

The Design of Search UIs (Hearst, 2010)

* Should be simple — part of larger task → do not distract.

↳ people have been struggle

* Old Search Engine	New Search Engine
Users	Highly educated everyone.
Content	Huge variety
Search over	Full text
Interface	GUI
Cost	free
Provider	Competing
	Monopoly.

* Process of Search UI design.

- learnability & accomplish task first time?
- Efficiency & after learned → how fast to accomplish tasks?
- Memorability & reestablish proficiency after no-use?
- Errors & how many, how severe, recoverable?
- Satisfaction & satisfy?

↳ need assessment (who, goal, tasks) → task analysis (steps to complete task, goal to support, scenario)

↳ design → evaluate → redesign cycle.

* Design guidelines.

↳ Offer informative feedback.

- Show search result immediately.
- Show informative doc. summary. (trade off → screen space) + surrogate (highlight)
- Allow sorting.
- Query term suggestion / correction.
- No! relevance score
- fast response time.

- ↳ Balance User Control / Automation
 - Rank ordering → match users' mental model
 - ↳ Ex. search query appears in results.
 - ↳ news → chronological.
 - Query Transformation. → apply lightly + reversible.
- ↳ Reduce Short-term Memory Load.
 - Suggest the Search Action in the Entry Form.
 - ↳ Ex. in search bar, what corpus you are searching.
 - Simple history Mechanisms. → revisit info. (Undo?)
 - Integrate Navigation & Search.
 - ↳ hierarchical faceted metadata — hierarchy on side faceted with search results.
- ↳ Provide Shortcuts for skilled users.
 - link in search result
- ↳ Reduce Errors.
 - Avoid Empty Result
 - Vocab Problems — multiple ways to query something.
- ↳ Recognize the Importance of Small details.
 - ↳ Ex. visualization / Google's "Did you mean" (short)
- ↳ Aesthetics.

Soylent: A word processor with a Crowd inside (2010, Bernstein)

- * Motivation - Authors usually need high-level help from other human not AI.
 - ↳ MS Word → ^{cannot} suggest how to fix. ↳ non-trivial
- * Soylent - prototype on top of MS Word + MkTurk.
- * Shortn / Crowdproof / Human Macro.
- * Contribution - embedding paid crowd workers in an interactive UI to support "complex" cognition + manipulation tasks on demand.
- * Crowd Programming Pattern (Find-Fix-Verify)
- * Shortn - select area of text that is too long.
 - ↳ slider to adjust length. → use combination of crowd trimming (cuts are not monotonic) ↳ Knapsack (DP)
 - ↳ 15-30% cut (single pass), 50% (multiple pass)
- * Crowdproof - catch typo / style / grammar error + 1 → 5 all rewrites.
 - ↳ drop down of replace + explanation
- * Human Macro - NL command
 - ↳ UI design → prevent user's buggy command
 - ↳ test run with one sentence / paragraph.
- * Programming Crowd (30% open-ended task as poor)
 - High Variance - Lazy Turker / Tager Beaver.
 - ↳ add verifiable quantitative questions (Lazy Turker needs to read)
 - Find - identify patches of user's work that need attention.
 - Fix - revise the patch.
 - Verify - quality control. (crowdproof - vote best, shortn - vote poor)
 - Fix ↔ Verify → different turkers.
 - Lazy Turker in find don't have to fix.
 - Split Find / Fix → can merge in parallel.
 - Turkers are better at vetting.

* Evaluation.

- Shortn. - 5 text to shorten. ~ 80% - 90%.
 - ↳ split w/it / work time.
 - ↳ pay less → slower → does not impact quality.
 - ↳ Error - correct grammar → incorrect style
 - ↳ Ex. capitalization, parallelism.
 - ↳ 30% raw edits are noise
 - ↳ reduce after verify (another 30% error)
 - ↳ cycle output to input → 70-80%, 3 iteration → stop..
- Crowdproof - 5 texts to proof read.
 - ↳ miss minor errors in the same patch.
 - ↳ lack of domain knowledge.
 - ↳ similar to Shorten
- Human Macro - 5 scenarios. (2 expr)
 - ↳ 5 u/grads from cs - can they communicate?
 - ↳ Turles - can they understand task?
 - ↳ 88% intention success.
 - ↳ error when prompt contain 2 requirements.

* Discussion

- Wizard of Turle
- wait time / cost / legal ownership. / confiden + info / domain knowledge.
- cost compare to what would have cost the user's productivity.

6 Learning Barriers in End-User Programming Sys. (Ko, 2004)

* Motivation - Research focuses on Language but not Env. & Lib.

* User Study - VB Tasks (7), 40 beginner programmers, 130 incidents

* Metaphore > Heuristics

* Learning Barriers (Scenario)

- Encounter

- weight cost / Risk / Reward

- Continue? → make simplify assumption

- valid? → make progress

- not valid? → knowledge breakdown.

* 6 Learning Barriers

- Design - I don't know what I want computer to do (2/4)

- Selection - I think I know what I want the computer to do.

BUT I don't know what to use (6/13)

- Coordination - I think I know what things to use (20/25)

BUT I don't know how to make them work together

- Use - I think I know what to use

BUT I don't know how to use it (17/36)

- Understanding - I thought I know how to use this

BUT it didn't do what I expected (34/38)

- Information - ↓ BUT I ~~do~~ don't know how to check (10/14)

* Gulf of Execution Gulf of Eval.

- Design

- Selection

- Understanding

- Coordination

- Info

- Use

* Good Metaphore

1) have a rich, human-centric source domain.

2) account for 6 learning barriers.

3) abstract + computer-centric enough → describe variety of PS.

4) Concrete enough → support analogical reasoning.

* As Factory.

- Program \rightarrow Factory.
- learner \rightarrow Factory Creator.
- Prog. Interface \rightarrow machines.
- Prog. Output \rightarrow product.
- Prog. Env. \rightarrow tools to help create/run

* Variation in Product.

* Variation in control.

* Challenges.

- Design is difficult — PS \rightarrow help scaffolding ideas.
- finding Behaviors is difficult — PS \rightarrow help search
 \hookrightarrow not many behaviors.
- Invisible rules are difficult to show — How to ~~do~~ reveal?
- Textual Programming Interface are limited (use)
— P.I. designed to match its semantics.
- Behavior is difficult to explain
— explain what program did / did not do.

Creativity Support Tools: Accelerating Discovery & Innovation (2007) ~~Shneiderman~~ Shneiderman.

* Motivation: promote new innovations → need shifts in thinking

↳ Productivity Support Tool → easy to design + evaluate

↳ CST → vague requirements + measures of success.

* Creativity & Innovation:

- Creativity → discovery / innovation of significant idea / pattern / method / device that gains recognition from accepted leaders in a field.

- Innovation → creativity + additional steps to ensure adoption.

* 3 Schools of thought on creativity:

- Structuralist → Preparation / Incubation / Illumination / Verification.

- Inspirationalist → spend time outside / meditate / random inkblot / photograph

- Situationalist → creative work is social.

* Csik-zent-mi-hal-yi

- Domain. → set of symbols that are accepted by a community.

- Field. → leaders of domain consider.

- Individual. → creativity ~~is~~ producer (contributed only is accepted)

* 8 Mind-set Change:

- Developer → move beyond Benchmarking

- playful exploration.

- rich search features.

- generate multiple alt.

- easy backtracking.

- rich history keeping

- Product Managers → ~~are~~ customers are creators not just users

- change requirement analysis

- change feature selection.

- change marketing strat.

↓
wants audiences, feedback,
rewards, recognition.

- Researchers → new evaluation methods.
 - ethnography
 - long-term case studies
 - log data.

* Design Principles ★★★

- Support Exploratory Search (Inspirationalist)
 - Users need to be aware of related works.
 - Faceted Search / dynamic query / ranking + clustering + partitioning
 - History keeping → rapid incremental + reversible exploration.
- Enable Collaboration (Situationalist)
 - Support collaboration in safe environment (early)
 - Find audiences (later)
- Provide rich-history-keeping. (Structuralist??)
 - Keep records of Alternatives.
- Design with low threshold, high ceiling, wide walls.
 - reduce need for import/export
 - Multilayer interface
 - for novice
 - for expert ↓

Yesterday's Tomorrow: notes on UbiComp's dominant vision (Bell, 2006)

* 3 Framing Points.

— UbiComp focuses on "proximate future" → achievement out of reach.

— Implementation is someone else's problems.

— seemingly interconnected world is misleading.

* Proximate Future

↳ future is just around the corner.

* Singapore: (Gov + citizen)

— Clear plan of network infra + benchmark + milestone.

— internet support collective & comm. practice.

↳ censorship ↔ agree.

* Korea:

— Public / Private Collab (not market force)

— Collective cultural / societal level not individual.

* USA

— productive & labor.

— neglect multi-generational living, high-density housing, public transit ...

* UbiComp is heterogeneous → messy.

↳ infinitely postponed UbiComp does not have to deal with this messy.

* Alternative "UbiComp of the present"

① Future is already here. → tech is a site of social + cultural production

② It is just not evenly distributed → 2 aspects @ need to Ask how UbiComp tech. exploit + reproduce power hierarchies.

③ We should contend with heterogeneity as a core part of research agenda. ④ different culture

- ① Future is already here:
- ↳ embedded in everyday life
 - ↳ need deeper understanding of how tech is a site of social + cultural production
- ② It is just not evenly distributed:
- 1) power relations are embedded in access to infra.
 - 2) different tech adoption in diff. culture.
 - 3) how messy + uneven infra are encountered & navigated.

Predicting Tie Strength with Social Media. (2009, Gilbert)

* Motivation: bridge the gap between social science theory "tie strength" and practical design on social media. + consider properties of present links

* Ties:

- weak → acquaintances → help find job
- strong → friend + family → affect emotional health.

* Tie Strength (Mark Granovetter, 1973)

↳ Curvilinear Dimensions

- original. {
- Time (Amount of)
 - intimacy
 - intensity
 - reciprocal services.
 - Structural (network topo.) (Burt)
 - Emotional Support (Wellman) → indication?
 - Social Distance (SES, edu., race...) (Lin)

* Research Questions

① Can the above dimensions predict tie strength?

② Limitation on social-media-based model?

* Methods

- 35 FB users. → rate TS of their FB friends. ~ 62 friends/30 min. ↗ random
- in lab → privacy. - collect data of user interactions with friends. 72 vars.

* Variables.

- intensity - wall words / #inbox messages & depth.
- intimacy - days since last comm. / wall/inbox intimacy words.
- Duration - when first comm.
- Reciprocal Service - like exchanged / common App.
- Structural - mutual friends / common group / TFIDF in about.
- Social Distance - EDU(collected) / Age / political diff (collected)

* Dep. Vars. (ask 3 tie Q.) — continuous scale.

- How strong - loan \$100 - Helpful for job?
- Upset if unfriend? - Bring friend to new site?

* Stat Methods

- R_i - 67 vars
- D_i - Pair-wise interaction between dimension.
- $N(i)$ - ~~social~~ network structure. (mutual friends)

* Results → 10-point weak → strong.

- intimacy - 32.8%.

- intensity - 19.7% (contrast to prior → many people → choose 1)

* Limitation

- Survey fatigue vs. confusion in Q order.
- not ^{diverse} wide participant

* Errors

- Asymmetric → ~~Prof + student~~ "Friend me"
- Edu. Diff - Prof + student
- Complex real-life relationship - Ex.
- Confounding Medium - outside FB.
- Unusual → use son's acc...

* Implication.

- (T) social media - not always align with prior work.
- (T) strength → ok as continuous value.
- (T) ~~add~~ Structural dimension modulates other dimensions.