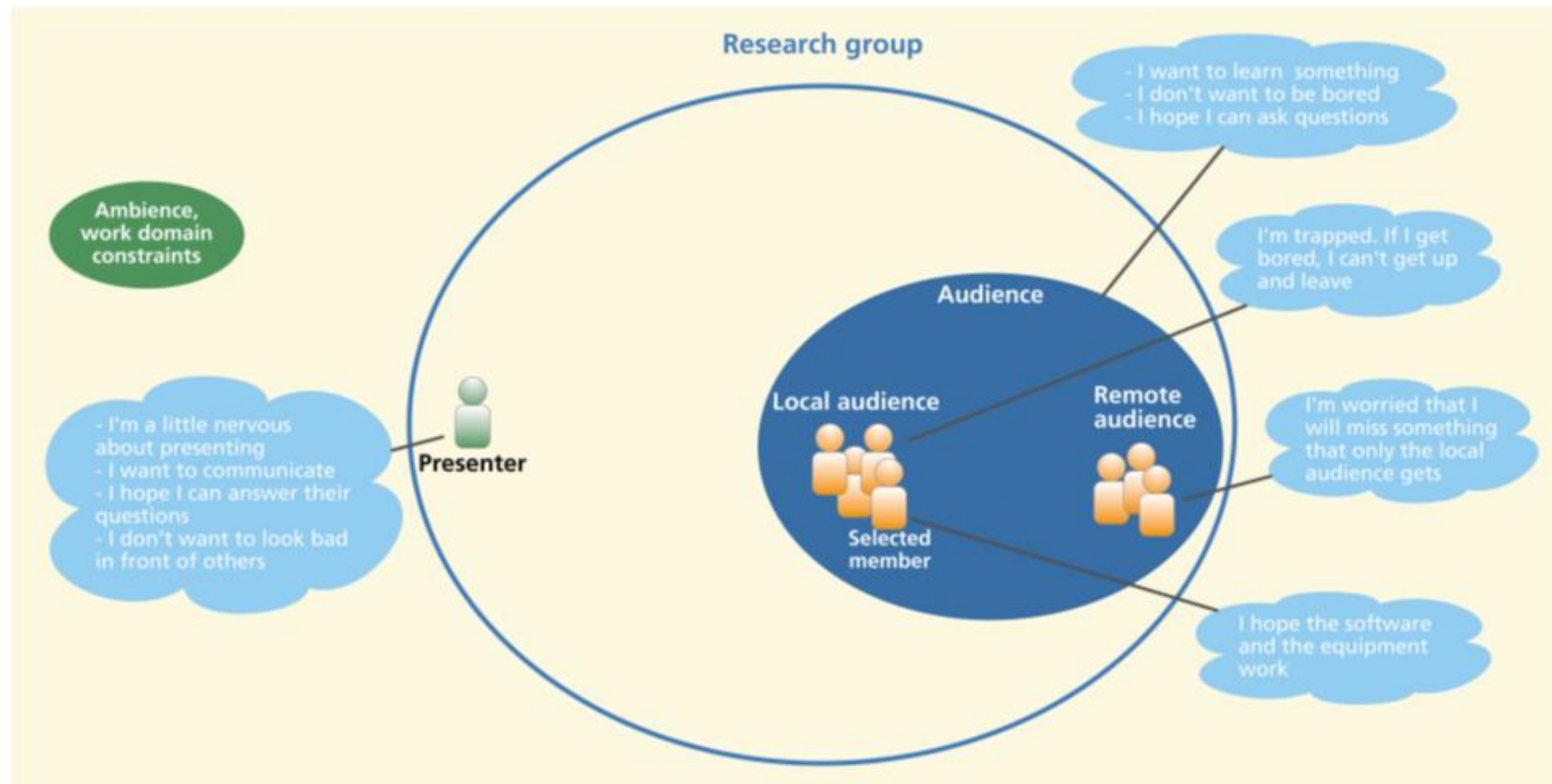- To diagram: start by drawing a circle for each of the above entities, label, and group

Example: Research Presentation

- Step 1/3: Identify the **entities**. We also added "Ambiance" as a nonhuman entity.
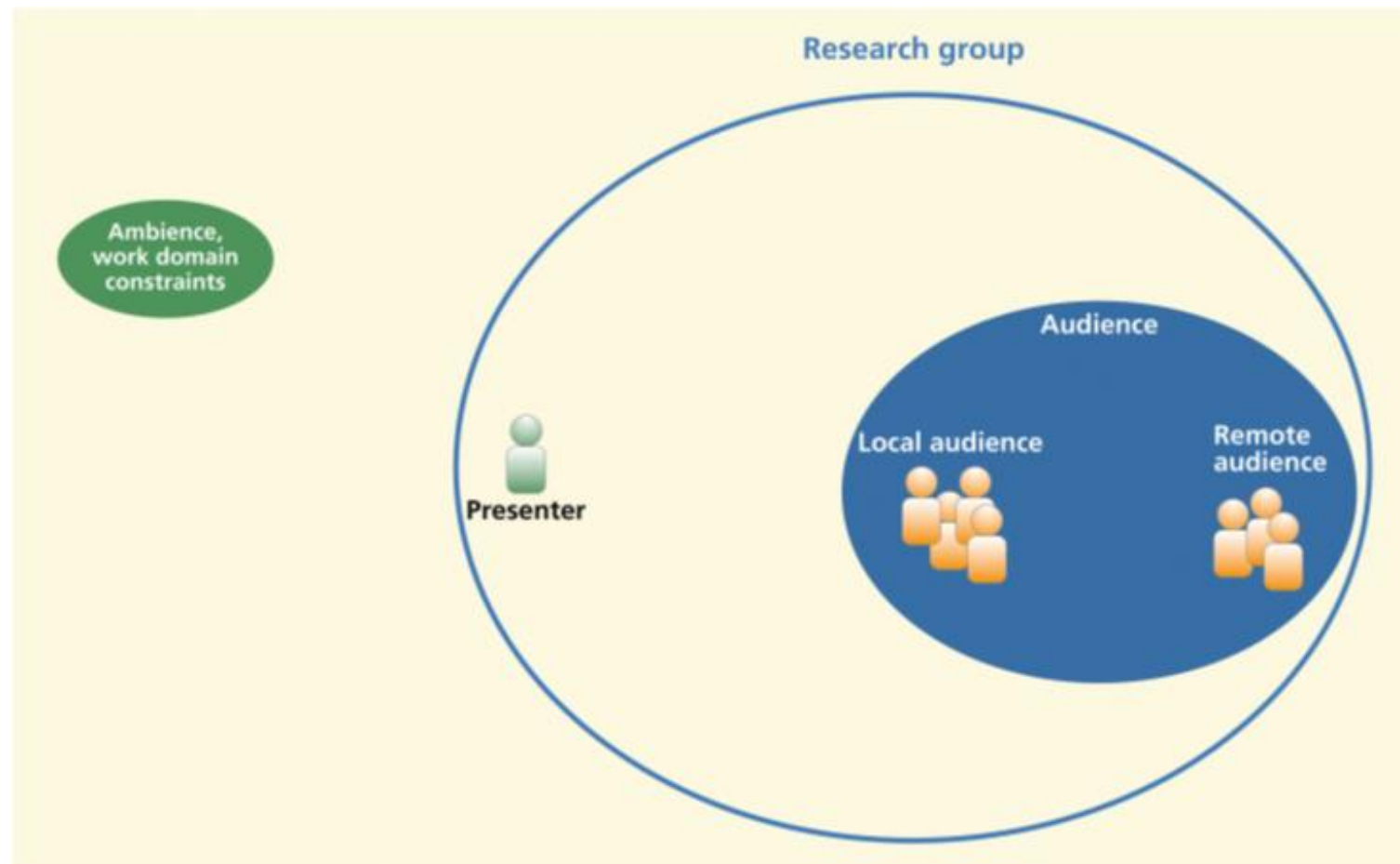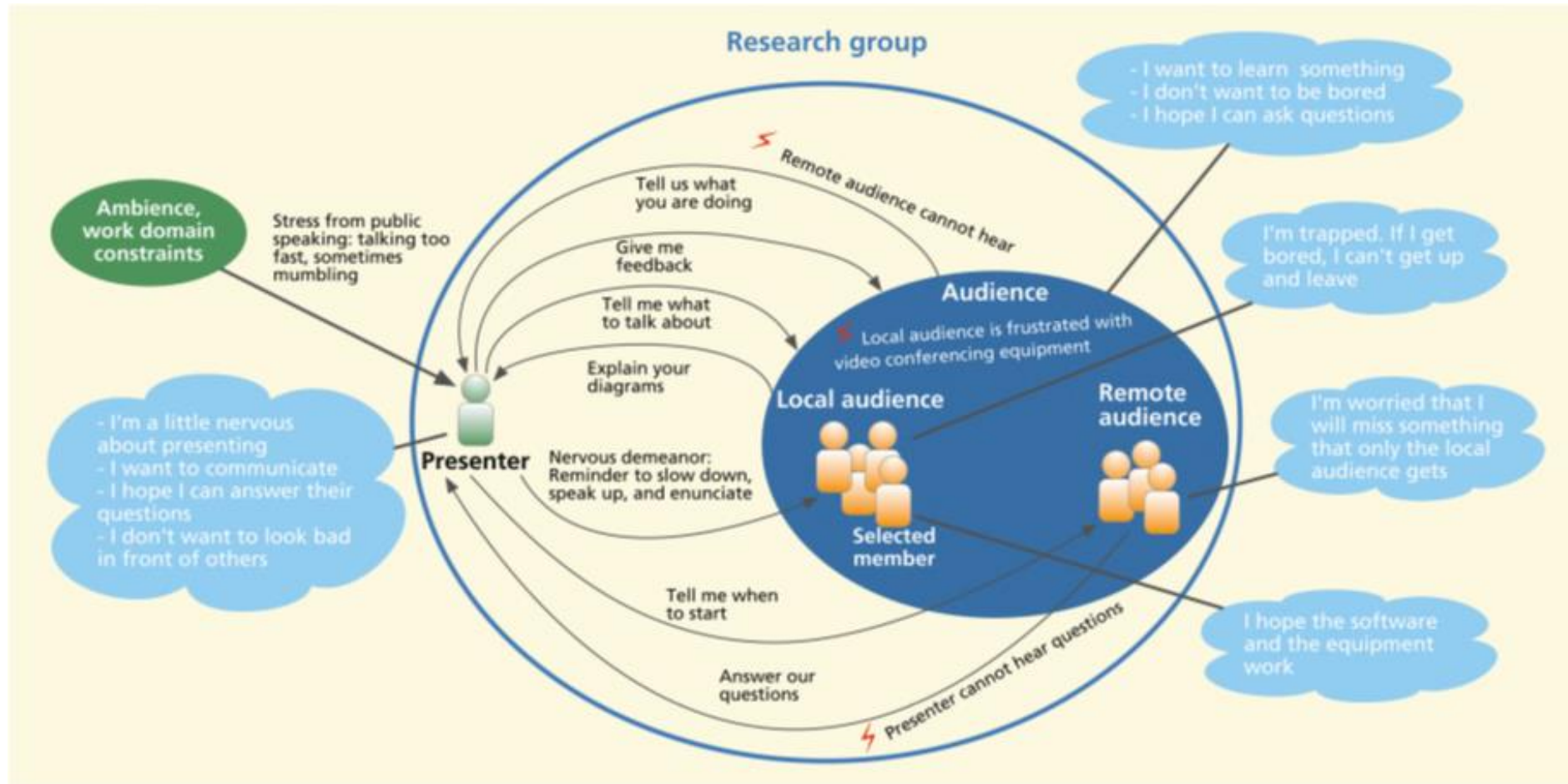
Example: Research Presentation

- Step 2/3: Add **concerns** and **perspectives** as node attributes.

Example: Research Presentation

- Step 3/3: Add inter-node **influences**.

Team Activity

- Go through your WAAD and any other work activity notes and:

- Review and refine as necessary the major user work roles and profiles, and the big picture work flow model

- Make a social model diagram. Identify active entities and represent as nodes. Show norms of behavior, concerns of individuals in specific work roles, influences, feelings, and environmental factors.

Task Models

- Usage scenarios and hierarchical task analysis (HTA)

- Structure and sequence

- Tasks vs. functions
  – Task: something a user does
  – Function: something system does
  – Example, form is displayed (system); data entered (user)

Goals>Work>Tasks>Sub-Tasks>Actions

Usage Scenarios

- Task interaction narrative stories about …
  - Specific people with work goals
  - Performing work activities
  - Within a specific work environment
  - User actions, system responses
  - Barriers encountered
  - As if it was a transcript of a real usage occurrence

Example: Usage Scenario for Mutts

Priya and a group of her friends plan an evening out together on the coming weekend. They agree to meet at the MUTTS ticket window on Friday afternoon. They decide to check out events for Saturday night. After waiting in line, Priya asks the ticket seller what kinds of events have tickets available for Saturday night. The agent looks through her computer listings of movies, concerts, plays, fairs, carnivals, and special events and tells the group about their options. After talking among themselves, they decide they want to go to a concert. The agent asks, "Which kind, classical or pop?" They choose to go with a pop concert. Again, she tells them their options. They finally decide on a concert playing at The Presidium.

There is some unease within the group, though, because they feel that the agent did not give them enough information to make the best choice and they felt some pressure to decide in a hurry.

They ask about what seats are available and the agent goes back to her computer and brings up a seating map of the hall. However, the tickets the agent has on hand are for only a subset of the seats actually available, forcing the group to pick from these, knowing they had not seen all the real options. They choose their seats based on price and seat location and the agent submits an order to buy the tickets. The group decides to give Priya cash and she will pay on her credit card. Priya swipes her credit card in the provided card reader. The transaction is authorized by the credit card company, the sale is committed, and the agent gives them the tickets. The group is happy, but they leave with a nagging feeling that there must be a better way to buy tickets.

Hierarchical Task Analysis (HTA)

- Break work down into tasks, subtasks, actions
- Descriptions and/or graphical representation
- Overall task inventory
- Individual task analysis

The HTA Approach

- Iterative decomposition:
  - **Goal**: the user's desired work objective
  - **Task**: how the goal can be fulfilled.
  - **Hierarchy of sub-tasks** to accomplish the task
  - **Actions**: what the user does to perform the sub-tasks. This is the lowest level description of the user's actions.
  - **Plans:** various flow scenarios to describe what conditions that a sub-task and/or action shall be performed

# Ex. Withdrawing Money from ATM

0. Withdraw Money from ATM
    1. Slide bank card into ATM
    2. Enter PIN
    3. Request Funds from Account
        3.1 select account to withdraw money from
        3.2 enter amount of money requested for withdraw
        3-3 request a transaction receipt
    4. Accept bank fee
    5. Take requested money from the withdraw slot
    6. Take the printed copy of the transaction receipt from the ATM
    7. Take the bank card from the ATM and place back in wallet

Plan 0 (normal): In order do 1, 2, 3, 3.1, 3.2, 3.3, 4 then in any order 5, 6, 7

Plan 1 (no receipt): do Plan 0 except skip steps 3.3 and 6

Plan 2 (reject fee): do Plan 0 except at 4 reject bank fee then do 7

Graphical Version
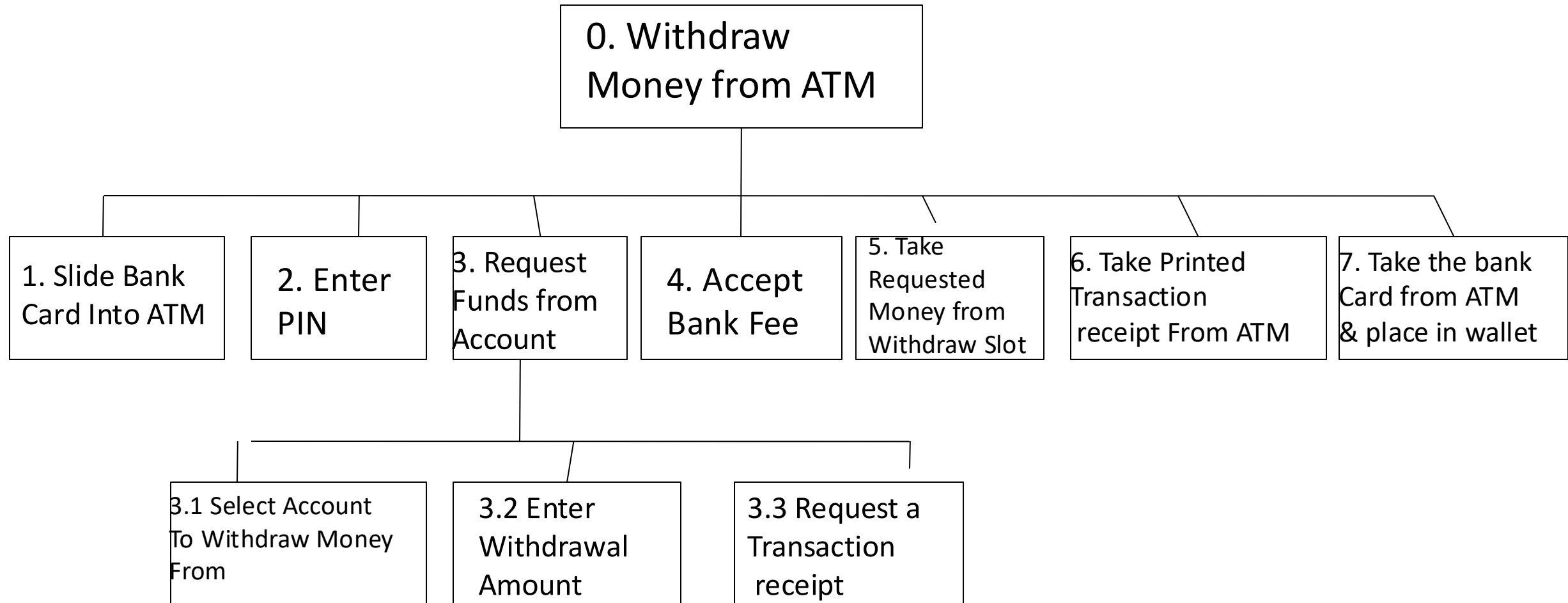
Practice – Create HTA for Check-in for a Flight

A passenger walks up to an airline kiosk at the airport to check-in for her flight. After selecting the check-in option the passenger must identify herself and the flight. The system offers the user the option of entering either their flight confirmation code, frequent flier number, or to swipe their credit card. After finding the user's flight record the system asks the passenger to select the passengers for the flight. For each selected passenger the user is offered the options to change seats and to check bags. For each passenger the user may select a new available seat and/or enter the number of checked bags. After all selections and changes have been completed, the system requests the user to pay the checked bag fee with a credit card. The system prints the baggage fee receipt, and then prints the boarding passes. The passengers are checked in.

Graphical HTA for Check-in for a Flight
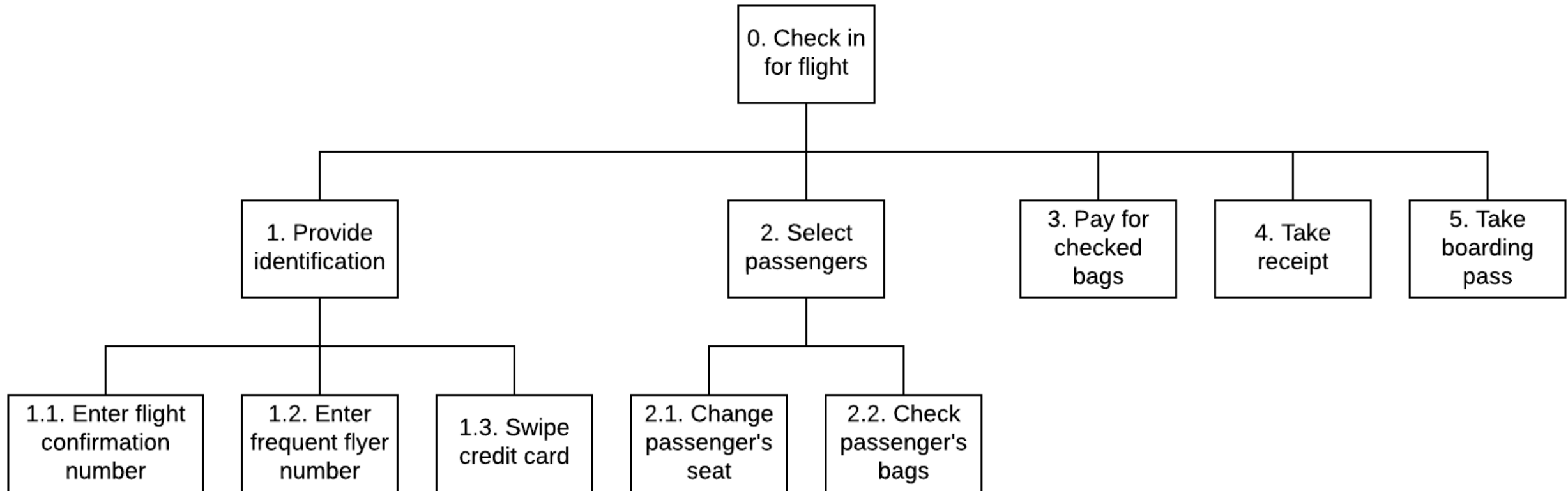
Example HTA (inventory) for MUTTS
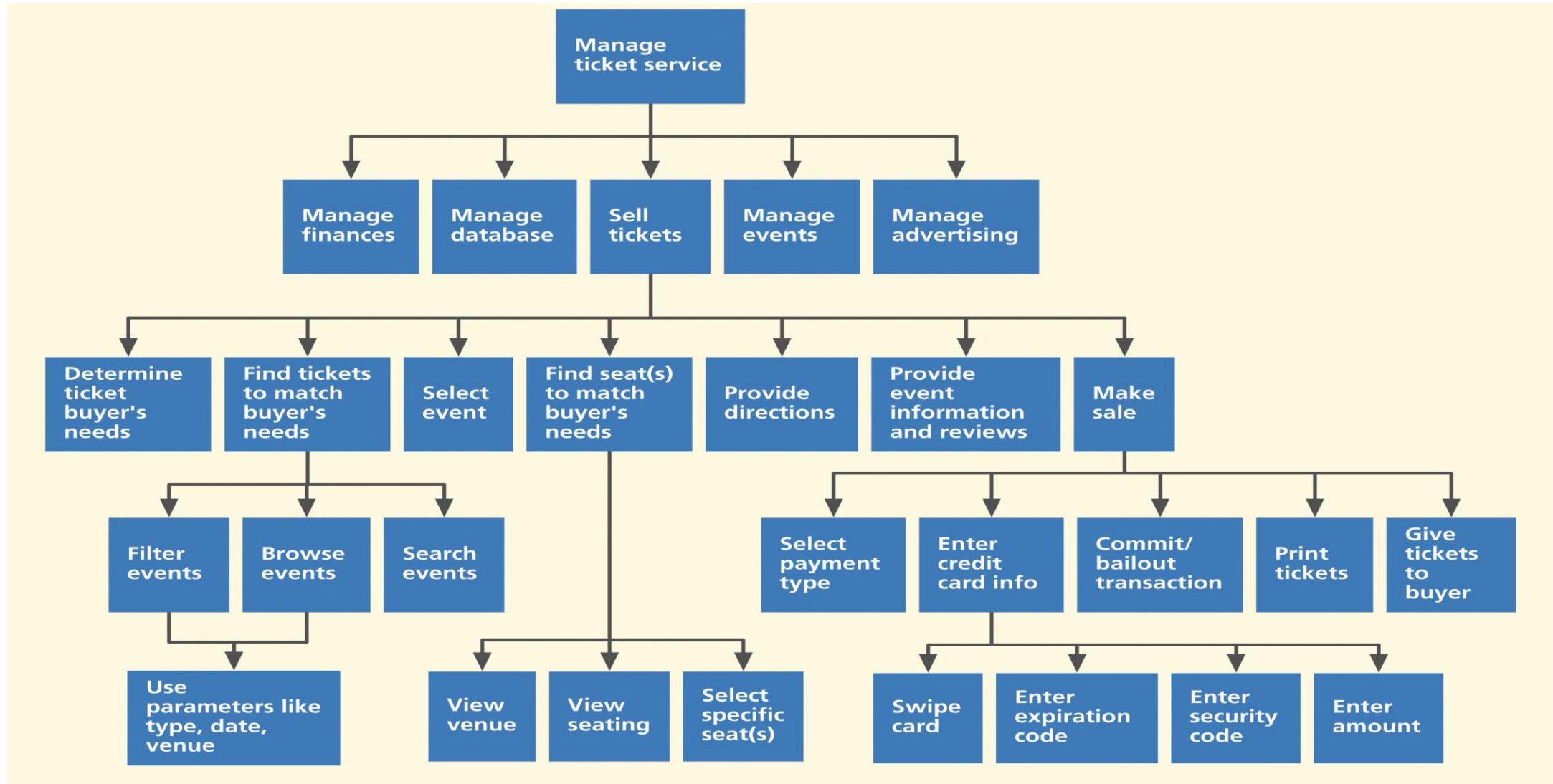
Activity – Team/Individual

- Go through your WAAD and any other work activity notes and:
  - Identify five tasks that represent core features of your system
  - Write **usage scenarios** for each
  - Then create a **hierarchical task analysis model** for each usage scenario
- Divide the work so **each team member** models at least one task
- Edit individual models for notation consistency

- Submit individual models to myCourses: "HTA and Usage Scenario"