Unit 4

Data analysis

Data analysis

- Analyze Quantitative data –
- Analyze qualitative UX data –
- Reporting different kinds of data

Analyze Quantitative data

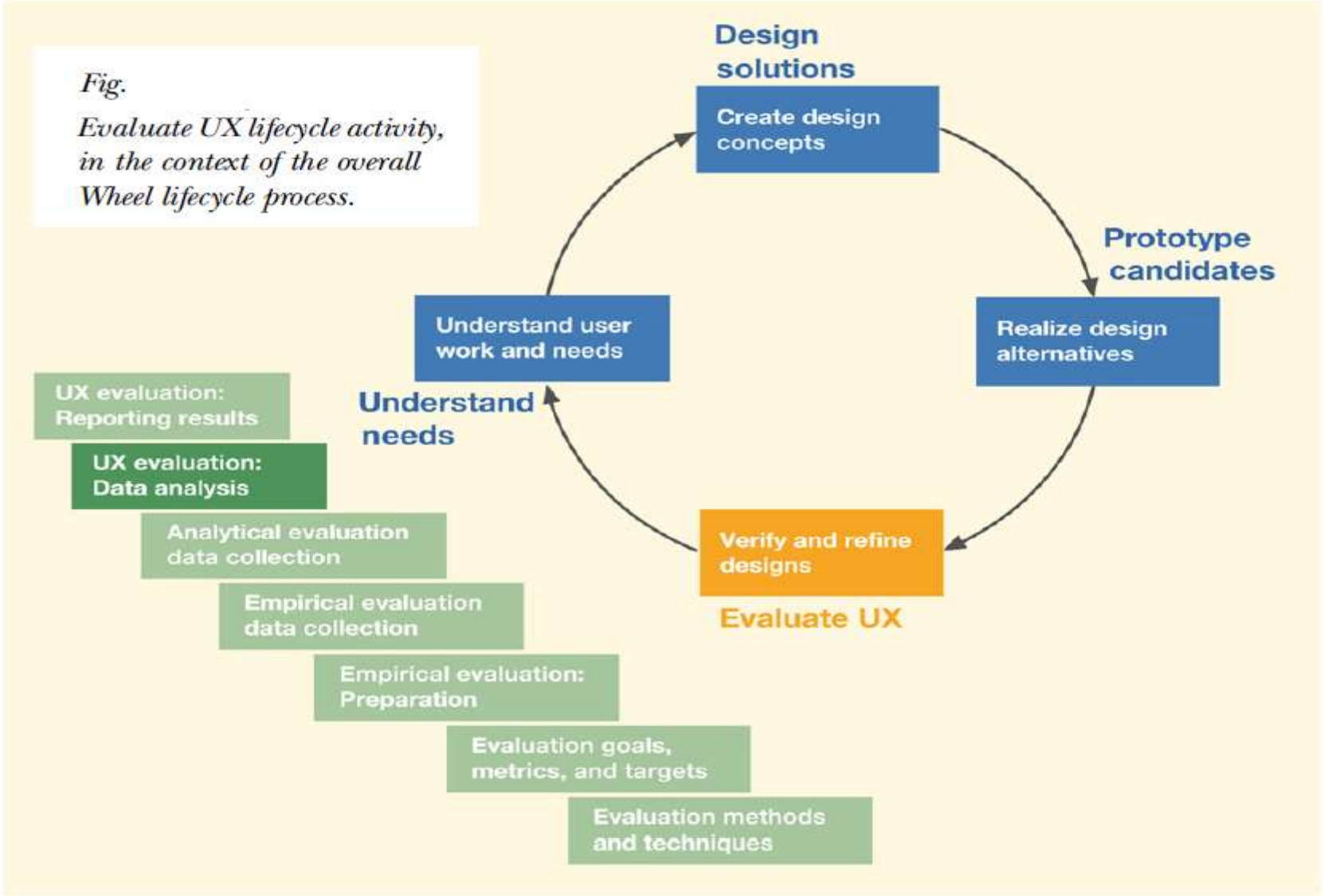


Fig.
Evaluate UX lifecycle activity, in the context of the overall Wheel lifecycle process.

Analyze Quantitative data

- 1. Use simple descriptive statistics
  - Informal quantitative data analysis does not include inferential statistical analyses.
  - The first step in analyzing quantitative data is to compute averages, or whatever metrics you are using, for timing, error counts, questionnaire ratings, and so on, as stated in the UX targets
  - If three participants are all very close in performance times for a particular task or three questionnaires have nearly the same values for a question, the numbers should give you pretty good confidence; those averages are meaningful.
  - If there is a big spread, however, you should find out why there is such a variance. Sometimes, it can mean that you should try to run a few more participants.

Analyze Quantitative data

- 2. Treat Subjective Quantitative Questionnaire Data as Simply as Possible
  - As an example, to obtain a single numerical result for a questionnaire based metric, we might use the average of scores on questions 1, 2, 5, and 8 as averaged over all the parts.
  - Or, more often, we'll average the scores over all the questions and over all the participants.

Analyze Quantitative data

- 3. Lining Up Your Quantitative Ducks
  - compute summary statistics of quantitative data across all your users, put the results in the “Observed Results”.
  - The first two targets are based on user performance metrics and the values entered are “3.5 minutes,” a count of “2” errors, and an average questionnaire score for Questions 1 through 10 of “7.5,” respectively.

Analyze Quantitative data

- 3. Lining Up Your Quantitative Ducks (contd..)
  - Comparing the observed results with the specified target levels, you can tell immediately which UX targets have been met, and which have not, during this cycle of formative evaluation.
  - we didn’t meet any of these three UX evaluation targets. This is not unusual for an early evaluation of a still-evolving design.

Analyze Quantitative data

Table .

Example of partial informal quantitative testing results for the Ticket Kiosk System

Work Role: User Class	UX Goal	UX Measure	Measuring Instrument	UX Metric	Baseline Level	Target Level	Observed Results	Meet Target?
Ticket buyer: Casual new user, for occasional personal use	Walk-up ease of use	Initial user performance	BT1: Buy special event ticket	Average time on task	3 min as measured at the kiosk	2.5 min	3.5 min	No
Ticket buyer: Casual new user, for occasional personal use	Walk-up ease of use for new user	Initial user performance	BT2: Buy movie ticket	Average number of errors	<1	<1	2	No
Ticket buyer: Casual new user, for occasional personal use	Initial customer satisfaction	First impression	Questions Q1–Q10 in questionnaire XYZ	Average rating across users and across questions	7.5/10	8/10	7.5	No

Analyze Quantitative data

- 4. The Big Decision: Can We Stop Iterating?
  - Here are some questions to consider:
    - Did you simultaneously meet all your target-level goals?
    - What is your general team feeling about the conceptual design, the overall UX design, the metaphor, and the user experiences they have observed?
    - What role does pressure from management and marketing play in this decision?

- 4. The Big Decision: Can We Stop Iterating? (contd..)
  - If your answers to these questions tell you that you can accept the design as is, you can stop iterating.
  - If your UX targets were not met—the most likely situation after the first Cycle(s) of testing—and resources permit (e.g., you are not out of time or money), you need to iterate.

Analyze Quantitative data

- 4. The Big Decision: Can We Stop Iterating? (contd..)
  - As you iterate, you should keep an eye on the quantitative results over multiple iterations: Is your design at least moving in the right direction?
  - It is always possible for UX levels to get worse with any round of design changes. If you are not converging toward improvement, why not?
  - Are UX problem fixes uncovering problems that existed but could not be seen before, or are UX problem fixes causing new problems?

Analyze qualitative UX data

- Formative analysis of qualitative data is the bread and butter of UX evaluation.
- 1. Overview
  - The process of determining how to convert collected data into scheduled design and implementation solutions is essentially one of negotiation in which, at various times, all members of the project team are involved.
  - Approach to usability problem analysis,

The team usually includes all the stakeholders, not just UX folks, and we rarely have much time. First, we agree on what we saw. No interpretation, just observation. This gets us all on the same page. Then we brainstorm until we agree on "what it means." Then we brainstorm design solutions.

Analyze qualitative UX data

- 2. Analysis Preparation Steps
  - Start analyzing qualitative data for each participant while that participant is still present to fill in missing data and clarify ambiguous issues.
  - Qualitative UX data notes can include:
    - Critical incident comment.
    - User think-aloud comment.
    - UX inspection note.

  Clean up the raw data before your memory fades

  - There is a delay between data collection and analysis.
  - The person performing UX problem analysis is not the same person who observed the incidents and recorded the comments.

Analyze qualitative UX data

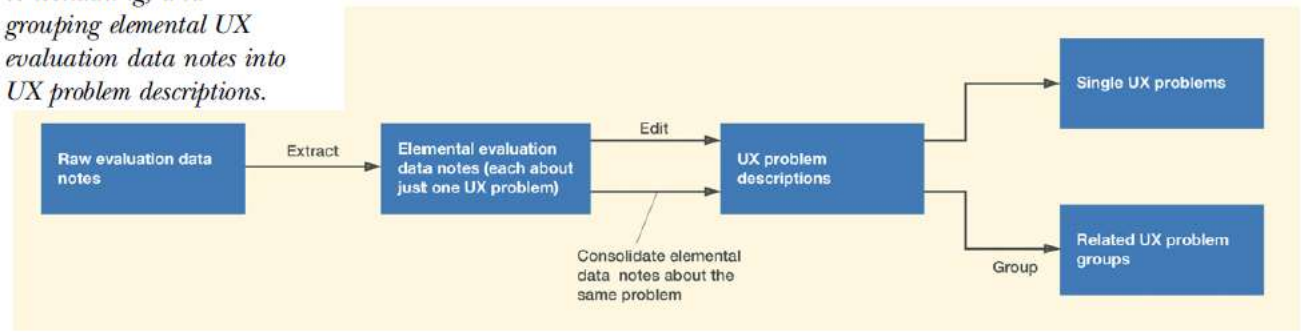
- 3. Qualitative UX Data Analysis Steps

1. Gather up your raw qualitative UX data notes.
2. Extract elemental data notes (just as we did in analysis for usage research).
   a. Each elemental data note should be about exactly one UX problem.
3. Edit elemental data notes into UX problem.
4. Consolidate multiple notes about the same UX problem description.
5. Group related UX problem descriptions so they can be fixed together.

Analyze qualitative UX data

Fig.

Extracting, editing, consolidating, and grouping elemental UX evaluation data notes into UX problem descriptions.



Analyze qualitative UX data

- Consider including these kinds of information:
  - *Problem name:*
    - So people can refer to it in other contexts and discussions
  - *Problem statement:*
    - Terse one-sentence summary of the problem as an effect or outcome experienced by the user, but not as a suggested solution. You want to keep your options flexible when you do get to considering solutions.
  - *User goals and task information:*
    - This information provides problem context to know what the user was trying to do when the problem was encountered.
    - What the user tried to do, what happened instead, and why: It's important to explain
    - what actually happened and what incorrect assumptions about the design or misunderstandings of how the design works led to it. Explain what the user should have done.
- *Causes and potential solutions:*
    - Although you may not know the problem causes or potential solutions at first, you should explain it if you do know or have any ideas.

Analyze qualitative UX data

- As an example, from our Ticket Kiosk System evaluation.
- One UX problem description states that the participant was confused about the button labeled “Submit” and didn’t know that this button should be clicked to move on in the transaction to pay for the tickets.
- Another (congruent) UX problem description (as encountered by a different participant) said that the participant complained about the wording of the button label “Submit,” saying it didn’t help understand where one would go if one clicked on that button.

Analyze qualitative UX data

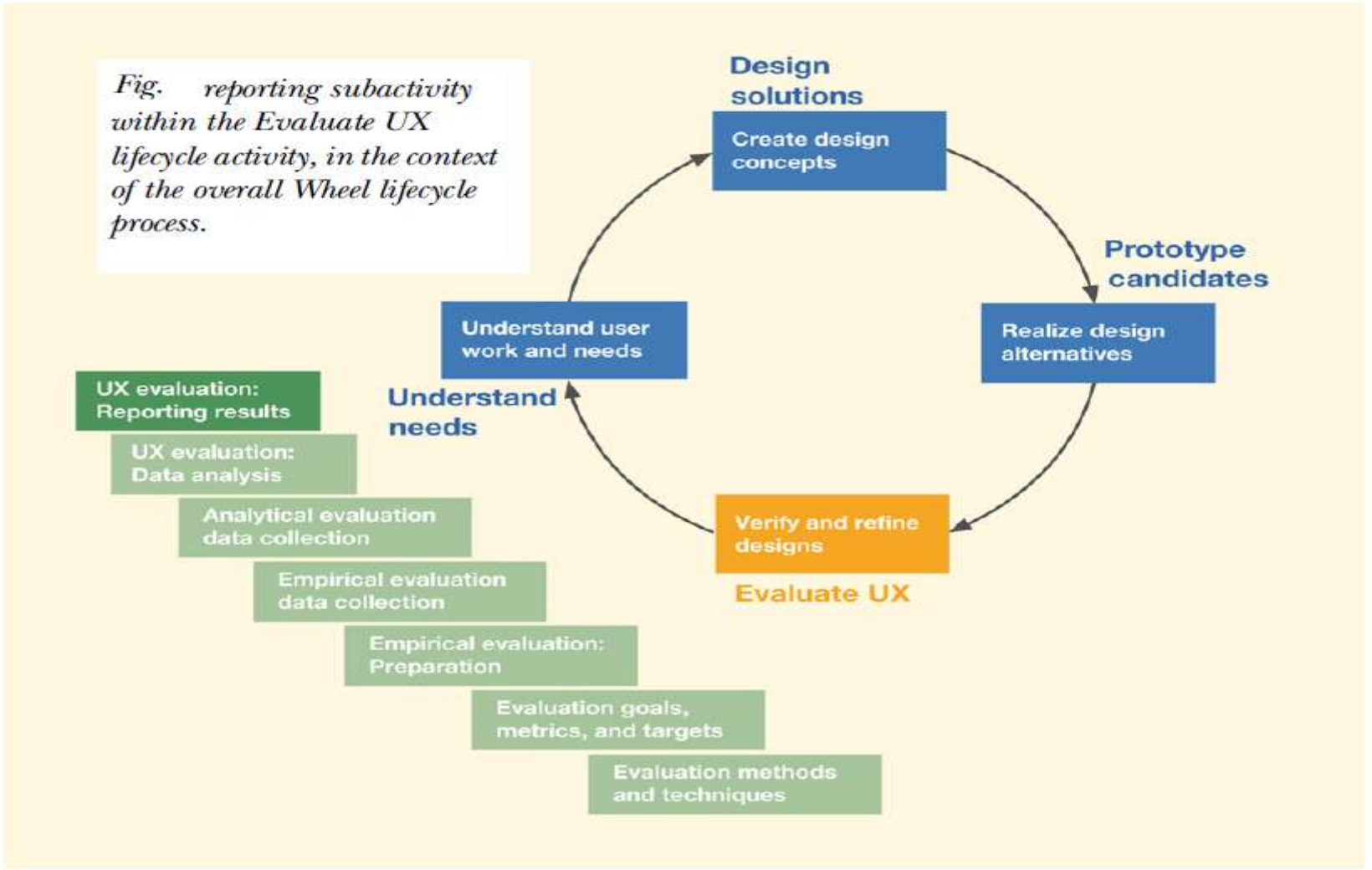
Example: Grouping Related Problems for the Ticket Kiosk System

Table

A group of related UX problems and solutions in a spreadsheet (thanks to Sirong Lin and her student project team)

Seat category distinguishability usability problem	9. User expected graphic of seat layout but missed seeing the button for that at first; kept missing "View Seats"	Group "View Seats" button in layout with other seat purchase task controls
	13. For "Selected seats," no way to distinguish balcony from floor seats because they use the same numbering scheme	Distinguish balcony seats and floor seats with different numbering schemes
	20. In "View Seats" view, participant couldn't determine which seats were already sold, because color choices were confusing	Use different icons or colors to distinguish which seats are already sold
	25. Missed fact that blue seat sections are clickable to zoom in on detailed view of available seats. User left thinking that blue seat section wasn't enough information about *which* seats are available	Show clearly that blue seat sections are clickable. When one is clicked, display the detailed seat information, like location, price, etc. Add legend to explain color usage
	26. Seat availability color-coding scheme problematic. Colors not distinguishable (color blindness?). In detailed seat view, purple wasn't distinguishable as separate between red and blue. Labels in this view not legible enough. Probably should have thicker font (maybe bold would do it)	Change the colors to a better combination with which the user can distinguish the different categories of seats clearly. Use a thicker font

Reporting different kinds of data



Reporting different kinds of data

- 1. Reporting Informal Summative Results.
  - If we collect and analyze quantitative data in UX practice, it will always be informal summative evaluation.
  - It may be part of the job of UX engineers to convince others in the project team to take action about poor UX, as revealed by UX evaluation.
  - This part of the role is especially important in large organizations where people who collect data are not necessarily the same people (or even people who have a close working relationship with them) as those who make the decisions about design changes.

Reporting different kinds of data

- 2. Reporting Qualitative Results—The UX Problems.
  - All UX practitioners should be able to write clear and effective reports.
  - Important to communicate effectively about the analysis and results.
  - Common Industry Format (CIF) for reporting formal summative UX evaluation results.
  - there was a need for an extension of the original CIF project to identify best practices for reporting formative results.
  - “formative evaluation” to include usability inspections and other methods for collecting formative usability and user experience data.