24. Models and Measures of Quality

19 November 2008
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Plan for ISSD Lecture #24

Service {and, or, vs} Product Quality
Quality in "Service Systems"
Quality of "Experiences"
Quality and "Consumability"
Quality & Usability of Information Systems
Poor Quality Service

Vincent Ferrari tries to cancel his AOL account

http://consumerist.com/consumer/top/the-best-thing-we-have-ever-posted:-reader

Three Aspects of Quality

Doing the right things -- requirements and design
Doing things right -- deployment and delivery
Keep doing the right things over time, fix things that go wrong
Service Quality \{and, or, vs\} Product Quality

Much of the thinking about service quality is an extension and contrast to that for product quality

- "Objective" product quality dimensions include features, performance, durability, reliability, conformance, and serviceability
- More "subjective" product quality dimensions include aesthetics and the perceived quality of "brand image"

Even for the objective dimensions where quality can be unambiguously measured, their priority can differ for different people and in different contexts

Service Quality is Like Product Quality, Sort Of

Some of the product quality dimensions can be measured and "objectified" when they are applied to services:

- Reliability of the service outcome
- Responsiveness has some similarity to product performance

But others can be applied mostly by analogy

- Physical characteristics of the environment in which the service is provided and any tangible evidence of the service are analogous to the features and (to some extent) aesthetics dimensions for products
- A service might conform to process standards, and a service provider might have to conform to professional or educational standards, certifications, or similar requirements that suggest some assurances of service quality
Service Quality Isn't Like Product Quality

The empathy of the service provider toward the customer is important in service providers, but there's no analogy for product quality (are robots the exception that proves the rule?)

And the more subjective dimensions of product and service quality may neither be understood nor valued in the same way by different people

- *De gustibus non est disputandum*
- *Chacun à son goût*

Quality in "Service Systems"

There may be one or more “moments of truth” or "encounters" in which the quality of a service experience becomes apparent, but that quality is enabled or constrained by many interrelated sub-systems or services

So we need to take a comprehensive and "end-to-end" view of how a service is defined and delivered

This end-to-end view shows that many of the key determinants of quality are invisible to the customer, and some of them are even invisible to the people delivering or "co-producing" the service
What Determines the Quality of the "Hotel Check-In" Service?

Your interaction with the person at the reception desk - Employee to Customer

Or, alternatively, your interaction with a "self-service" check-in application - Business to Customer Self-Service

The reception person's interaction with the hotel's information systems - Business to Employee

Interactions between the hotel's information systems and other information systems - Business to Business

The Hotel Service System - 4 Interconnected Interactions
This notion that quality is a property of the entire service system and not just the last service encounter is similar to that embodied in the "quality movement" and statistical process control for industrial processes (Deming, Juran, etc.)

Their central idea is that quality can’t be “tested in” by inspecting the final products Instead, quality is achieved through process control -- measuring and removing the variability of every process needed to create the products

For services delivered and consumed by people, the system for quality is usually manifested in the idea that every participant understands the "big picture" so they can make the right decisions and align their efforts to make the best use of every other member of the service system

The quality of even the most highly experiential services can be enabled or constrained by back stage processes invisible to the service customer
Juran's Categories of "Quality Costs"

In 1951 Joseph Juran published the *Quality Control Handbook* that outlined the "cost of quality" framework as a management guide for determining how much to spend on quality at any point in the "quality system".

Juran says the costs of preventing and finding quality problems...

- Prevention costs (design reviews, training, guidelines, knowledge...)
- Appraisal costs (tests, process control measurements, reports, evaluations,...)

... must be balanced against the costs associated with those quality problems:

- Internal failure costs (costs incurred before the product or service is delivered: scrap, rework, lost time, unused capacity, ...)
- External failure costs (cost incurred when quality problems reach customers: returns, recalls, complaints, field services, warranty repairs, liability lawsuits,...)

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Investing in Prevention

![Diagram showing the relationship between prevention costs and failure costs, with an emphasis on the importance of investing in prevention to minimize total costs of nonconformance.]
Quality Drivers in the Back Stage

- Methods, work instructions
- Parts and raw materials
- Machines and equipment
- Operator discipline, skills
- Environment
- Final characteristics of product

Quality Drivers in the Front Stage

- Technical process task
- Supplied goods or information
- Facility, equipment environment
- Customer participation (behavior/attitude)
- Employee participation (behavior/attitude)
- Screening of customers
- Result/Outcome
Quality of "Experiences"

The highly subjective nature of most dimensions of service quality means that it is most sensible to use customer-centered measures.

Quality is defined as the difference between the level or nature of service that the customer expected and the level or nature that the customer perceives.

This "gap" can be positive or negative, but "service science" tends to focus on detecting, remedying, and preventing negative ones where perceived quality was less than expected.

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The Service Triangle as a Quality Framework

![Service Triangle Diagram]

- **Firm**
  - Service marketing
    - Service features and outcome
    - Positioning and pricing
    - Mass communication and branding

- **Frontline employee**

- **Customer**
  - Sales and relationship marketing

- **Internal marketing**
The Service-Profit Chain As a Quality Framework

Service Quality Gap Model (Zeithami, Berry, & Parasuraman)
"Consumability" as Quality

O-i SD introduces the concept of "consumability" to augment traditional notions of quality.

"Consumability" measures the ease with which a customer/user gets the value from a product, system, or service (see "Out of the box" experience).

A highly consumable product or service has a short "time to value".

Meta-tasks" that must be carried out before any value can be gained reduce consumability.

"Consumability" implies a system and end-to-end perspective, and includes both experiential considerations and more traditional measures of quality -- but from the customer's point of view.

Meta-tasks between As-Is and To-Be

Meta-tasks may interfere with achieving the to-be state.
Metatask: Getting it Out of the Box

Packages You Won’t Need a Saw to Open

For software:

- Planning
- Installation, Configuration, Integration
- Training, Operations
- Problem reporting, Applying fixes, Upgrading
- ...

For a high-definition TV?

For obtaining specialty medical treatment?
Consumability Profile -- Compared to Competition

Consumability Assessment against Competitor

Consumability and Priority in Project Planning / Investment
Quality of Information Systems

Quality and the Design Lifecycle [1]
Quality and the Design Lifecycle [2]

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<thead>
<tr>
<th>Evaluation method</th>
<th>Requirement analysis</th>
<th>Design</th>
<th>Code</th>
<th>Test</th>
<th>Deployment</th>
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<td>Scenario based checklists</td>
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<td>Thinking-aloud protocol</td>
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<td>Logging actual use</td>
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Definitions of Usability

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<tbody>
<tr>
<td>User performance (objective)</td>
<td>Learnability—time to learn</td>
<td>Learnability—memorability</td>
<td>Learnability</td>
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<td>Learnability—retention</td>
<td>Learnability—errors</td>
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<td>Effectiveness—errors</td>
<td>Effectiveness—efficiency</td>
<td>Operability</td>
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<td>Effectiveness—task time</td>
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<td>Understandability</td>
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User view (subjective)

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<td>Attitude</td>
<td>Satisfaction</td>
<td>Satisfaction</td>
<td>Attractiveness</td>
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### Usability Techniques

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<th>Inspection Methods</th>
<th>Test Methods</th>
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<td>Heuristic Evaluation</td>
<td>Cognitive Walkthrough</td>
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<tr>
<td>Applicability</td>
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<td>all</td>
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<td>Required Time</td>
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<td>medium</td>
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<tr>
<td>Needed Users</td>
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<td>none</td>
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<tr>
<td>Required Evaluators</td>
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<td>3+</td>
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<tr>
<td>Required Equipment</td>
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<td>low</td>
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<tr>
<td>Required Expertise</td>
<td>medium</td>
<td>high</td>
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<tr>
<td>Intrusive</td>
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### Usability Through Iteration

![Usability Through Iteration Diagram](image)
Iteration and "Local Optimization"

The design changes from one iteration to the next are often motivated by specific features or functions that caused used difficulties or otherwise failed to meet expectations.

This specificity focuses the design/redesign activity on alternatives in the "neighborhood" of the current design.

It makes it unlikely that radical design ideas will be considered, even though they might be significantly better.

So the best solution that can be developed is the "locally optimal" one, which makes the starting point critical in retrospect, even though it might have been arbitrary or accidental.

Local Optimization

"Local optimization" results whenever the search for a better solution is limited to "nearby" alternatives in the design space.
Readings for 24 November


[READ] Andrew N. Hiles, “Service level agreements: Panacea or pain?”