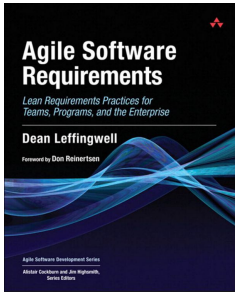
CE Department

Software Requirements Engineering

40688

These slides are designed to accompany Agile Software Requirements (2011) by Dean Leffingwell and support the university course Software Requirements Engineering, instructed by Mehran Rivadeh. Created and designed by Mahnaz Rasekhi.



Agile Software Requirements (2011)
Dean Leffingwell

Requirements Discovery ToolKit

Chapter 12

Mehran Rivadeh
mrivadeh@sharif.edu
Software Requirements Engineering
October 2025 - Fall 1404 - SUT

Contents

1. **The Requirements Workshop**

The Requirements Workshop

The workshop purpose is

- To drive **consensus on** the **requirements** of the **system** or application.
- To gain **rapid agreement** on a course of **action** from the **key stakeholders**, in a very **short time**.

Key stakeholders of the project are gathered together for a short, intensive period, typically no more than a day or two.

The **workshop** may be **facilitated** by

- A product owner
- Product Manager
- Team member
- Outside facilitator

The Requirements Workshop

Requirements Workshop Benefits

- ➔ It **forms** an **agreement** between the **stakeholders**, the **product owners**, and the **development team** as to **what the application must do**.
- ➔ It **assists** in building an **effective team** of these stakeholders, all **committed** to a **common vision**.
- ➔ All stakeholders get their say; no one is left out.
- ➔ It can **expose** and **resolve political issues** that may otherwise interfere with project success.

The Requirements Workshop

How To Plan And Run A Successful Requirements Workshop?

- Preparing for the workshop
- Setting the agenda
- Running the workshop

Contents

1. The Requirements Workshop
    a. **Preparing For The Workshop**
    b. Setting Agenda
    c. Running The Workshop

Preparing For The Workshop

1. Selling The Concept

- First, it may be necessary to sell the concept by **communicating** the **benefits** of the **workshop** to **prospective participants**.
- This is typically not a difficult process, but surprisingly it's not unusual to encounter resistance:
  - "We can't possibly get all these critical people together for one day."
  - "You'll never get [name your favorite stakeholder] to attend."
- Don't be discouraged; **if you hold it**, **they will come**.

Preparing For The Workshop

2. Ensuring The Participation of The Right Stakeholders

Identify the particular stakeholders who can contribute to the process and whose needs must be met in order to ensure a successful outcome.

- ➔ Who needs to **be consulted** on the **scope** of this **project**?
- ➔ Who has an **input** to the **budget**?
- ➔ Who can provide **guidance** on the **functionality** and required **qualities** of the new system?
- ➔ Who will **use** it?
- ➔ Who can **support** or **harm** this **project politically**?
- ➔ Who else could be **impacted by** the **new system**?

Preparing For The Workshop

3. Attending To Logistic

- A conscientious approach to logistics is necessary.
- Logistics involve everything from **reserving** proper **facilities** to **arranging travel** to **managing breaks** and **refreshments**.
- Murphy's law—"**Whatever can go wrong will go wrong**"—should be your guideline, because the **team may have only one chance to get it right**.
- If you approach logistics with a **high degree** of **professionalism**, it will be **obvious to** the **attendees** that **this is an important event**, and they will act accordingly. You'll also have a more successful workshop.

Preparing For The Workshop

4. Providing Warm-up Materials

- Send warm-up materials in advance to **prepare** the **attendees** and to **increase productivity** of the **actual session**.
- These materials **set** each **attendee's frame of mind** and context for the session.
- It is **recommend** that you provide two types of warm-up **materials**:
  - Project-specific information
  - Out-of-the-box thinking information

Preparing For The Workshop

4. Providing Warm-up Materials (Cont.) → **Project-specific information:**

- Lists of suggested features
- Results of interviews with prospective users
- Analysts' reports on trends in the industry
- Material from the product council (covered later)
- New management directives
- New marketing data, and so on.

➔ Although it's important not to bury the prospective attendees in data, it's also important to make sure they have context.

Preparing For The Workshop

4. Providing Warm-up Materials (Cont.) → Out-of-the-box thinking information:

- ➔ Thought-provoking and stimulating articles about the process of creativity
- ➔ Rules for brainstorming
- ➔ Requirements management
- ➔ Managing scope, and so on.

Preparing For The Workshop

4. Providing Warm-up Materials (Cont.)

➔ **Tip**

Do not send the data out too far in advance. You don’t want the attendees to read it and forget it, and you don’t want an extended planning cycle to decrease the sense of urgency. Send the data out anywhere from two days to one week in advance.

Preparing For The Workshop

5. Role of The Facilitator

- ➔ You may want to have the workshop run by an **outside facilitator**, one who has experience with the unique challenges and charged atmosphere of the requirements scoping process.
- ➔ However, **if** this is **not practical**, the workshop could be facilitated by the **product owner** or **other team member** if that person has the following characteristics:
  - Has solid consensus-building or team-building skills
  - Is personable and respected by the internal and external team members
  - Is strong enough to chair a challenging meeting

Preparing For The Workshop

5. Role of The Facilitator (Cont.)

Generally, however, if the **workshop** is to be **facilitated** by **a team member**, that person

- ➔ Should not contribute to the ideas and issues at the meeting. Otherwise, the workshop is in danger of losing the objectivity that is necessary to foster an open environment in which a new consensus can emerge.
- ➔ This can be especially challenging for a product owner, who, after all, is supposed to have strong opinions about what the system is supposed to do.
- ➔ In any case, the facilitator plays a pivotal role in making the workshop a success. After all, the team has all the key stakeholders gathered together, perhaps for the first and last time on the project, and they cannot afford a misfire.

Preparing For The Workshop

5. Role of The Facilitator (Cont.) → Responsibilities

- ➔ Establishing a professional and objective tone
- ➔ Starting and stopping the meeting on time
- ➔ Establishing and enforcing the meeting “rules”
- ➔ Introducing the goals and agenda
- ➔ Managing the meeting and keeping the team “on track”
- ➔ Facilitating decision and consensus making
- ➔ Managing any facilities and logistics issues to ensure that the focus remains on the agenda
- ➔ Making certain that all stakeholders participate and their input is heard
- ➔ Controlling disruptive or unproductive behavior

Contents

1. **The Requirements Workshop**

Setting Agenda

The agenda for the workshop will be based on the **length**, the **needs** of the particular project, and the **content** that needs to be developed.

Table 12–1 Sample Agenda for the Requirements Workshop

Time	Agenda Item	Description
8–8:30	Introduction	Review agenda, facilities, and rules.
8:30–10	Context	Present project status, market needs, results of user interviews, and so on.
10–12	Brainstorming	Brainstorm features of the application.
12–1	Lunch	(Some work though lunch to avoid loss of momentum. Other times a break is sorely needed.)
1–2	Brainstorming	Continue brainstorming.
2–3	Feature definition	Write two- or three-sentence definitions for features.
3–4	Idea reduction and prioritization	Consolidate and prioritize features.
4–5	Wrap-up	Summarize and assign action items; address "parking lot" items.

Contents

1. **The Requirements Workshop**

Running The Workshop

- These decision-making workshops are often characterized by a **highly charged atmosphere**.
- It can be difficult to get consensus, including differing opinions and expectations for the solution requirements and the impact on resources and budgets; nearly all these reasons will be present at the workshop.
- So, the **setting** may **be politically charged**, **confrontational**, or both.
- This is yet another reason for **having** a **facilitator** who is **not** a **team member**.
- Let the **facilitator take** the **heat** and **manage** the **meeting** so as **to not exacerbate any problems**—past, present, or future—among key stakeholders.

Running The Workshop

1. Brainstorming And Idea Reduction

- The most important part of the workshop is the brainstorming process.
- This technique is ideally suited for the workshop setting.
- It fosters a creative and positive atmosphere and gets input from all stakeholders.

Running The Workshop

2. Production And Follow-Up

- **After** the **workshop**, the **facilitator records conclusions** and **distributes** them after the meeting.
- Then the facilitator's job is over, and responsibility for success is again in the hands of the development team.
- Typically, it's the **product owner's job** to **follow up** on **any open action items** that were recorded at the meeting.
- Often, the **output** of the **meeting** will be a **simple list** of **ideas** or **suggested product features** that can be turned over to the development team for **user story development** and **implementation**.

Running The Workshop

2. Production And Follow-Up (Cont.)

- In some cases, additional workshops with other stakeholders will be scheduled, or additional research or other efforts will be necessary to gain a better understanding of the ideas fostered at the workshop.
- So far, we've primarily described the mechanics of the workshop, yet it is the creative part of the workshop that delivers the real value.
- There, new ideas are generated, and a clearer vision for the new project begins to emerge.

Contents

2. Brainstorming

a. Idea Generation

b. Idea Reduction

c. Idea Prioritization

Brainstorming

- Whether you are in the **workshop setting**, whether you are in an **informal setting** with some team members or stakeholders, or indeed whenever you find yourself **needing new ideas** or **creative solutions** to problems, **brainstorming** is a **simple**, **fun**, and **easy way** to **get stakeholders to contribute**.

Brainstorming

- In the requirements workshop setting, you probably already have a pretty good idea of the features of the new product.
- However, in addition to reviewing the suggested features for the product, the workshop provides the opportunity to solicit new input and to mutate and combine these new features with those already under consideration.
- This process will also help in the goal of “finding the undiscovered ruins” and thereby making sure that you have sufficient input and that all stakeholder needs are addressed, or at least understood.
- Typically, a major portion of the workshop is devoted to brainstorming new ideas and features for the application.

Brainstorming

Brainstorming Does The Following:

- ➔ Encourages participation by all parties present
- ➔ Allows participants to “piggyback” on one another’s ideas
- ➔ Has high bandwidth—many ideas can be generated in a short period
- ➔ Identifies multiple potential solutions to whatever problem is posed
- ➔ Encourages out-of-the-box thinking—unlimited by the usual constraints

Brainstorming

Brainstorming Has Two Phases:

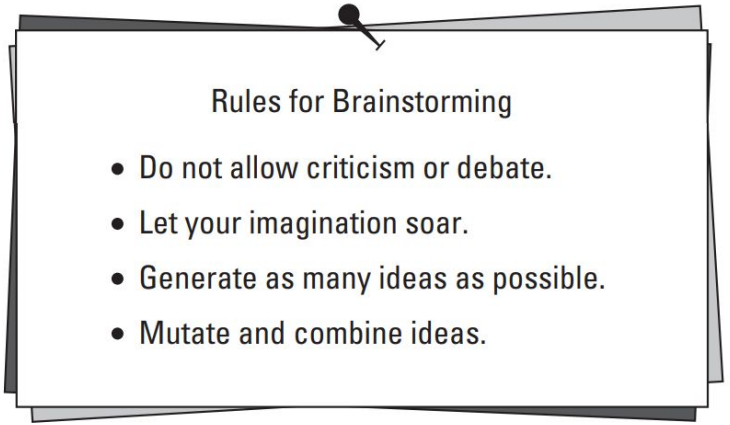
1. **Idea generation**
    a. Idea generation identifies as many ideas as possible, focusing on breadth of ideas, not depth.
2. **Idea reduction**
    a. The goal during idea reduction is to analyze and reduce the ideas generated.
    b. This includes pruning, organizing, ranking, expanding, grouping, refining, and so on.

Contents

2. Brainstorming

Idea Generation

- The first objective is the generation of as many ideas as possible in a short time frame.
- Typically, the facilitator first explains the rules for brainstorming.



Idea Generation

- The facilitator also explains the objective of the process.
- For example, the following questions may be used for this purpose.
  1. What features would you like to see in the product?
  2. What services should the product provide?
  3. What opportunities are we missing in the product or the market?

Idea Generation

- After stating the objective of the process, the **facilitator asks participants** to **share** their **ideas aloud** and to also **write them down**, one per card.
- **Ideas** are **spoken out loud** to enable others in the room to **piggyback on the ideas**, that is, to think of related ideas and to **mutate** and **combine ideas**.
- In this process, however, **the first rule—no criticism or debate**—must be foremost. If this rule is not enforced, the process will be squelched, and people who are sensitive to criticism may not feel comfortable putting forth more ideas.

Idea Generation

Tip

- In our experience, **the most creative** and **innovative ideas** (those that truly revolutionized the product concept) did not result from any one person's idea but, instead, **from** the **combination** of **multiple** and **perhaps** even seemingly **unrelated ideas**.
- Any process that fosters these types of breakthroughs in ideation is a worthy process.

Idea Generation

- As ideas are generated, the facilitator collects them and posts them on a wall.
- Idea generation should proceed until all parties feel it has reached a natural end.
- It is common for lulls to occur during idea generation. These are not necessarily times to stop the process. Lulls tend to correct themselves as soon as the next idea is generated. Longer lulls might be cause for the facilitator to state the objective again or to ask stimulating questions.

Idea Generation

- Most idea generation sessions last around **an** hour, but some last **two** to **three hours**.
- The number of ideas generated will be a function of how fertile the subject being discussed is, but it is common to **generate 50** to **100 ideas**.
- The process tends to **have a natural end**; at some point, the stakeholders will simply run out of ideas. This is typified by longer and longer gaps between idea submissions. At this point, the facilitator ends that portion of the session.

Contents

2. Brainstorming

Idea Reduction

- Of course, not all ideas are worthy of consideration for the solution.
- If they were, the idea generation process was deficient.
- When the idea generation phase ends with a sufficiently large number of ideas, it is time to initiate idea reduction and to bring focus on a set of ideas that can drive the next increment of solution development.
- Several steps are involved in idea reduction.
  - Pruning Ideas
  - Grouping Ideas
  - Defining Features

Contents

2. **Brainstorming**

Idea Prioritization

- Cumulative Voting: The $100 Test
- “Critical, Important, Useful” Categorization

Online Brainstorming

Contents

3. Interview

Interview

- Another requirements-gathering technique is the user/stakeholder interview, a simple and direct technique that can be used in virtually every situation.
- One of the **key goals** of **interviewing** is **to make sure** that the **biases** and **predispositions** of the **interviewer** do not **interfere with** a **free exchange** of **information**.
- This is a subtle and pernicious problem. Sociology (a class most of our developers missed) teaches us that it is extremely difficult to truly understand others because we are all biased by our own conceptual filter, one that results from our own environment and cumulative experiences.

Interview

Context-Free Questions

- **How do we avoid prejudicing the user's responses to our questions?** We do so by asking questions about the nature of the user's problem without context for a potential solution.
- Examples of such questions include the following:
  - Who is the user?
  - Who is the customer?
  - Are their needs different?
  - What other stakeholders will be impacted by this product or project?
  - Where else can a solution to this problem be found?

Interview

Solutions-Context Questions

- After the context-free questions have been asked and answered, it may be appropriate to begin exploring solutions.
- After all, we are not generally rewarded for simply understanding the problem but rather for providing solutions.
- The solution context may also give the interviewee new insights. And, of course, our users depend on us to have context; otherwise, they would have to teach us everything they know about the subject.

Interview

Solutions-Context Questions (Cont.)

- As an aid to building this skill within the development team, we have combined these techniques into a “generic, almost context-free interview,” a structured interview that can be used to elicit user or stakeholder requirements.
- Appendix A in book provides the template for this interview.
- The interview consists of both context-free and context-rich sections.
- It also provides questions designed to make certain that all aspects of requirements, including nonfunctional requirements, such as usability, reliability, supportability, and so on, are explored.

Interview

The Moment of The Interview

With a little preparation and the structured interview template, the product owner (or any other member of the team) can do an adequate job of interviewing a user or customer. Here are some tips for a successful interview.

- ➔ Prepare an appropriate context-free interview.
- ➔ Understand the background of the stakeholder to be interviewed.
- ➔ During the interview, jot down answers in your notebook (don’t attempt to capture the data electronically at this time).
- ➔ Refer to the template during the interview to make certain you’re asking the right questions and that you have covered all you intended.

Interview

The Moment of The Interview (Cont.)

- Make sure that the script is not overly constraining.
- Once rapport has been established, the interview is likely to take on a life of its own.
- The customer may well launch into a stream-of-consciousness dialogue, describing in detail the horrors of the current situation.
  - This is exactly the behavior you are looking for.
  - If this happens, do not cut it off prematurely with another question; rather, write down everything as quickly as you can, letting the user exhaust that particular stream of thought.
  - Ask follow-up questions about the information that has just been provided.
  - Then, after this thread has run to its logical end, get back to other questions on the list.

Interview

The Moment of The Interview (Cont.)

- After even a couple of such interviews, the product owner/developer/analyst will have gained some **knowledge** of the **problem domain** and will have an enhanced understanding of both the **problem being solved** and the **user's insights** on the **characteristics** of a **successful solution**.

Interview

The Analyst's Summary

- The Analyst's Summary is used for **recording** the **three most important needs** or **problems uncovered** in the interview.
- In many cases, after just a few interviews, these **highest-priority needs will start to be repeated**.
- This means you may be starting to **get convergence on** some **common needs**.
- This is the **start** of your **feature backlog**, a set of assets you will build and use to good advantage over the course of your project.

Contents

4. User Experience Mock-Ups

User Experience Mock-Ups

- Developing user experience interfaces in agile is always a challenge.
- In some ways, **agile makes it easier**; teams have lots of chances at it, iteration by iteration.
- But in other ways, **agile makes it harder** because it's unlikely that much big, up-front design (BUFD) has happened.
- So, **all** the **aspects** of the **presentations**, **dialogues**, and **flows** that **make** a **user interface** easy to navigate are likely to be **largely unexplored prior to beginning implementation**.
- That can make for a lot of **churn**—and **real frustration often results**.

User Experience Mock-Ups

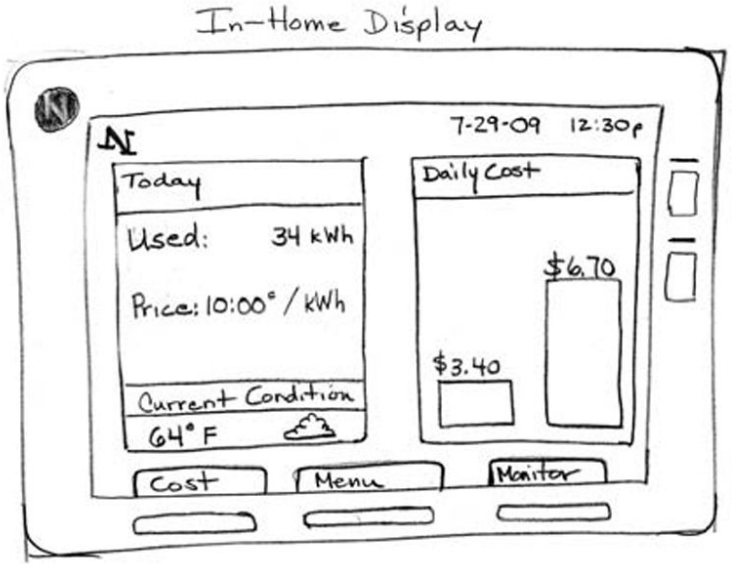
- The lighter the representation, the quicker the feedback, and the lower the churn in code.

Let’s look at some lighter-weight approaches to defining user interfaces here.

- “A picture is worth a thousand words”
- A soft and fuzzy, easy-to change drawing or mock-up is an early and effective means of communicating elements of user presentation.
- Mock-ups can cover a wide spectrum of techniques and sophistication.

User Experience Mock-Ups

- At the low end, we can simply make a quick pencil sketch of what we want.



User Experience Mock-Ups

- A step up from there is to use a simple drawing tool to illustrate preliminary page design and also flow between pages.
- A further step up in sophistication is the use of tools to create wireframe models of the desired story.
- Wireframes usually start as a static drawing using any number of drawing tools, like we illustrated in Figure 12–3.
- Once the general shape of the story begins to jell, it is helpful to animate the model to illustrate the important interactions with the user.

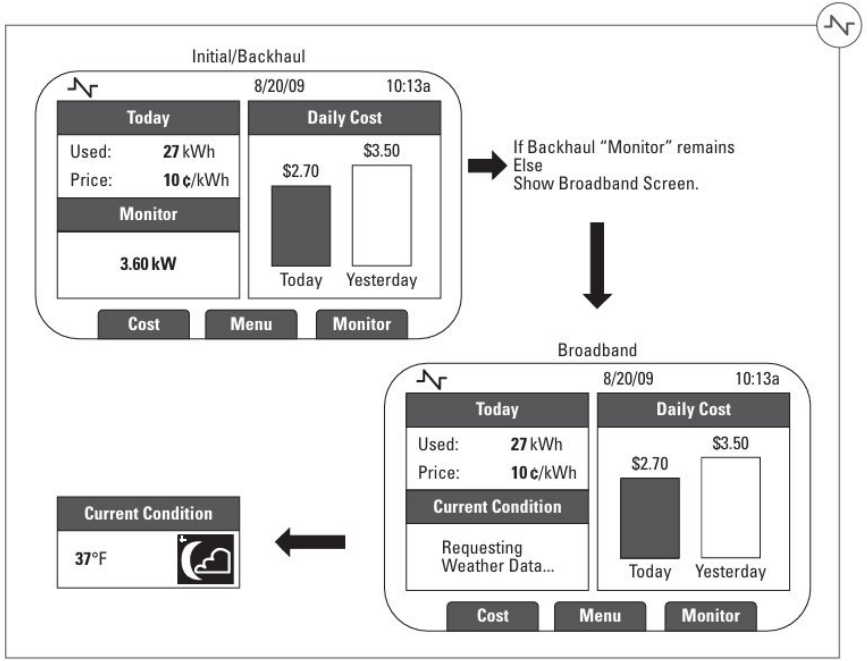
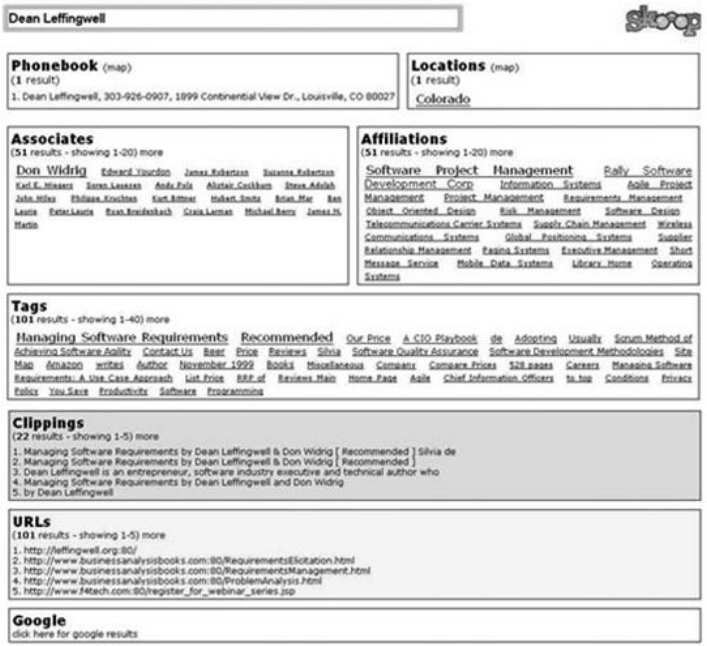


Figure 12–3 Preliminary flow design

User Experience Mock-Ups

- The figure illustrates a wireframe model for a fairly complex web interface.
- This model was animated in HTML so it was interactive with the user.
- This gives a semblance of life to the UI and the users' interaction, all before the code was cut.



Contents

5. **Forming A Product Council**

Forming A Product Council

- Sometimes the real challenge isn't coming up with new ideas, but figuring out which existing tasks or projects should come first.
- In the next chapter, we'll provide concrete suggestions for **prioritizing features** based on the **cost of implementation** and **the cost of delay**.
- Even that method, however, doesn't necessarily tell a product owner:
  - Which business segments deserve the most attention from limited IT resources?
  - How to align a diverse set of stakeholders around an agreement to a common set of objectives?

Forming A Product Council

- Often, the product owner is in a tough situation.
- It all can't be done, but each executive stakeholder thinks their stuff should (or must) be done.
- So, any decision the product owner makes is likely to be criticized, and some of the executives carry a pretty heavy club with their criticism.
- It can be a hazardous job.

In these cases, we recommend that **the product owner organize a product council**, which is empowered to act as the approval body on the key decisions.

Forming A Product Council

- The product council should consist of the key stakeholders in the enterprise or business unit.
- If the constitution of the group is not obvious, the product owner may need to do a stakeholder analysis.
- Example: in one IT shop that served a large retail organization, a product council may include:
  - Representatives from each line of business
  - The CFO, A CTO
  - A few enterprise business analysts
  - The most senior development manager.
- This group meets periodically to review the backlog of projects and decide what projects get funded and how many resources they deserve.

Contents

6. Competitive Analysis

Competitive Analysis

- Product companies always face the question:

  Who is our competition?

  What features are they offering?

- It is possible to hire **market survey companies** that will **research a domain** and **produce reports outlining prospective benefits** of **a product proposition**.

- But most companies do their own competitive analysis; that way, they gain the knowledge directly, and it helps create **their own distinctive competence** over time.

Competitive Analysis

In its simplest form, a competitive analysis consists of the following:

- Refining the domain of interest/product category
- Identifying competitors
- Studying competitive offerings
- Preparing an analysis of the finding for evaluation

Competitive Analysis

Table 12–2 A Sample Competitive Analysis Comparison Matrix

Product	Web Approach	Content Transparency	Page Commenting	"Stumbling"
Our product plans	Collects every page visited.	Toolbar tags give "flavor" of a page; embedded tags in search pages allow users to jump to selected pages.	Instant messaging, "sticky notes" on pages	Based on similar useful pages.
Search Engines				
Google, MSN, Yahoo	Finds "all" pages based on search.	Short abstract of discovered pages.	None	The user must supply topic.
Social Networks				
YouLicit	The user must bookmark page.	Poor.	None	Based on similar pages.
StumbleUpon	The user must bookmark page.	Embedded categories (not actually a tag); rating into Google search pages.	Offline comments	Stumbling on category of interest.
Del.icio.us	The user must bookmark page.	Click bookmark button to see community tags.	Offline comments	No.
Yoono	The user must bookmark page.	No tagging.	None	User-suggested links.

Competitive Analysis

In more complete analyses, such as those generated using the technique of **Quality Function Deployment**.

- ➔ Analysts assign weights to each of the features.
- ➔ Assign numerical values to each competitor's features.
- ➔ Sum the weighted values to figure out which features provide the best competitive differentiation.

Contents

7. Customer Change Request System

Customer Change Request System

- As our industry has matured and our users' online access has become ubiquitous, our **customer's expectations** for **direct** and **unfiltered input have grown** as well.
- To this end, many companies maintain **a customer-facing enhancement request system** for just this purpose.
- For example, Rally Software provides one such system.

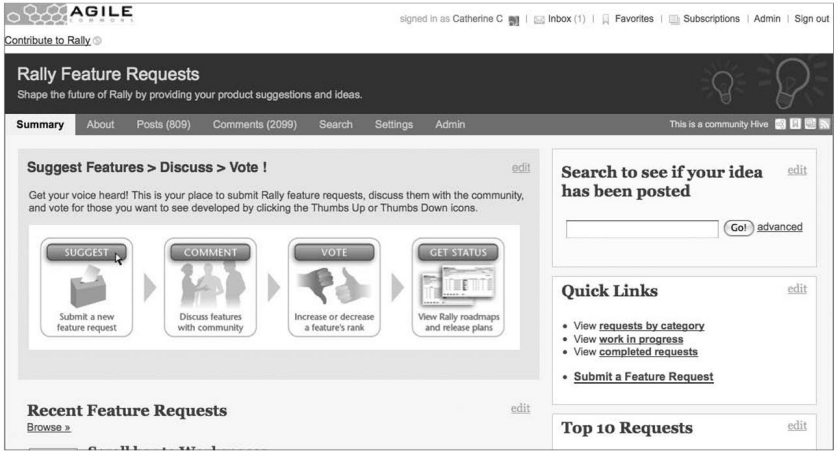


Figure 12–5 Example customer-facing feature request system

Customer Change Request System

Defect Logs

- lest we forget, defect logs provide **a rich source of product requirements**, because typically many of the reported “defects” are really enhancement requests.
- A **high number of enhancement requests for a particular capability item** is a relatively **unbiased form** of **prioritization** (at least from the perspective of existing customers).

Contents

8. **Use-Case Modeling**

Use-Case Modeling

User Stories

- The primary technique used by agile teams to understand and communicate customer requirements.
- It's certainly a handy construct.
- Small user stories help us drive the extreme instrumentalism that characterizes agile development.

What about systems of complexity and serious scale?

- Systems that are composed of other systems.
- Systems that contain hardware devices and software components.
- Suites of applications that work together to provide even higher value to the user.

Use-Case Modeling

- Here, **neither features nor user stories** are sufficiently **capable constructs** to describe this complex, aggregate behavior.
- For these systems, we need a construct that describes the **interplay among the actors** (users, devices, subsystems) and **the various systems** that **work together** to deliver this behavior.
- Here we suggest **applying use cases** and **use case modeling** as a primary requirements discovery technique.

End of Chapter 12

Contributions

- Author of Reference Book: **Dean Leffingwell**
- Course Instructor: **Mehran Rivadeh**
- Slide Creator: **Mahnaz Rasekhi**
  - These slides are primarily based on Agile Software Requirements by Dean Leffingwell, with occasional adaptations to enhance clarity and engagement.