

# CS 5704: Software Engineering

Usability Engineering

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# Is the fuss over usability real?

**BBC NEWS**

● UK version ● **International version** About the versions | Low grap

Last Updated: Friday, 24 June 2005, 15:20 GMT 16:20 UK

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## Time to get used to usability

The world's ageing population makes accessible design an imperative, argues Bill Thompson.

**BBC NEWS** WORLD EDITION

Last Updated: Thursday, 3 November 2005, 13:26 GMT

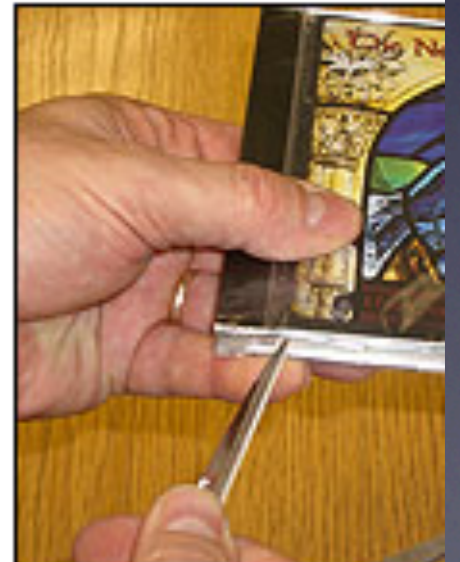
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## Making things work - the vote

It's World Usability Day, the chance to celebrate the products and services that make our daily lives easier and more efficient.

But there's a long way to go - consumers are more likely to scream in frustration while



# Why should we care?



# We should care because...

- For the user, the UI is the system
- Usability can
  - increase productivity
  - reduce training and help-desk costs
  - help with error recovery/avoidance
  - save human life in certain domains
  - make or break a product

# Usability defined

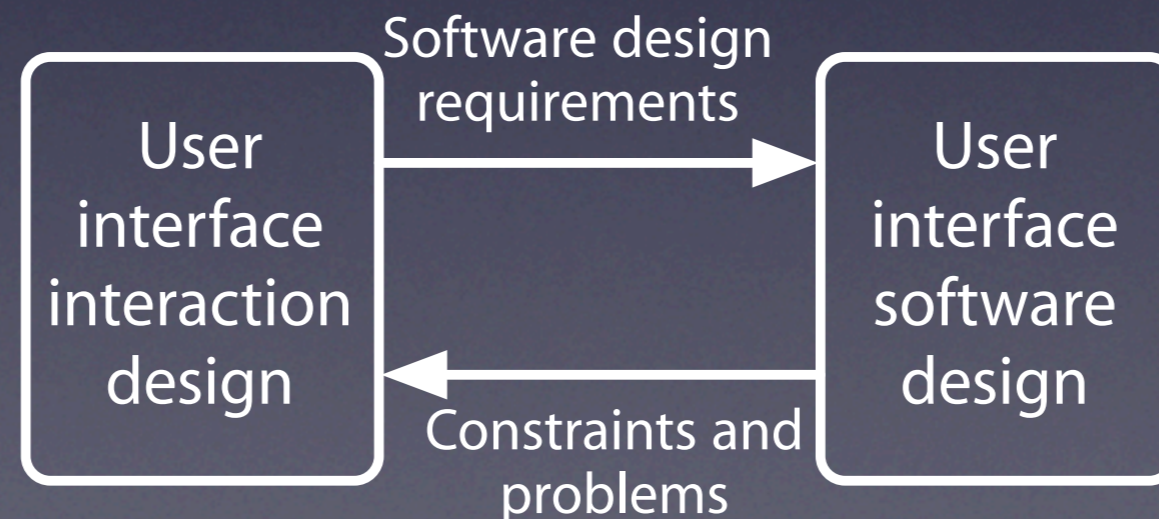
- *Usability* is a characteristic of an interactive system that indicates ease of use, usefulness, and satisfaction
- Usability includes:
  - Effectiveness and efficiency (user productivity)
  - Learnability
  - Safety
  - User satisfaction
  - ...

# How to measure usability?

- Cannot be measured directly
- Common indicators of usability
  - Speed of user task performance
  - User error rate
  - Subjective user satisfaction
  - Ease of learning
  - Retention over time

# Interaction design

- Not about software!
- A user interface involves
  - Interaction component - “look and feel” and behavior
  - Interface software component - code that implements interaction component



# Misconceptions

- Usability is
  - “dummy proofing”
  - “doing usability” is just usability testing
  - about “user friendliness”
- Peanut butter theory of usability
- Priest in a parachute theory of usability

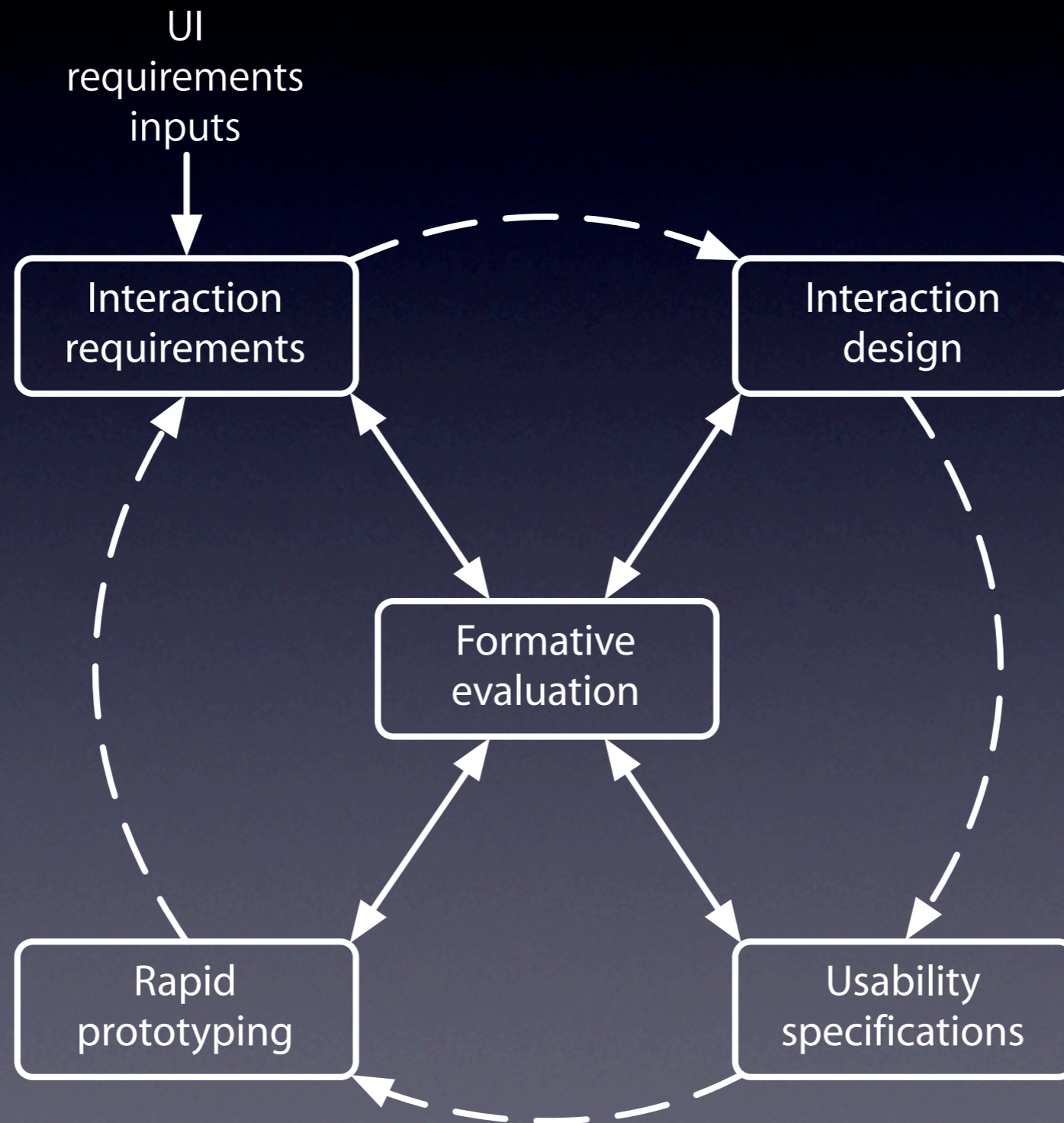
# Product and process

- Similar to software engineering, interaction design requires attention to
  - *product* - content, design principles and guidelines
  - *process* - usability engineering life cycles, methodologies

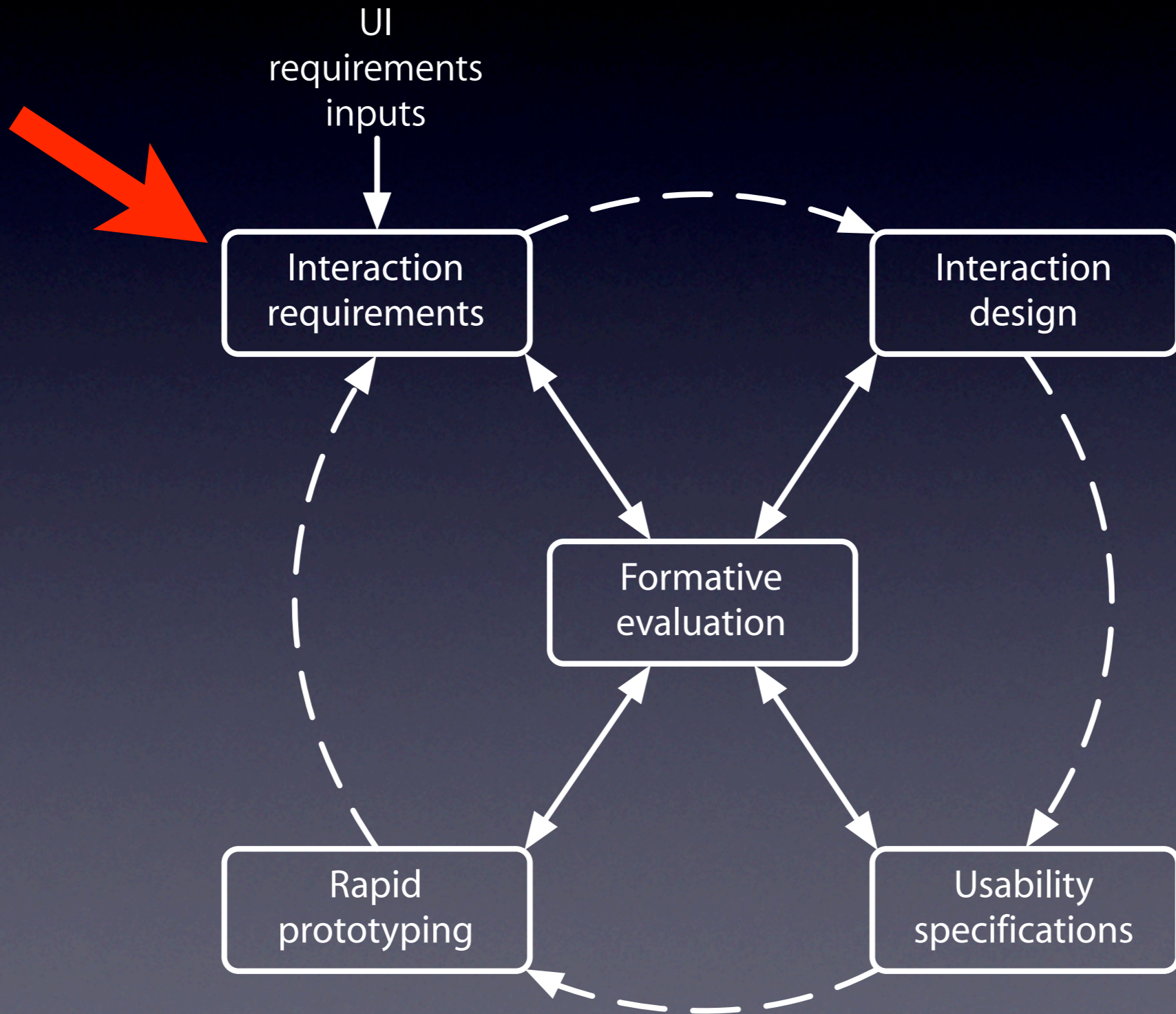
# SE and UE processes

- UE process iterates more often and at a lesser scope
  - It is not possible to get it right the first time
  - “Ready, Fire, Aim” approach
- SE process iterates too, but at a much larger scope

# UE life cycle

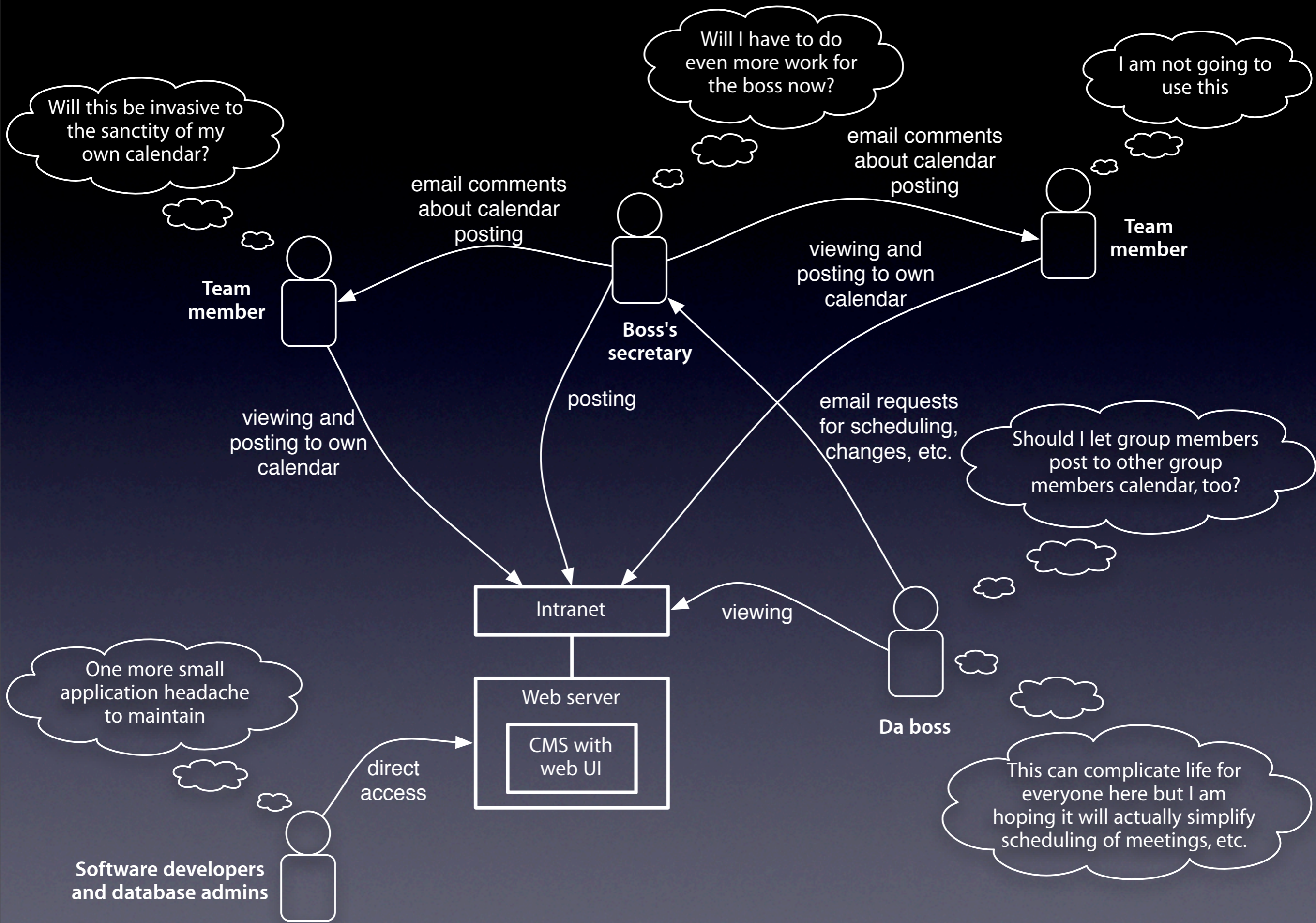


# UE life cycle



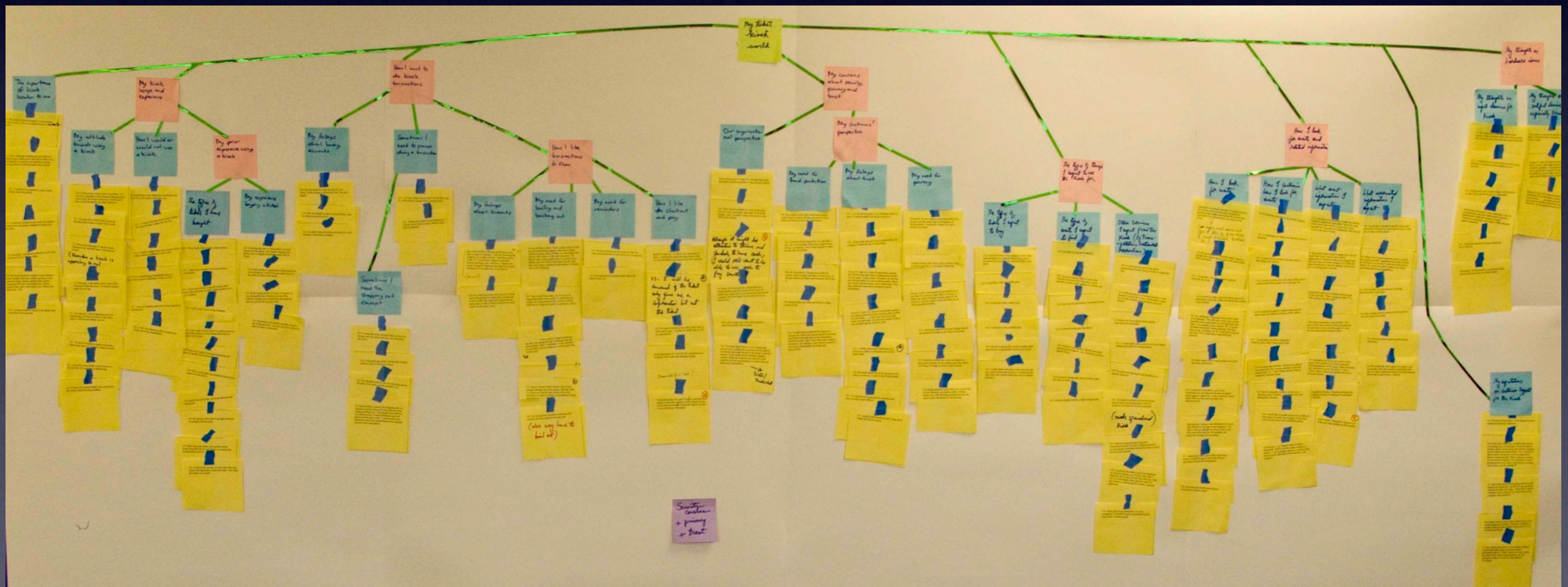
# Interaction requirements - I

- Ethnographic field studies
  - Contextual inquiry and analysis
  - Requirements engineering
- Product over view model
- Rich picture model (example)



# Interaction requirements -2

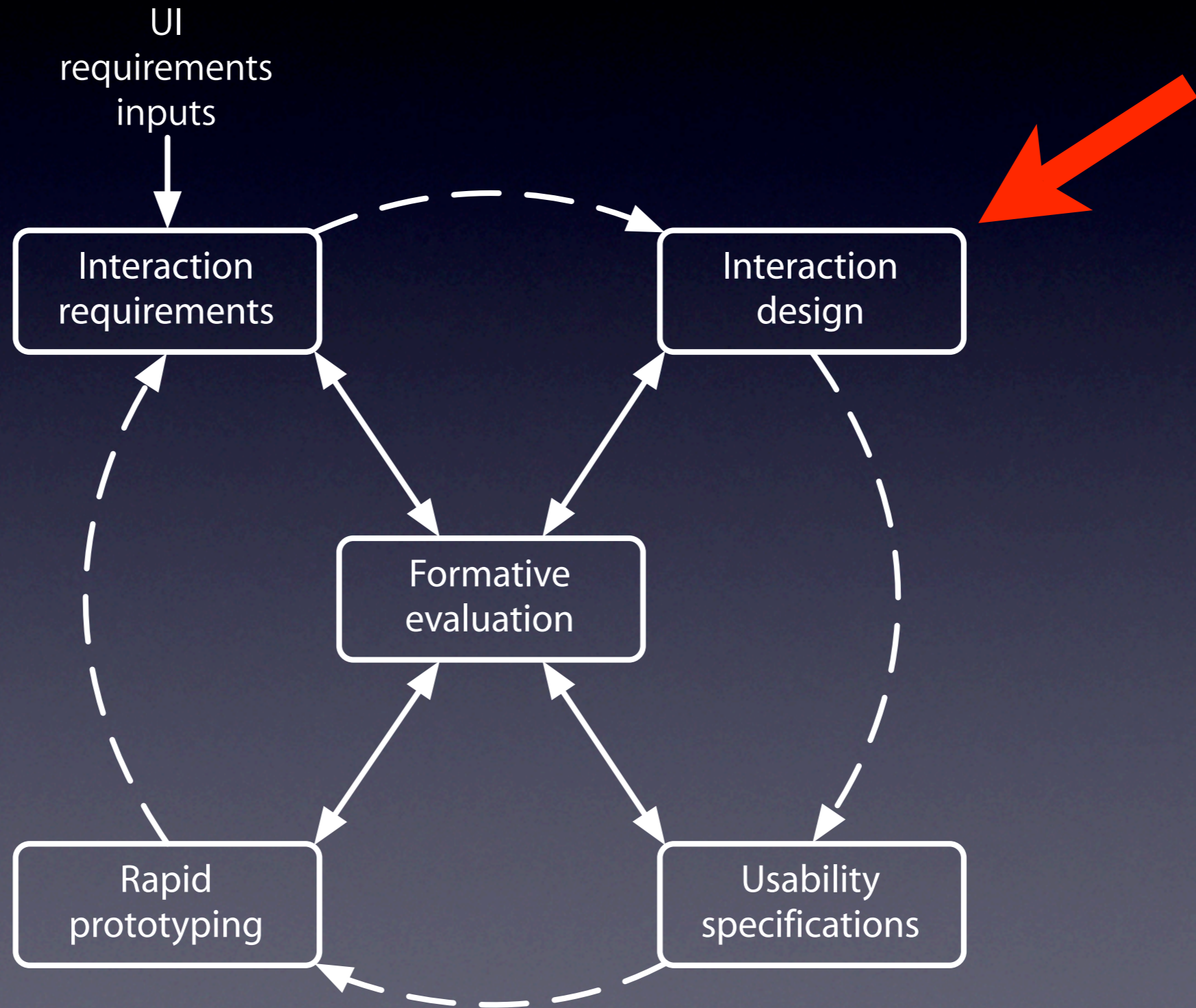
- Affinity diagramming



# Interaction requirements -3

- User classes and personas
- Task and work flow analysis
  - Note: task vs. function
- Usability goals

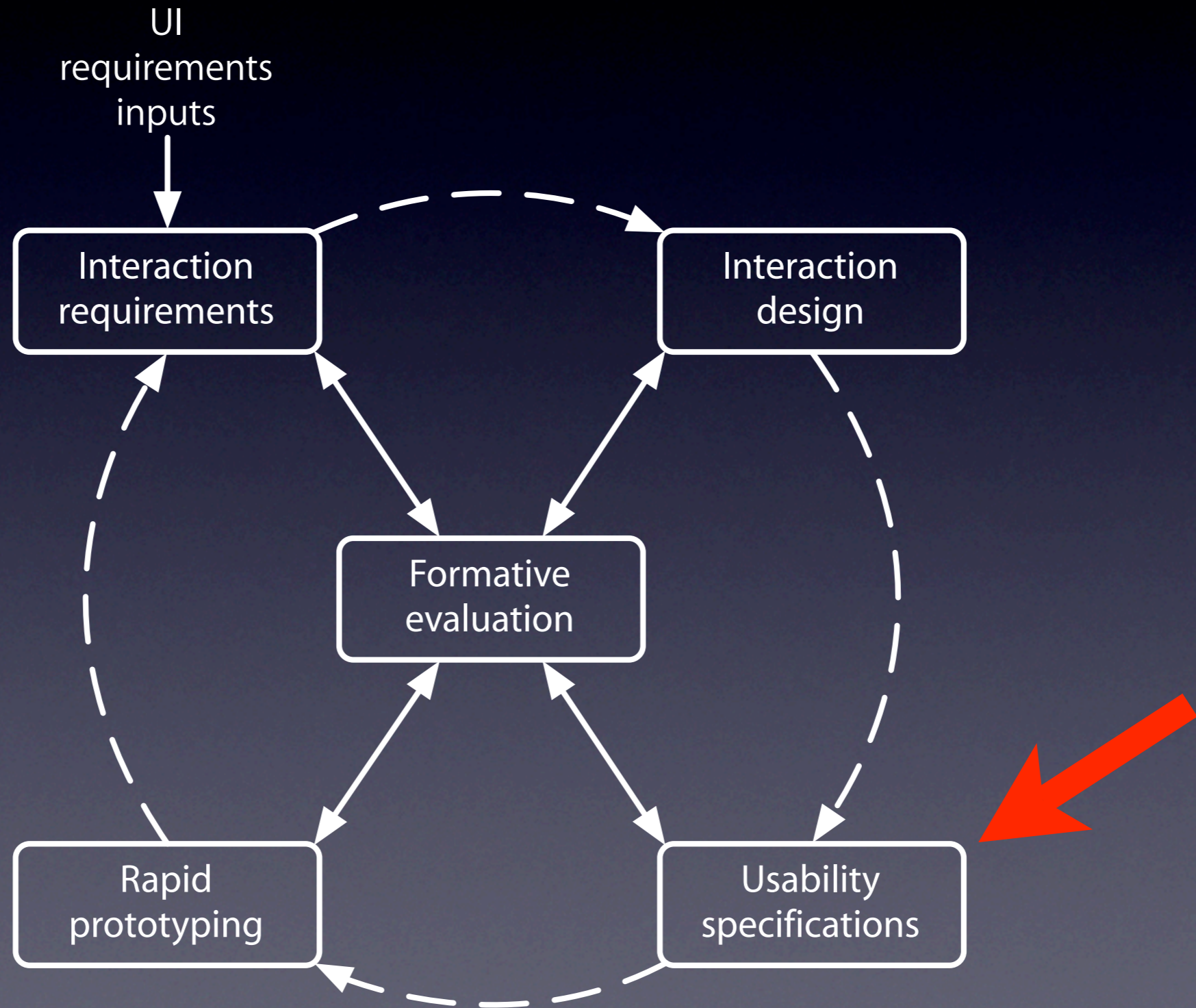
# UE life cycle



# Interaction design

- Usage scenarios
- Conceptual design
- Detailed screen design
- Participatory design
- Interaction flow maps, wireframes, story boards
- Custom style guides

# UE life cycle

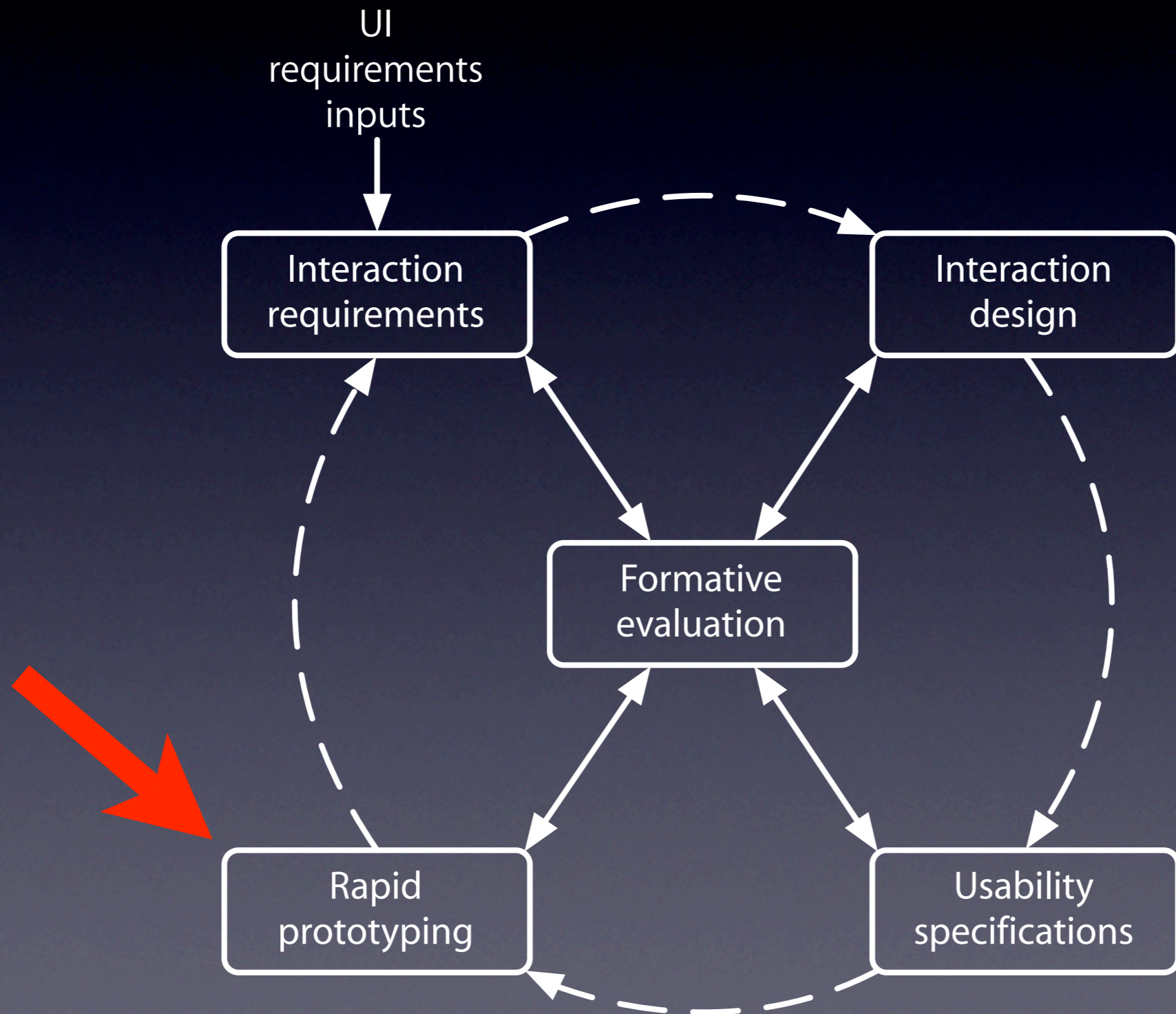


# Usability specifications

- Quantitative usability goals against which user interaction design is measured
- Target levels for usability attributes
  - metrics for interaction design

User class	Usability goal	Usability attribute	Measuring instrument	Value to be measured	Baseline level	Target level
Casual user, for personal use	Walk-up-and use for new user	Initial user performance	BT I:Add appointment	Average time on task	20 sec (current system)	15 sec
Casual user, for personal use	Customer satisfaction	Initial user satisfaction	Q1, Q2, Q7 in questionnaire	Average score over questions (out of 10)	7	8.5
Professional user, for work	Accuracy	Long term use	BT I:Add appointment	Average number of errors	2	0.5

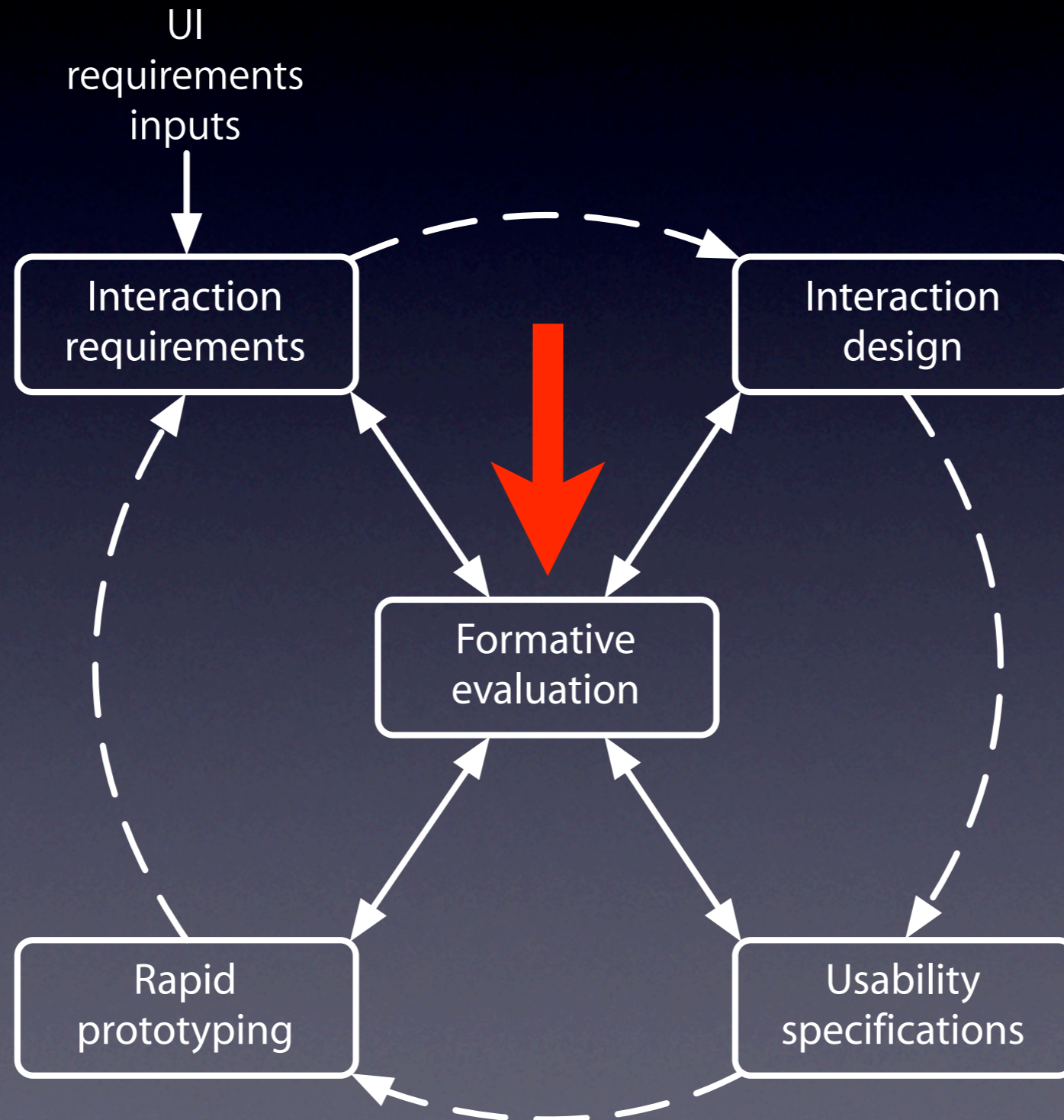
# UE life cycle



# Rapid prototyping

- Need something to evaluate before committing resources to build real thing
  - observe and study design consequences
- Lo-fidelity paper prototypes can evolve very quickly
- Computer-based prototypes can distract from usability focus early on


# UE life cycle



# Usability evaluation

- Formative evaluation
  - engineering, descriptive statistics
  - *The cook tastes the soup*
- Summative evaluation
  - science, inferential statistics
  - *The guests taste the soup*

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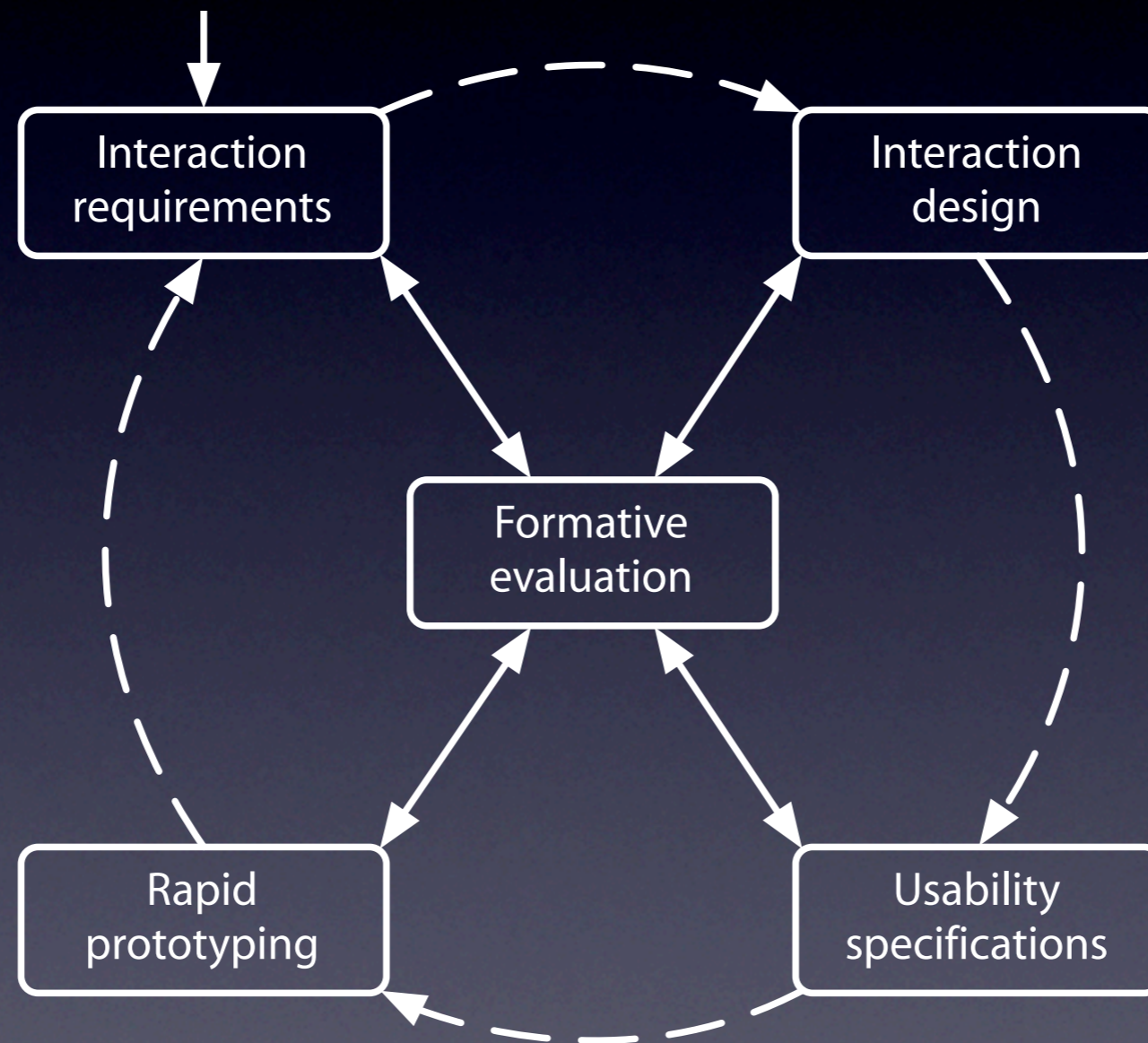
# Evaluation methods

- Lab-based testing
- Usability inspection (by experts)
- Design walkthroughs
- Field testing
  - Self-reporting, remote usability evaluation
  - Feedback from pro users (alpha and beta testing do not count)
- Lots of variations of these themes

# Lab-based testing

- Select representative users
- Qualitative data - to assess usability levels
  - BTs to generate time-on-task, error counts, ...
  - Subjective ratings
- Qualitative data - to identify usability problems
  - Verbal protocol taking
  - Critical incident capture
- Analyze usability data to get usability problem list

# Fix problems, iterate...



end