

Functional Fixation as a Critical Barrier to Effective Design and Implementation of Information Systems

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A Classical Problem in Information Systems Research:

- Why information system developers cannot meet users' needs and requirements?

Typical Explanations:

- IS workers think differently than users
- IS workers refuse to see things from the user's perspective
- Users don't know what they need
- Users are resistant to changes

Why can't the two sides close this gap?

Implicit underlying assumptions:

1. People are not willing to accept change
2. There are only two opposing sides

However, these assumptions do not adequately explain the gaps between the developers and the users

Another Explanation: (Theory of Bounded Rationality)

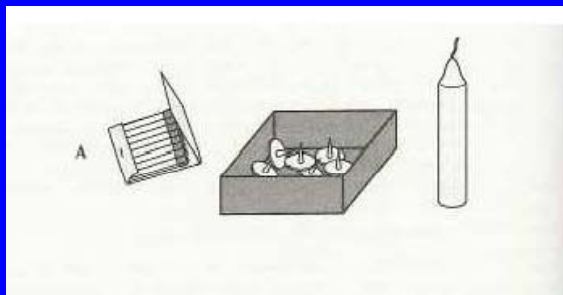
- Functional fixedness as constraints that create serious problem solving barriers for both developers and users.

What is Functional Fixedness?

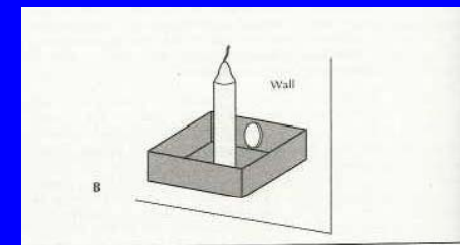
Based on Gestalt Psychology: Functional fixedness may be defined as a "mental block against using an object in a new way that is required to solve a problem." Karl Duncker (1945)

Classic Candle Box Experiment that Illustrates Functional Fixedness

In a classic experiment demonstrating functional fixedness, Duncker (1945) gave participants a candle, a box of nails, and several other objects, and asked them to attach the candle to the wall so that it did not drip onto the table below.



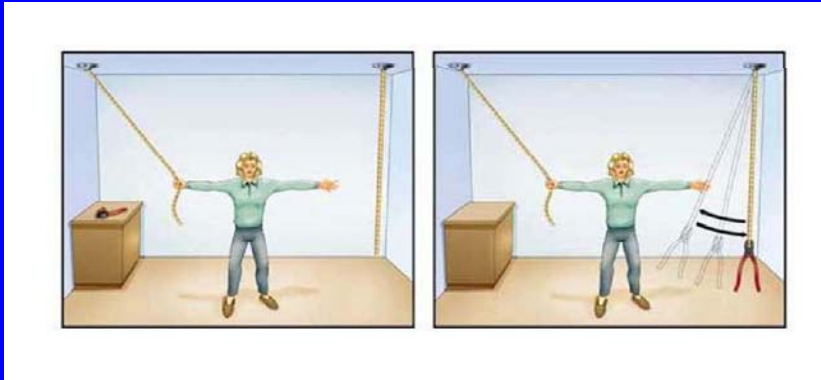
Classic Candle Box Experiment that Illustrates Functional Fixedness



Duncker found that participants tried to nail the candle directly to the wall or to glue it to the wall by melting it. Very few of them thought of using the inside of the nail box as a candle-holder and nailing this to the wall. In Duncker's terms the participants were "fixated" on the box's normal function of holding nails and could not re-conceptualise it in a manner that allowed them to solve the problem.

Classic Two-Strings Experiment that Illustrates Functional Fixedness

Maier (1930, 1931), Birch and Rabinowitz (1951)



Functional Fixedness as Constraints for Daily Decisionmaking: Walking vs Taking Public Transportation

1. Shanghai: Walking from the Bund to YuYuan Garden
2. Boston: Walking from downtown to Boston Garden

Functional Fixedness as Constraints for Technical Problem Solving and Technology Adoption: Robotic Applications

Differences between views of robots by US vs Japanese managers and engineers (Whitney, HBR 1986)

Functional Fixedness as Constraints for Software Engineers and Programmers

Software engineers do not easily see opportunities to reuse existing components because they are “functionally fixed on designs (Latour and Dusiak, 2007)

Functional Fixedness as Constraints for Management Information Systems

- Interpretation of a managerial problem by managers from several different functions (Simon)
- Interpretation of accounting information after a change in the accounting standard or process (Jaedicke and knight, 1966; Ashton, 1976)

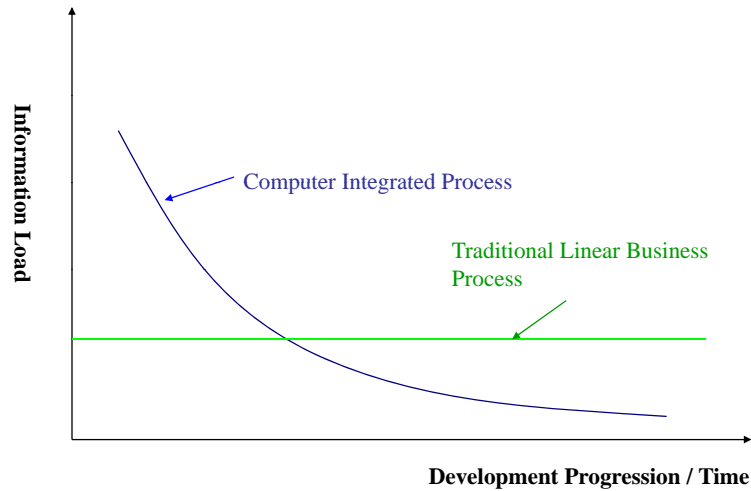
Typical Problem Solving Gaps Between IT/IS Developers and Users

- Developers: Functionally fixed on technology means and capabilities
- Users: Functionally fixed on meeting immediate or short-term application needs

Typical Problem Solving Gaps Among Users in an Computer Integrated System: Inability to See the Whole Picture

Fable of the Four Blind Men and the Elephant

Typical Problem Solving Gaps Among Users: Information Processing Challenges of a Computer Integrated System



Information Load: Computer Integrated Process vs. Traditional Linear Business Process

Strategies For Overcoming Functional Fixedness in IT/IS Development and Design

1. Uncommitting/unfreezing

Approaches: Challenge assumptions, make implications explicit, make analogies explicit

Strategies For Overcoming Functional Fixedness in IT/IS Development and Design

2. Focus on end objectives rather than changes to existing means of problem solving

Approaches: Examination of desired end results, prototyping for sharing of vision, collecting objective data on user experience.

Strategies For Overcoming Functional Fixedness in IT/IS Development and Design

3. Knowledge Sharing

Approaches: Cross-functional teams, co-location, job rotation