Unit 2
Data modeling

Data modeling

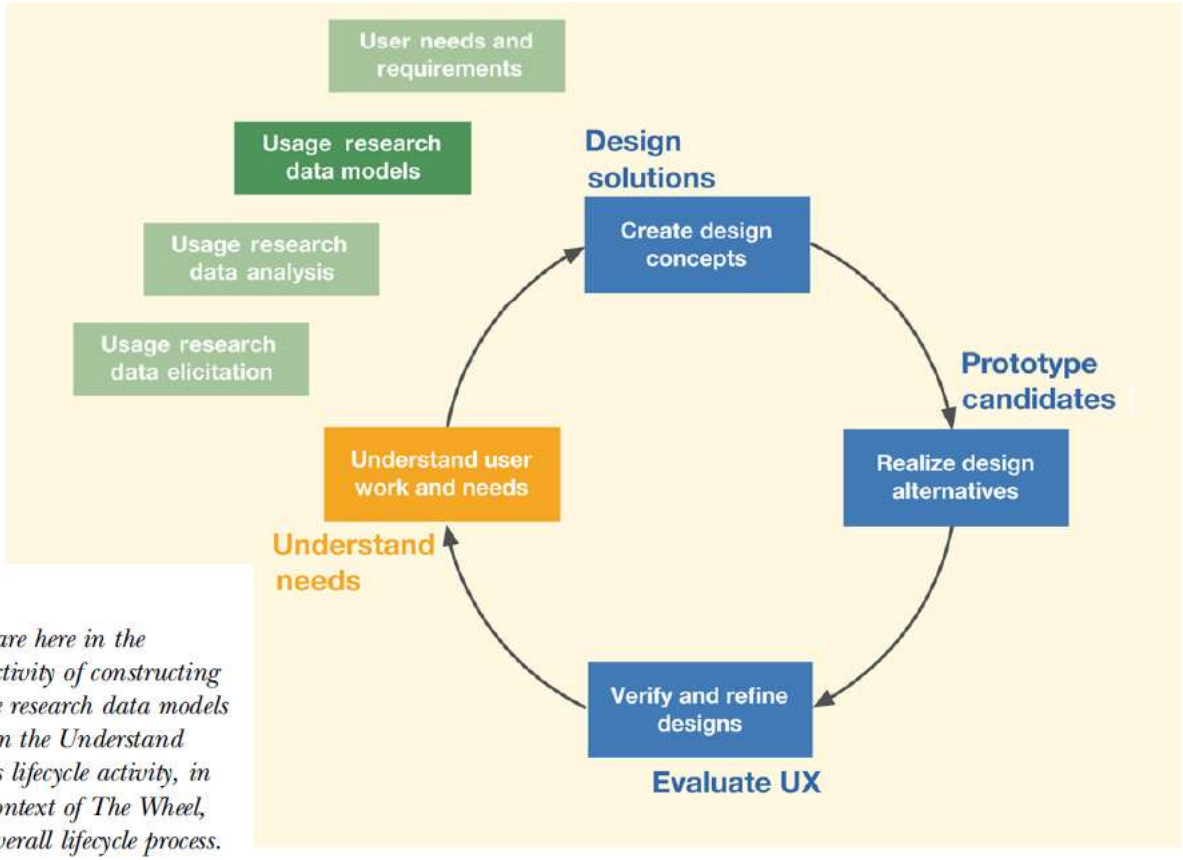


Fig.

You are here in the subactivity of constructing usage research data models within the Understand Needs lifecycle activity, in the context of The Wheel, the overall lifecycle process.

Data modeling

- The user work role model.
- The flow model.
- Task models.

Data Modeling

1. User work role model –
2. Flow model –
3. Task structure models –
4. Artifact model
5. Physical work environment model –
6. Information architecture model –
7. Social model–
8. Hybrid models –
9. Model consolidation

1. User work role model

1. Work role

- A user work role is not a person, but a work assignment defined by the duties, functions, and work activities of a person with a certain job title or job responsibility, such as “customer” or “database administrator.”
- Job titles themselves, however, don’t necessarily make good names for user work roles; you should use names that distinguish them by the kind of work they do.

A work role can:

- Involve system usage or not.
- Be internal or external to the organization, as long as the job entails participation in the work practice of the organization.

1. User work role model

3. Mediated Work Roles

- Some “users” serve roles that do not use the system directly but still play a major part in the workflow and usage context.
- We call these users “mediated users” because their interaction with the system is mediated by direct users.
- Mediated roles are often customers and clients of the enterprise on whose behalf direct users such as clerks and agents conduct transactions with the computer system.

1. User work role model

2. Subroles

- For some work roles, it can be useful to distinguish subroles defined by different
- subsets of tasks the work role does. Examples of subroles for the ticket buyer role
- include student, general public, faculty/staff, and alumni ticket buyers.

1. User work role model

4. User Class Definitions

- A user class for a work role or subrole is defined by a description of relevant characteristics of the potential user community that can perform that role.
- Every work role and subrole will have at least one user class.

5. Post the Work Role Modeling Results

2. Flow model

- 1. What Is a Flow Model?
  - The flow model, at its base, is a simple graphical representation of how information and artifacts flow through the system as it is used
- 2. Central Importance of the Flow Model
  - Flow model is a unifying representation of how the system fits into the workflow of the enterprise, it is important to understand it and get it established as early as possible.

2. Flow model

- 3. How to Make a Flow Model
  - Draw the evolving flow model diagram as a graph of nodes and arcs.
  - Start by drawing people icons, labeled with the work roles, as nodes.
  - Include roles external to the organization.
  - Add nodes for other entities, such as a database into which and from which anything related to the work practice can flow.
  - Draw directed arcs (arrows) representing flow, communication, and coordination necessary to do the work of the enterprise, between nodes.
  - Label the arcs with what (e.g., artifact, information) is flowing and by what medium (e.g., email, phone calls, letters, memos, and meetings).
  - In usage research analysis, as you encounter elemental notes that describe how work flows in the organization, set them aside as inputs to the flow model or merge them directly into the evolving flow model.

2. Flow model

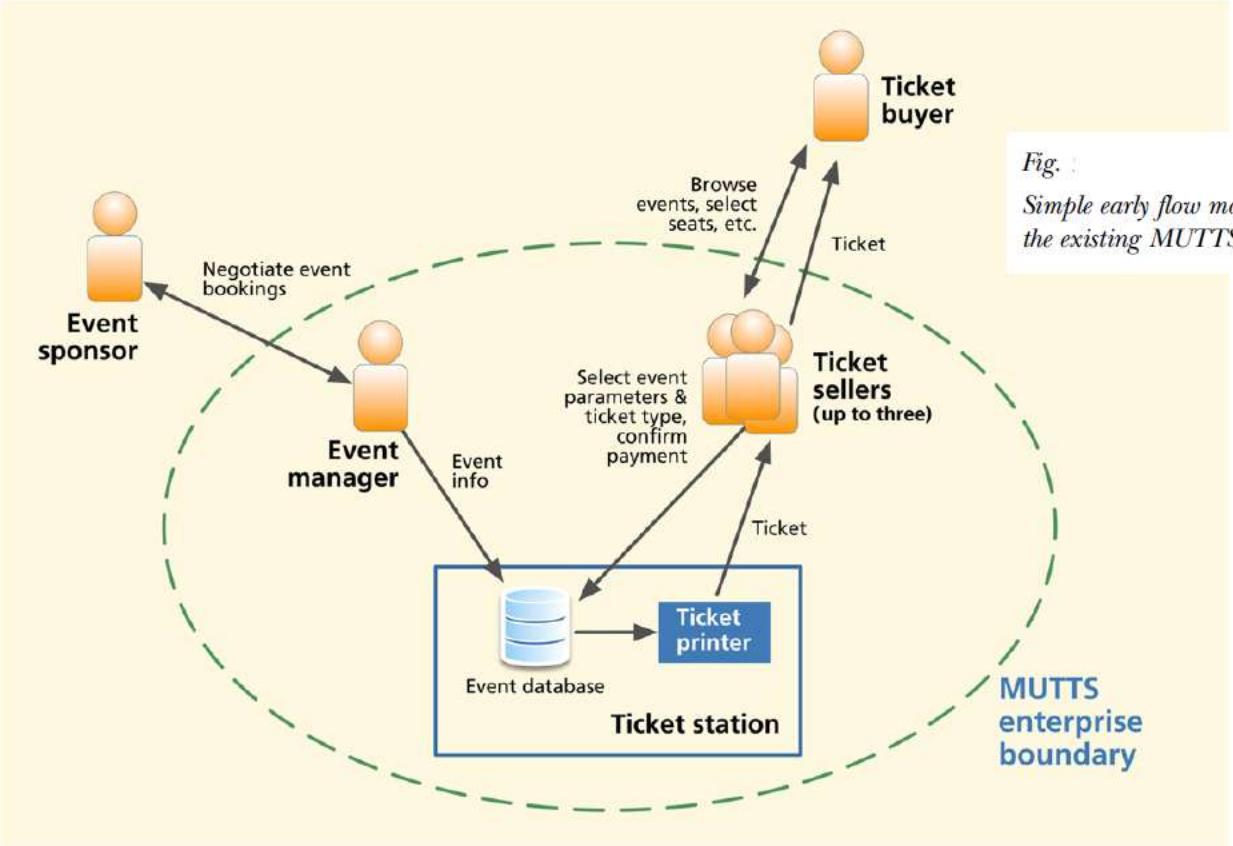


Fig.

Simple early flow model for for the existing MUTTS.

3. Task structure model

- THE HIERARCHICAL TASK INVENTORY (HTI)
- The primary task structure model is the hierarchical task inventory.
- Benefits of a Task Structure Model – Task
- Structure models are used to catalog the tasks and subtasks that must be supported in the system design.
- Like functional decompositions, task inventories capture hierarchical relationships among the tasks and subtasks.

3. Task structure model

Task structure models:

- Represent what user tasks and actions are possible in the work practice and work environment, using the system or not.
- Are essential for informing UX design, telling you what tasks (and functionality) you have to design for in the system.
- Serve as a checklist for completeness in the emerging design (Constantine & Lockwood, 1999, p. 99).

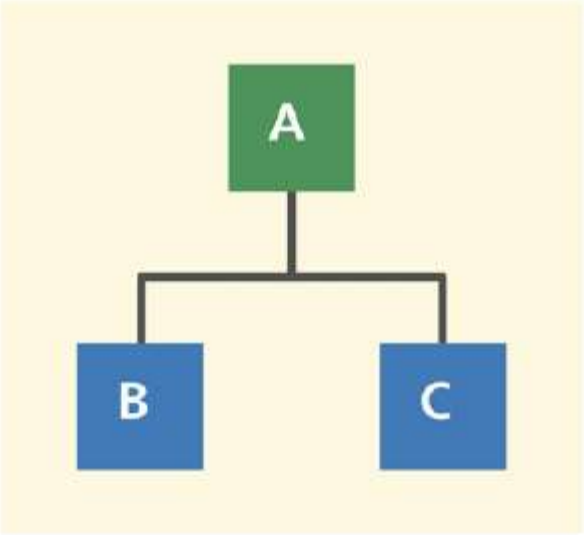
Create an HTI Model

- A simple task structure can be easily represented as a hierarchical (indented) list of tasks and subtasks. More complex task structures are best represented in an HTI diagram.
- Hierarchical task inventories can be constructed top-down, bottom-up, or both. Large, more general tasks are decomposed into smaller, more specific, and more detailed tasks.

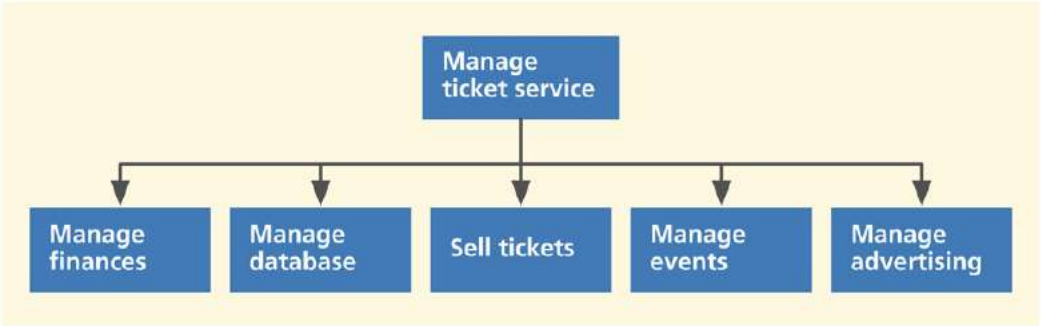
Hierarchical Relationships

Fig.

Hierarchical relationship of task A, the supertask, and tasks B and C, subtasks.



Example: A First-Level HTI Diagram for MUTTS



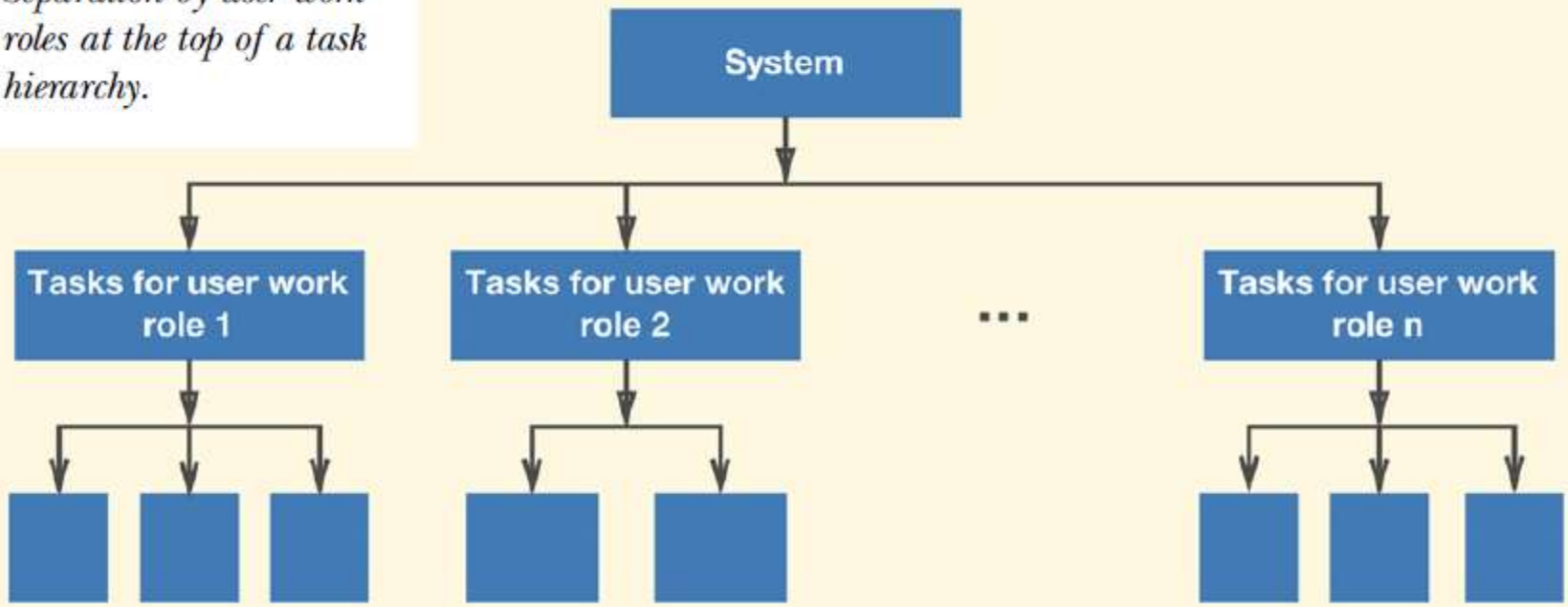
Fig

Sketch of the top levels of a possible hierarchical task inventory diagram for MUTTS.

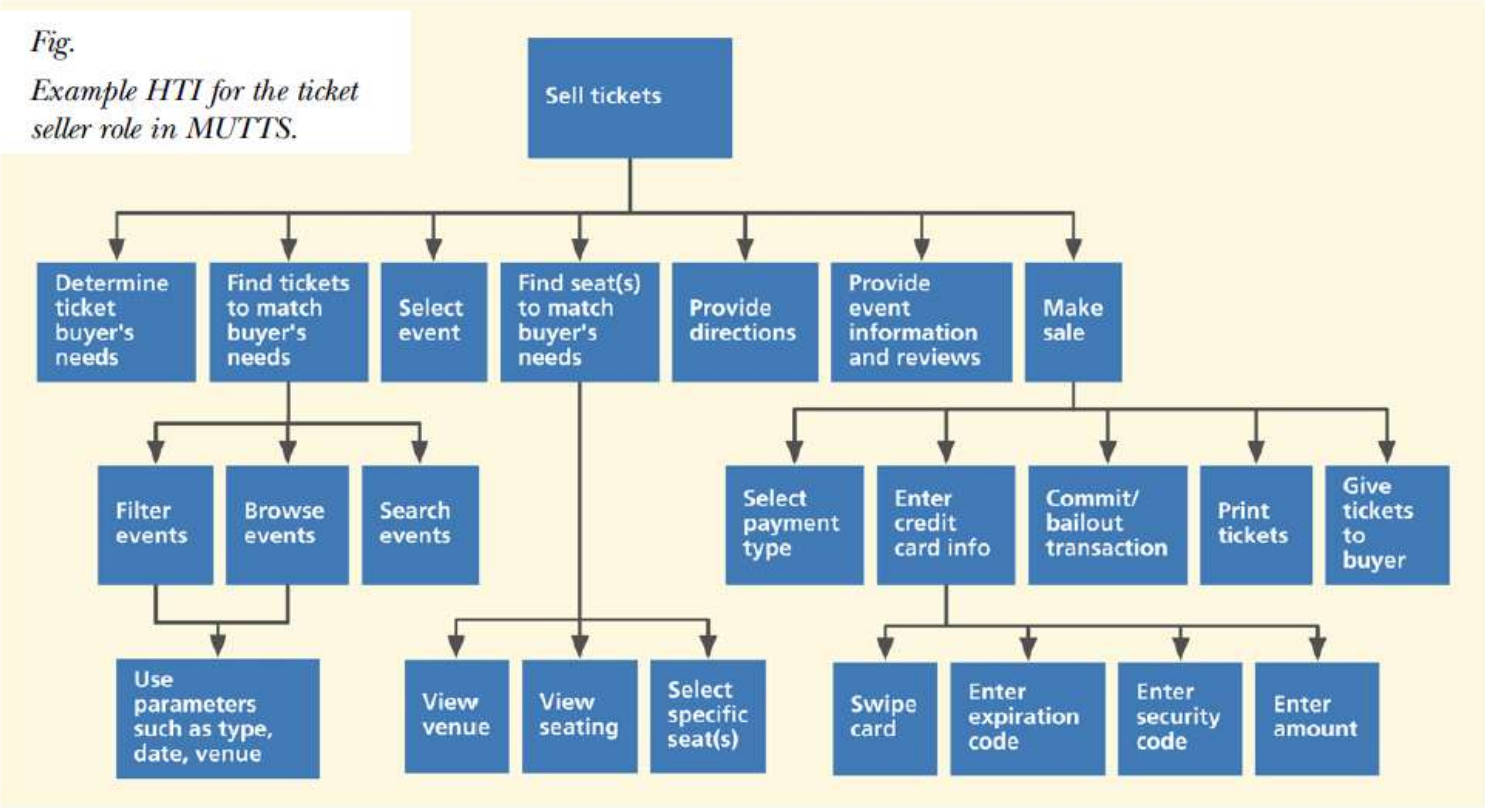
HTI Can Often be Decomposed by User Work Role

Fig.

Separation by user work roles at the top of a task hierarchy.



HTI Can Often be Decomposed by User Work Role



4. Artifact model

- Artifact model is probably just a collection of labeled artifacts plus some notes about them.
- Examples of artifacts include:

  - Work practice forms.
  - Sketches.
  - Props.
  - Memos.
  - Significant email messages.
  - Correspondence templates.
  - Product change orders.
  - An order form.
  - A receipt.
  - Paper or electronic forms.
  - Templates.
  - Physical or electronic entities that users create, retrieve, use, or reference within a task and/or pass on to another person in the work domain.
  - Photos (with permission) of the work place and work being performed.
  - Other objects that play a role in work performed.

Example: Work Artifacts from a Local Restaurant

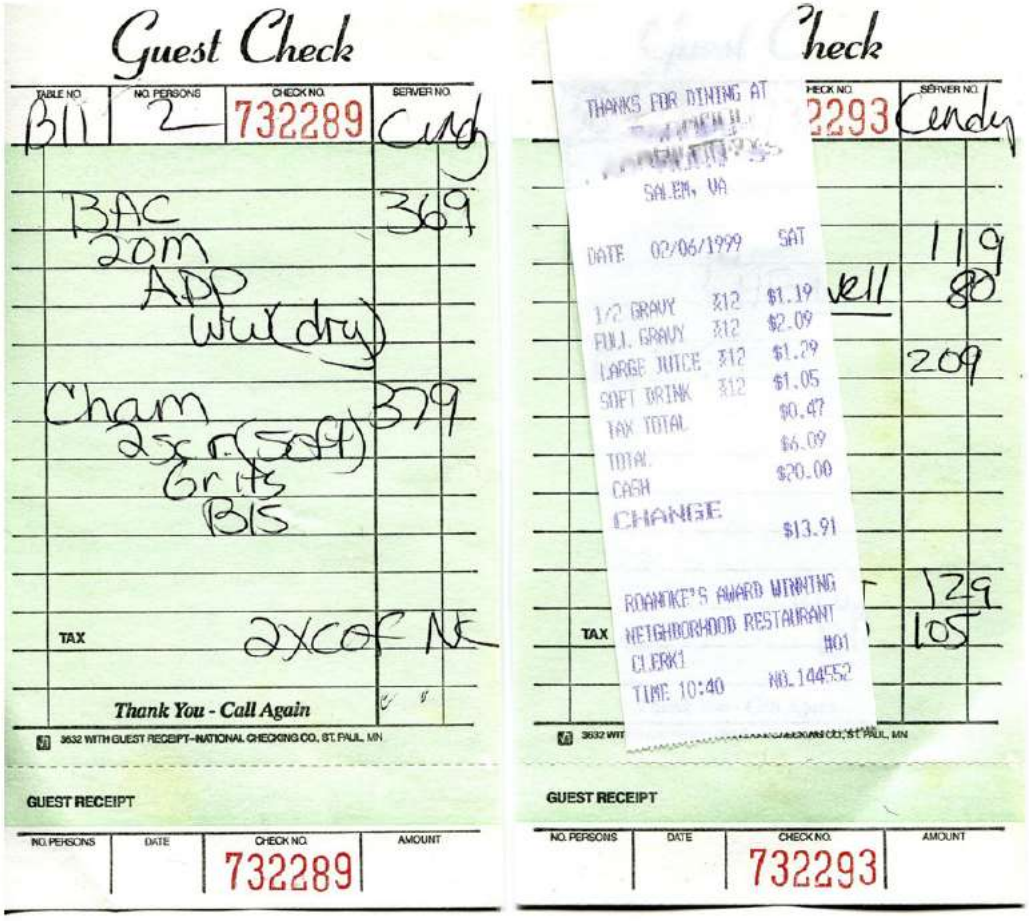


Fig.

Examples of work artifacts gathered from a local restaurant.

Constructing the Artifact Model

- A collection of artifacts that you gathered in usage research data elicitation, including sketches, copies of paperwork, photographs, and real instances of physical work practice artifacts
- Make posters as exhibits ready for discussion and analysis.
- Add stick-on notes associating them with tasks, user goals, and task barriers.

Example: Combining the Artifacts Into a Restaurant Flow Model

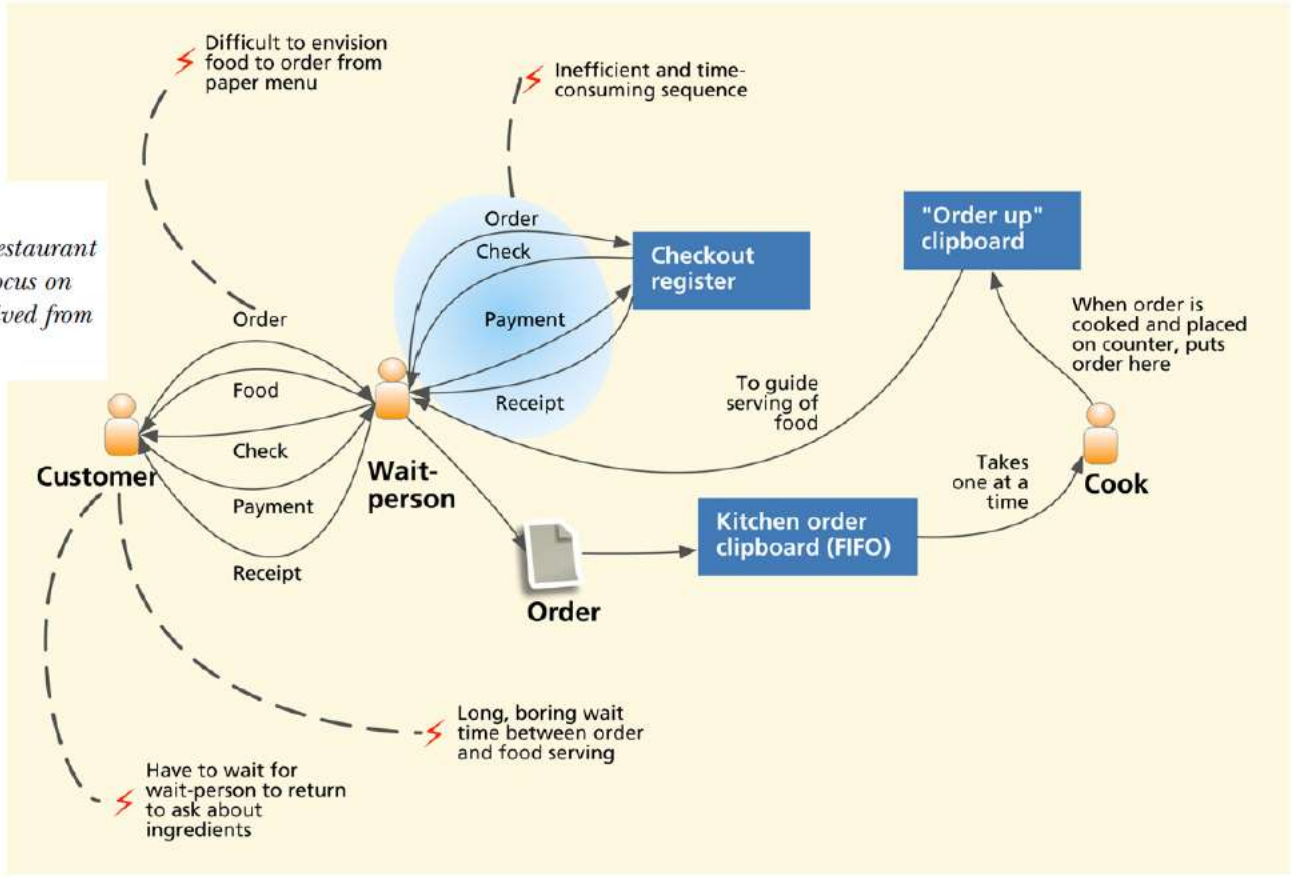


Fig.
Early sketch of a restaurant flow model with focus on work artifacts derived from the artifact model.

5. PHYSICAL WORK ENVIRONMENT MODEL

- Physical models are pictorial representations of the physical layout of work locations, personnel, equipment, hardware, physical parts of the ecology, communications, devices, and databases that are part of the work practice
- Include sketches, diagrams, and photos of the working environment

Elemental data notes related to physical workplace layout

- Physical workspace layout.
- Floor plans (not necessary to scale).
- Where people and important objects stand and where they move to during interaction.
- Locations of:
  - Furniture.
  - Office equipment (telephones, computers, copy machines, fax machines, printers, scanners).
  - Communications connections.
  - Work stations.
  - Points of contact with customers and the public.

Include Hardware Design, When Appropriate

- For example, if you are designing a new smartphone, this is about considering industrial design, material, production issues, heating, and other physical issues such as interference with any wireless antennas in the device, temperature tolerances, and weather proofing.

Include Environmental Factors, When Appropriate

- For example, a steel mill floor is about safety concerns, noise, dust, and hot temperatures—conditions where it is difficult to think or work.

A physical model

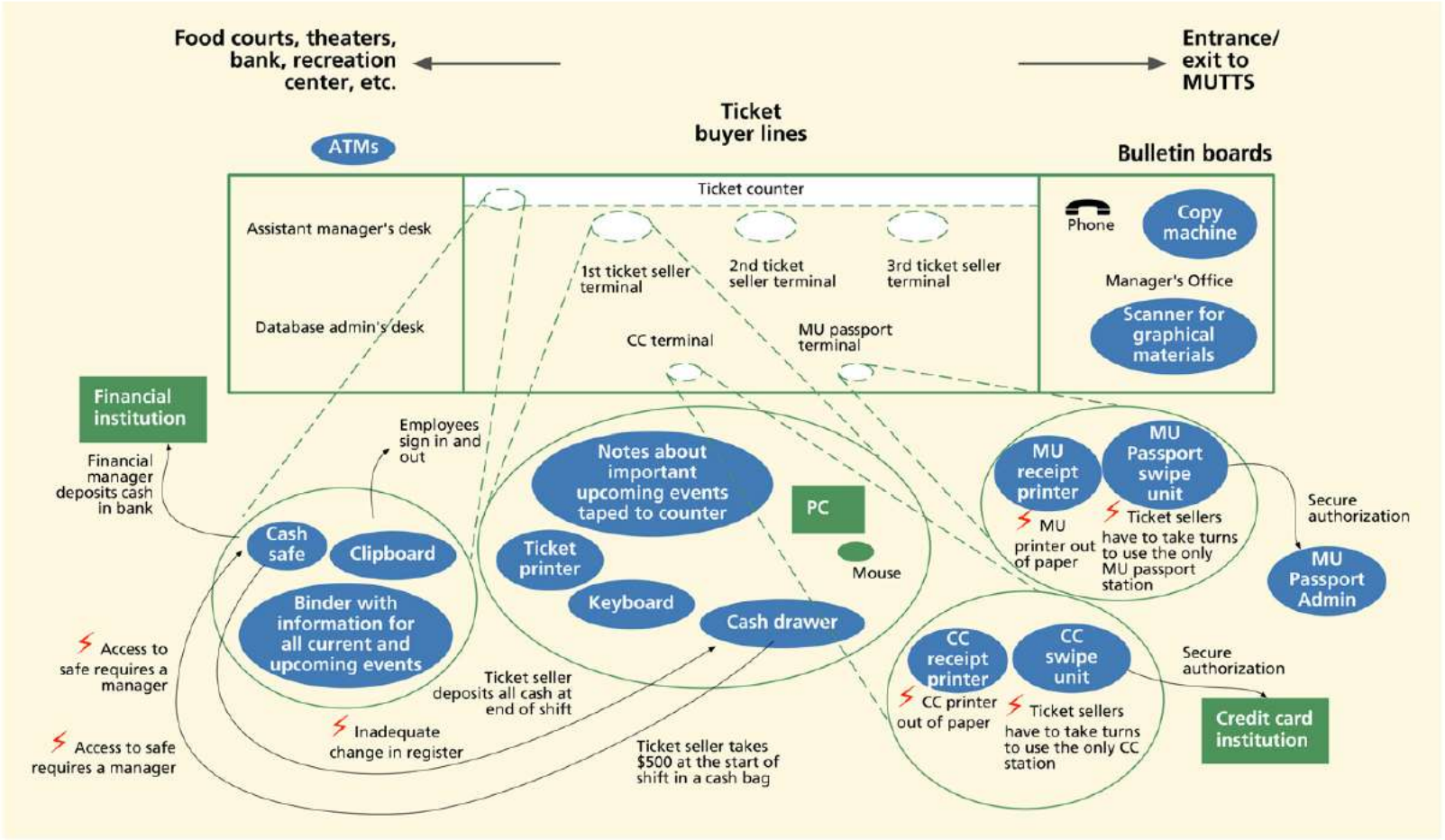


Fig.

A physical model for MUTTS.

6. INFORMATION ARCHITECTURE MODEL

- What information do users use and interact with as part of their work and how is it structured?
- Information architecture is usually fairly simple in the product perspective.

Example: Information Architecture Modeling

- Event name.
- Event type.
- Event description.
- Range of dates event is occurring.
- Ticket costs:
  - Seat types and costs.
  - Reserved status.
- Venues:
  - Location.
  - Capacity.
- Directions to venues.
- Video trailers.
- Photos.
- Reviews.

Example: Information Architecture Modeling

Suppose you have to register each ticket buyer, especially if they pay by credit card. The ticket buyer might have attributes like these:

- Name.
- Address.
- Email address.
- Phone number.

There might also be a relationship between events and ticket buyers, including these attributes:

- Date of reservation.
- Seat number.
- Cost of ticket, as paid.

7. Social model

- The social model is the least commonly used model, especially in agile environments. It is needed only when social and cultural interactions among the people involved in the work practice are complex and/or problematic.

7.Social model

More specific examples include:

- The overall flavor or feeling in the workplace.
- Organizational philosophy and culture.
- Workplace ambience and environmental factors.
- Professional and personal goals of workers.
- Political structure and realities.
- Thought processes, mindsets, policies, feelings, attitudes, and terminology that occur in the work environment.
- Legal requirements and regulations.
- Organizational policies.
- Subversive activities.

8. Hybrid model

- The goal of modeling is to represent a useful perspective or perspectives about the work domain for the design situation.
- Purity of each model is not the goal.
- Do what it takes to capture what you learn about the work domain.
- For example, if the work practice centers around a physical space, like a ticket office, combine the physical model and flow model into a hybrid model.

9. Model consolidation

- In a large project, if you construct your models with multiple subteams working in parallel, you will get multiple models of the same type.
- Now is the time to consolidate the model versions by merging them into one model.
- The key idea is to induce generalizations, that is, a bottom-up process to build a general model from the important pieces of specific data.