everything you wanted to know about software but were afraid to ask

Daniel Jackson · Leading Jewish Minds · May 12, 2022
part 1: how did we get here?
from word star (1978)... 

QUANTUM NIGHT

By Hugo and Nebula Award-winner ROBERT J. SAWYER

"A really good book. Just the sort of science fiction I'd like to be writing myself if I had the time."

--John Gribbin, author of In Search of Schrödinger's Cat

I beheld the monster.
One of them, anyway. There were six according to the indictments; nine, if you believed the Huffington Post, which argued that three other corrections officers who should also have been charged had gotten off scot-free. But this one, everyone agreed, had been the ringleader: Devin Becker was the man who had incited the other guards -- and he was the only one who had actually killed somebody.

"Thirty minutes," said a burly sergeant as Becker folded his lanky form onto the metal seat. The irony wasn't lost on me: Becker himself was now in the care of a prison guard. Quis custodiet ipsos custodes? Who indeed watches the watchers?

Becker had high cheekbones, and the weight he'd lost since the notorious video had been recorded made them even more prominent. That the skin pulled taut across them was bone white only added to the ghastly appearance; put a black hood over his head and he could have played chess for a man's soul.
Facebook’s Dark Design: It’s Not Just the Algorithms

In the midst of our current debate about Facebook, have we ignored a core issue? Public scrutiny has focused almost entirely on the company and its practices. Congressional testimony of a whistle-blower earlier this fall—and the Wall Street Journal’s continuing expose—have revealed the extent to which its employees knew, through their own research, about the damage that their product causes. And yet the product itself has been strangely absent from much of the discussion.

There has been talk of algorithms, notably how Facebook determines which posts users see, and how rankings favor sensational content, feeding extremism and aiding the spread of disinformation. And user interface experts have long noted the myriad small and subtle ways in which sites like Facebook entice the user into more frequent and impetuous interactions.

These things matter, and their pernicious effects are well known, if not always acknowledged. But the essence of a software product (such as the Facebook app) is not found in the buttons and colors that appear on the screen, nor in the algorithms that prioritize one data item over another. Instead, it lies in the concepts of an app—the behavioral building blocks we interact with—that shape how we use and understand it, and that determine the impacts of our actions.

The concepts of “newsfeed,” “likes,” “friends,” “tagging” and so on—these are the core of Facebook, and scrutinizing them reveals the ways in which Facebook’s design often serves the interests not of users but of Facebook itself. These concepts, in other words, are the drivers behind Facebook’s wider societal impacts, and the damage they cause is not accidental but is by design.

The purpose of the newsfeed is, according to Facebook, “connecting people to the stories that matter most to them.” If that were true, you should be able to filter and sort posts as you would items in an online store. And yet Facebook’s newsfeed not only lacks the most elementary controls but is not even stable: a refresh of your browser window will show you a new selection of posts, changing not only their order but even dropping top posts that you might have wanted to read.

We’re so familiar with this concept that we fail to notice how strange it is. The newsfeed concept has conditioned us to accept what appears to be a near-random selection of posts, opening the void into which Facebook can insert the algorithmic choices.
tech-driven design: from code-breakers to memory extenders
the first digital computers: code-breaking, weather & missile trajectories

Univac 1101 console (1950)

Univac 1103 (1950)
computers for payroll, inventory and tea!

LEO 1: Lyons Electronic Office (1951)
vannevar bush: a new role for computing

The Atlantic, July 1945
MEMEX in the form of a desk would instantly bring files and material on any subject to the operator’s fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.
doug engelbart and the augmentation research center at SRI

“the mother of all demos” (1968)
doug engelbart’s mouse (1968)
XEROX 8010 Star Information System

Star provides integrated text and graphics. A variety of type sizes and styles may be used.
apple macintosh (1984)
human-driven design: from doors to usability heuristics
perceptual fusion

stimuli within 100ms are fused: less than this feels instantaneous

an early flip book

progress bar
“On Windows the menu bar is right there, no need to move your eye to another part of the screen.”
psychology of HCI and Fitts’s law (1986)

The Psychology of Human-Computer Interaction

STUART K. CARD
THOMAS P. MORAN
ALLEN NEWELL

The time to move to target is:

\[ \text{time to move to target} = a + b \log(D/W + 1) \]

reaction time

“index of difficulty”
applying Fitts’s law

the Mac menu is a bit further away, but it effectively has **infinite** size, so it’s much quicker to locate
James Gibson’s affordances, repurposed by Don Norman (1988)

“affords pushing”

“affords pulling”
“norman doors”

push or pull?

door with user manual

multiple user manuals
mapping

from: The Design of Everyday Things, Donald Norman
did the book designer read the book?
jakob nielsen’s heuristics of user interface design (1994)

- Visibility of system status
- Match between system & world
- User control & freedom
- Consistency & standards
- Error prevention
- Recognition
- Not recall
- Flexibility & efficiency
- Aesthetic & minimalist
- Helpful error messages
- Help & documentation
“design systems”

Apple’s human interface guidelines

Google’s Material Design
part 2: the essence of software
5 sample concepts
apple iPod (2001-2022): what made it great?
was it the first MP3 music player?

- Rio PMP300 (1998)
- Sony MS Walkman (1999)
- Apple iPod (2001)
was it the physical design?

Jony Ive, 2001
Apple iPod

Dieter Rams, 1958
pocket transistor radio T3
was it the technology?

Toshiba’s 5GB disk (2000)
1.8 inch wide x 5mm thick

apple, IBM and sony’s firewire (1995)
1,000 songs in < 10 minutes
the song library concept
some other product-defining concepts
the url concept

https://dnj.photo/projects/spaces/#image/5
the folder concept

invented as part of Multics operating system (1964)
the spreadsheet formula concept

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Dan Bricklin’s VisiCalc (1979)
the chatroom concept

WhatsApp (2022)

internet relay chat (1988)
part 3: confusing concepts
twitter confuses a first lady
Nov 2, 2015: Twitter changes Favorite (Star) to Like (Heart)

We are changing our star icon for favorites to a heart and we’ll be calling them likes. **We know that at times the star could be confusing, especially to newcomers.** You might like a lot of things, but not everything can be your favorite. *Twitter press release*
what concept is this?

concept Upvote
purpose rank items by popularity

concept Bookmark
purpose save items to revisit

missing concept!
Twitter adds a new concept (2018)

- **Concept**: Upvote
  - **Purpose**: Rank items by popularity

- **Concept**: Bookmark
  - **Purpose**: Save items to revisit
concepts that confuse (unintentionally)
Someone accidentally deleted thousands of files in my company Dropbox: how can I quickly undelete them?
Ava is a party planner

Bella is having a party

does the name change for Ava too?

answer: it depends

if Ava just shares Bella Plan with Bella and Bella renamed the folder, Ava sees no change

if Ava shared a folder containing Bella Plan then Ava does see the change
Bella deletes Bella Plan from shared folder Bella Party

Delete folder?
Are you sure you want to delete **Bella Plan** from the shared folder ‘Bella Party’?

Cancel  Delete

Bella deletes shared folder Bella Party

Remove shared folder?
Are you sure you want to remove the shared folder **Bella Party** from your Dropbox? This folder will stay shared with any existing members. You can re-add it later.

Cancel  Remove
correctly predicting behavior

- good knowledge: delete shared folder results in leaving
- average knowledge: delete shared subfolder removes it
- poor knowledge:
how many users believe the folder concept works

how folders actually work (in Dropbox, Unix, Multics)
concepts that obfuscate (intentionally)
a dark UI pattern: sneak into basket
thumbs up, but 3 distinct concepts

**concept** Upvote
**purpose** rank items by popularity

**concept** Reaction
**purpose** send reactions to author

**concept** Recommendation
**purpose** use prior likes to recommend

This is homework and I'm having a hard time understanding the definitions of the objects:

```
sig Library {
    patrons : set Person,
    on_shelves : set Book,
}
```

Daniel: I think we should organize a software concepts forum.

👍 1  😊
what is a facebook like?

3 concepts in one!
Reaction (send emoticon to poster)
Upvote (show this post more)
Recommendation (show me more like this)
five dark concepts of surveillance capitalism

- upvote: promotes popular content
- profile: infers personal tastes
- notification: tells you when new content
- Facebook tag: names people in posts
- web beacon: tracks visits to websites

- damages self esteem of teens
- big pharma advertises to sick people
- endless engagement & interruption
- expands visibility unexpectedly
- Facebook tracks non members too
closing thoughts
summary: three kinds of invention shape our software

- technology
- user interfaces
- concepts

how we understand our software and whether it’s fit for
THE ESSENCE OF SOFTWARE

WHY CONCEPTS MATTER FOR GREAT DESIGN

DANIEL JACKSON

much more in the book

sign up for newsletter

essenceofsoftware.com

join the discussion

forum.softwareconcepts.io

essenceofsoftware.com