# Pareto and Zipf Laws

- Pareto principle is named after the Italian economist Vilfredo Pareto, who found that a majority of the land in 19th century Italy was owned by the minority of the population.

- the **law of the vital few,** or the **principle of factor sparsity** states that, for many events, roughly **80% of the effects come from 20% of the causes**

- 80/20 rule, applied to the most profitable customers and most critical usability problems, identifying top tasks.

- **80% of the occasions users use only 20% of the features supported in a product!!.** Designers to note – the key features should be visible, easily locatable and not hidden in the UI

Pareto Optimality Principle

- Law of the Vital Few, states that just 20% of the work that you have done to achieve something is responsible for 80% of the results that you've achieved.

- Simply put, you only need to fix a little in order to get a lot of positive change.

- Prioritising your efforts on the small portion that could have the biggest impact

- Trying to tackle and perfect all your issues at once is overwhelming and yields diminishing results

20% Effort

80% Results
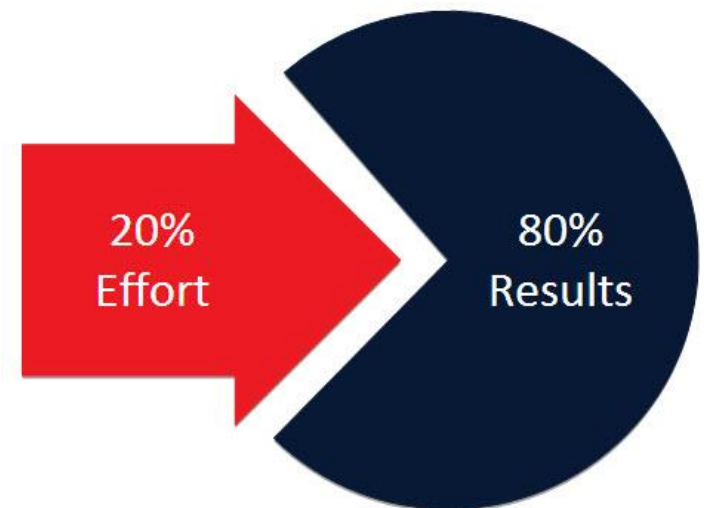
- Related to the Pareto law is Zipf's law,

- After a linguist who noticed that the most frequent word will occur approximately twice as often as the second most frequent word, three times as often as the third most frequent word, and so on.

- It also applies to customers for product types, word frequency in a verbatim analysis and the frequency of commands used in software such as MS Word

- Zipf's Principle of Least Effort : People want the most outcome for the least effort

- Most useful behaviors are performed frequently, and become easier and quicker over time due to this. users do not want to spend a lot of time and effort deconstructing your innovative navigation labels.
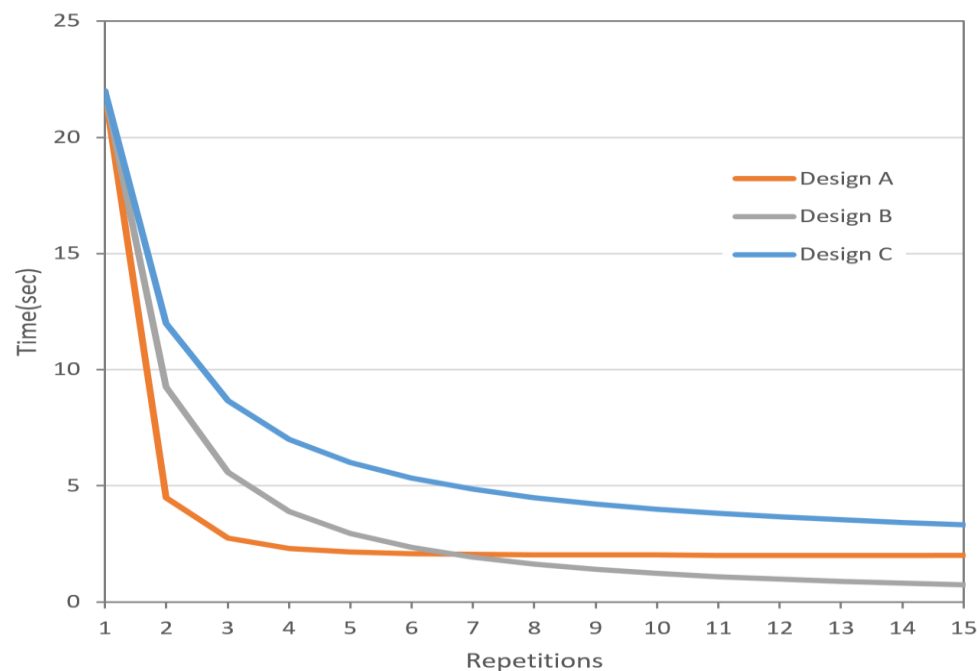
✓Design A is much faster than designs B or C.

3rd repetition design A speeds up even more, and after the 4th repetition the reaction times reach a plateau; the curve flattens out ;

Users have learned the interface as much as possible.

no more improvements to be expected, and extra repetitions will only decrease the reaction time insignificantly.

With design A, **learning is saturated after the 4th repetition** (or that 4 is the saturation point for design A

Mean selection time from a pie menu (log-log scale)
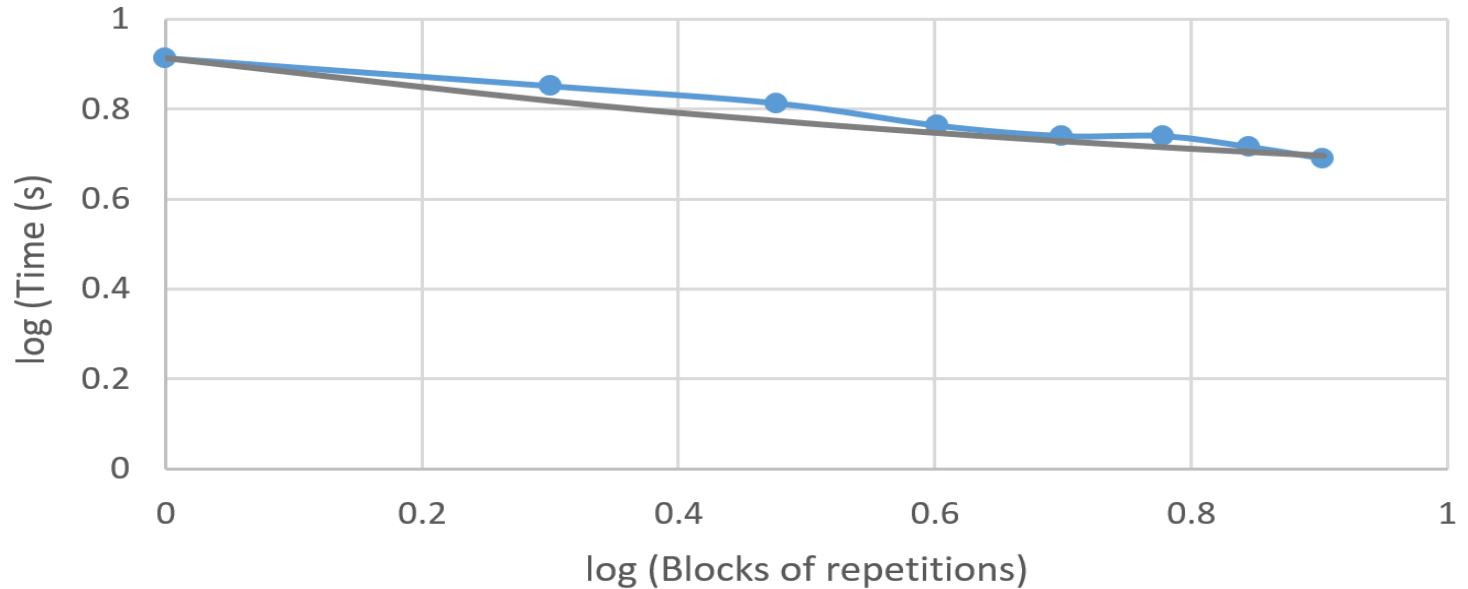
- *learning curve - Ahlstrom's menu experiment - described by a power law; plotted in log–log scale, well approximated by a straight line.*

- **The power law of learning** : (1) time it takes to perform a task decreases with the number of repetitions of that task;

- (2) the decrease follows the shape of a power law.
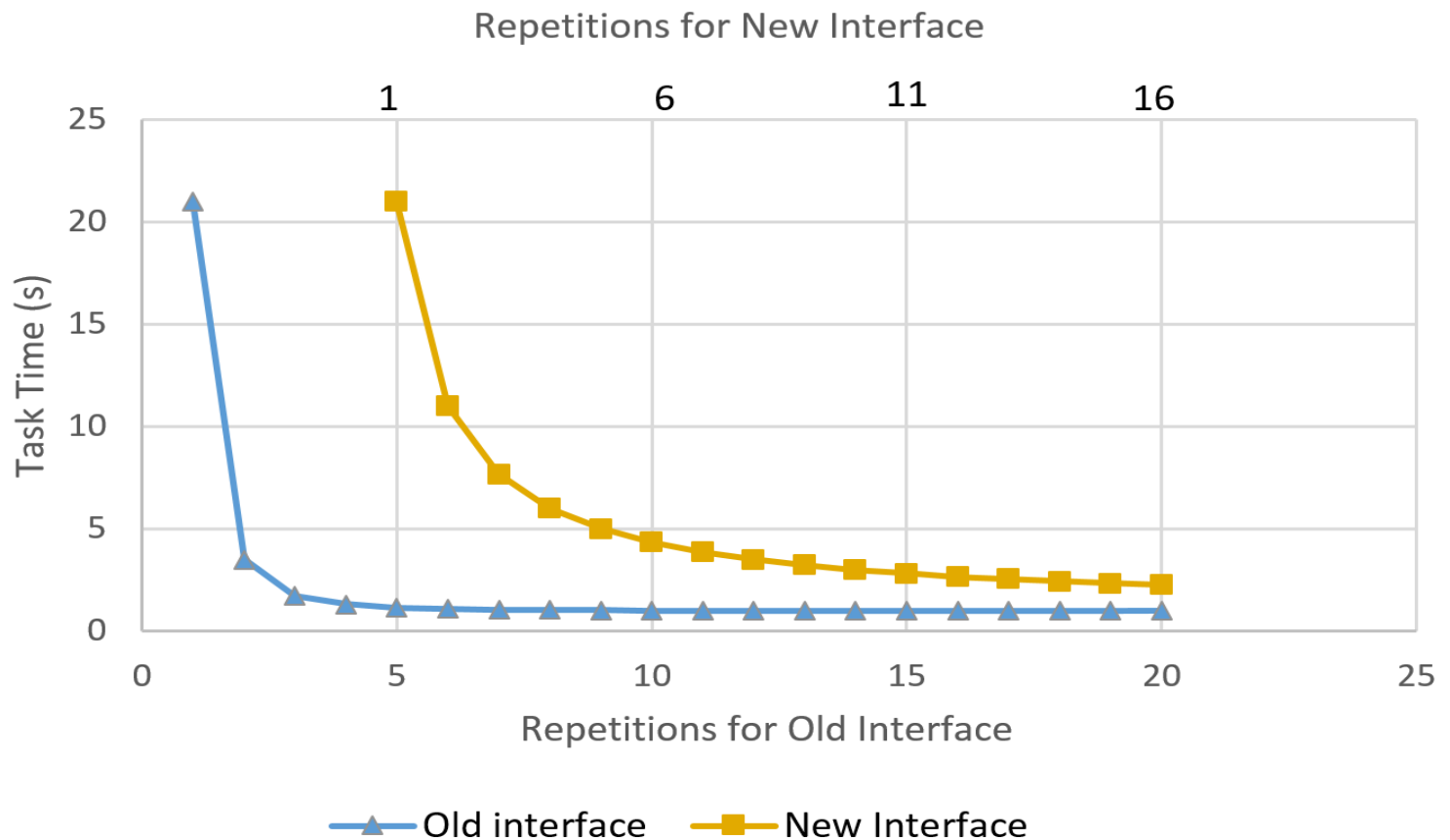
- *Learning curves for two different interfaces:* when the new interface is introduced, old one is already at saturation level *(repetition 1 for the new interface corresponds to repetition 5 for the old one).*
- *Takes a lot more time & good will for the user* – *with new suboptimal interface than to continue using the old one.*
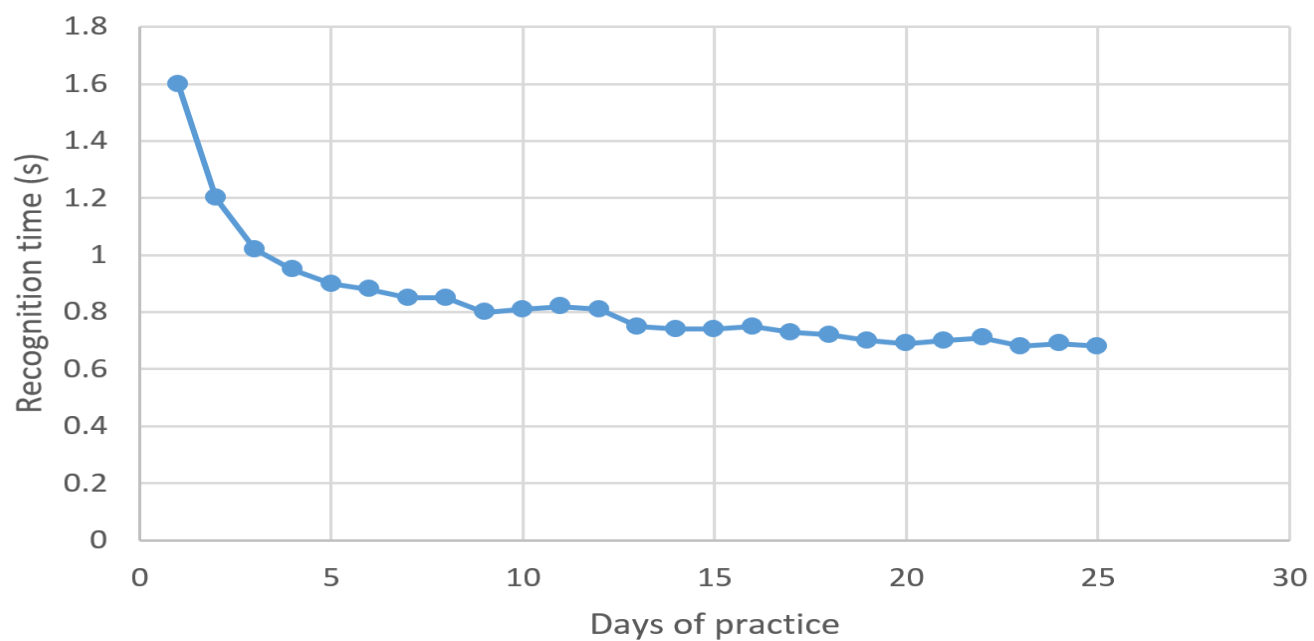
- Romans - "repetition is the mother of learning"

- *Peter Pirolli & John R. Anderson , time it took participants to recognize facts that they had studied decreased with # days they had practiced those facts.*

- *curve follows a power law* and reaches a *saturation level approximately* around day 12. power law of learning says that the time it takes to retrieve a piece of information from memory depends on how much we've used that information in the past, and this dependence follows a power law

- **ASIMOV'S 3 LAWS (adapted by) RASKIN**

- **1ˢᵗ Law of Interaction Design (XD):**

- *A computer shall not harm your work or, through inaction, allow your work to come to harm*.

- Aggravating experience you can have with a computer is losing work

- worse than having to redo work you have already done is losing data that you cannot reproduce exactly, like creative work

- *A computer shall not harm your work or, through inaction, allow your work to come to harm*
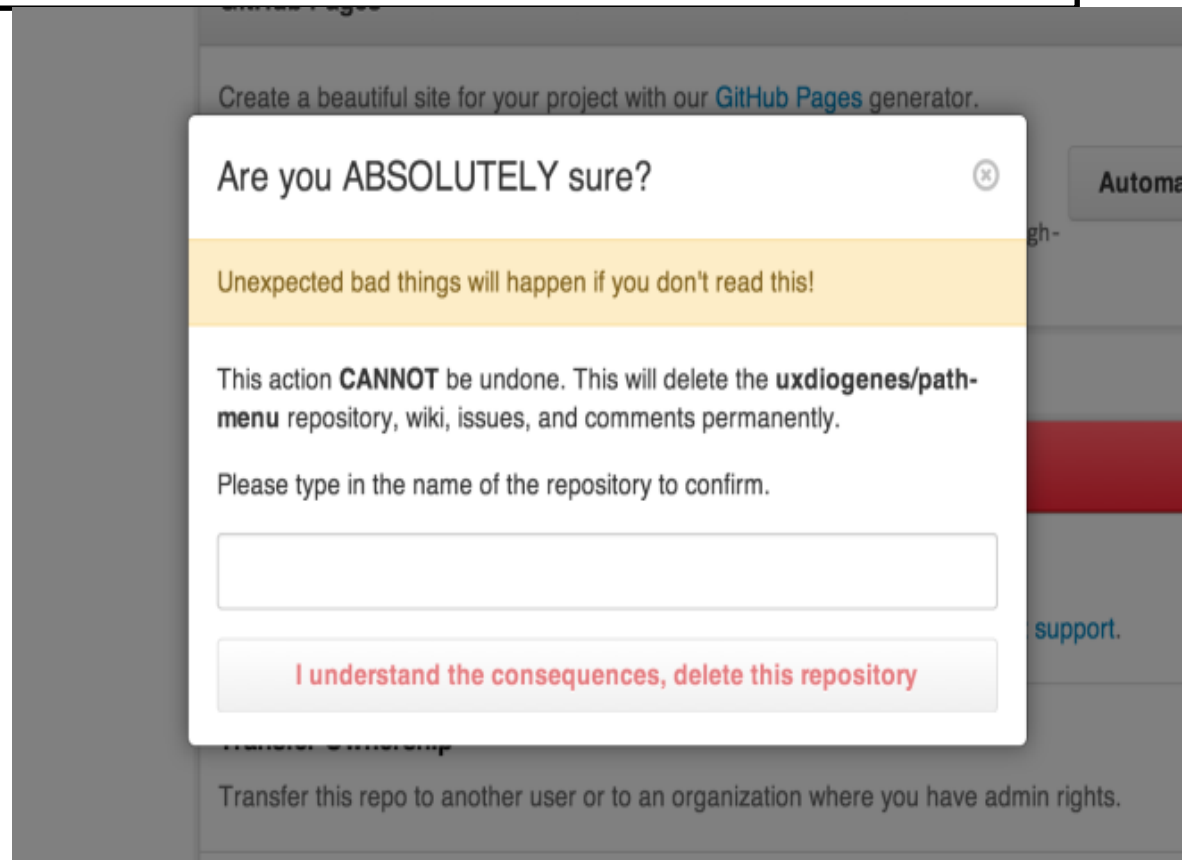
USABILITY / UX / XD – LAWS / GUIDELINES

- **1st law – (i) Apps must maintain data integrity**

- has safeguards and redundancy to prevent data loss

- robust undo functionality, and shielding destructive actions to prevent inadvertent data loss.

- GitHub's repository deletion dialog- this one forces you to type the name of the repository to continue

- forces the user's locus of attention to the repository name during the deletion process

- preservation of efforts related to the content the user is working with, as well as the content itself

Apple's Time Machine and autosave, and Dropbox's revision history Ideal fits!!

Create a beautiful site for your project with our GitHub Pages generator.

Are you ABSOLUTELY sure?

Unexpected bad things will happen if you don't read this!

This action **CANNOT** be undone. This will delete the **uxdiogenes/path-menu** repository, wiki, issues, and comments permanently.

Please type in the name of the repository to confirm.

I understand the consequences, delete this repository

Transfer this repo to another user or to an organization where you have admin rights.

• preserving selections across work sessions, and including them in the list of actions that can be undone.

• interface allows a user to customize or rearrange elements, that arrangement or customization should be preserved.

- **2nd law – *A computer shall not waste your time or require you to do more work than is strictly necessary***

- users are burdened with tasks because it was simpler to let a person perform the action manually than to code a system to do it automatically.

- forcing a user to select a credit card type, when that information can be inferred from the number.

- Great interfaces bring information in the system to the user in the way(s) they are most likely to want and/or understand it

- .

- Simple -- set money aside for any number of "goals," and that amount, along with pending transactions is subtracted from your "Safe-to-Spend" balance.
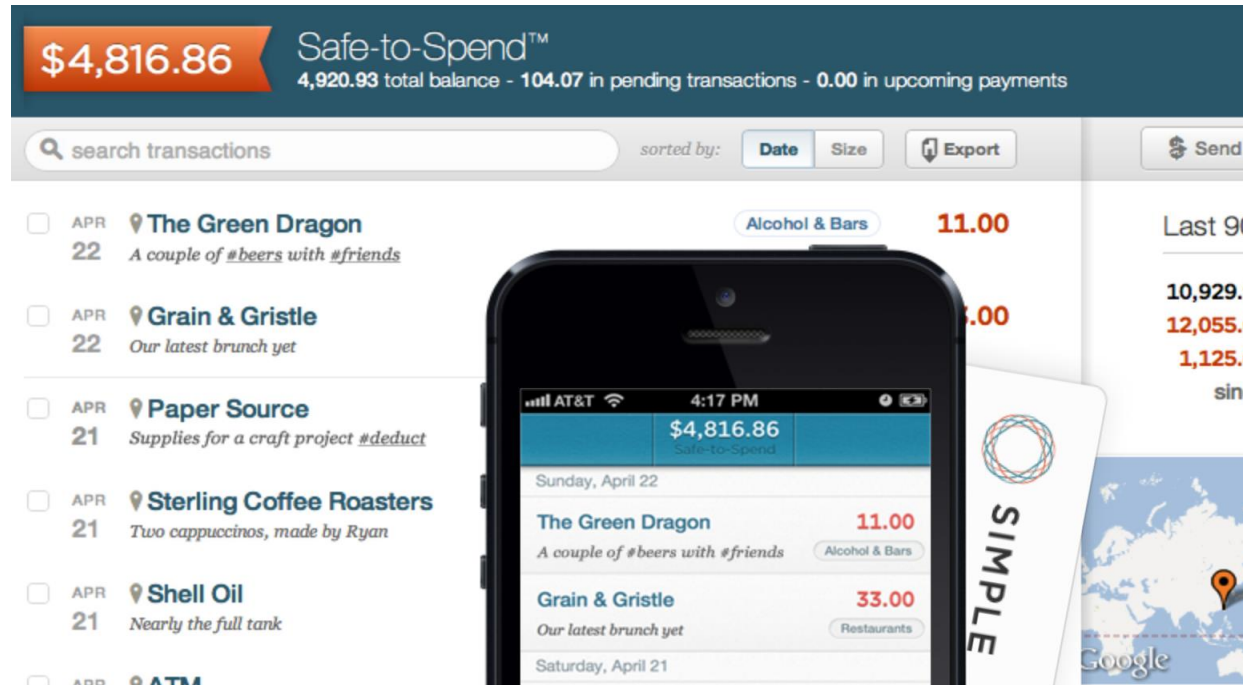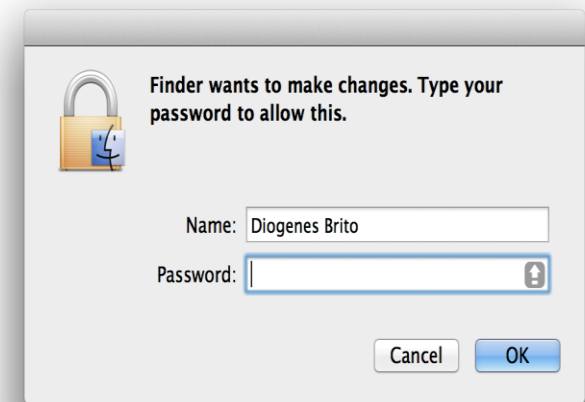

- Simple's "Safe to Spend" recognizes the way people actually want to use their money

- 3rd Law: An interface should be **humane**; be *responsive to human needs and considerate of human frailties*

- *Focus on user centred design*

- Good interaction design is always about

- respecting the limitations of the human

mind and body

- sensitive to both our visceral, physiological responses, and our cultural values.   have single **locus of attention**

- CAPS LOCK Light Design. not a good solution for avoiding slipping into caps lock - user's attention locus not on the key when they press it.   Mac solution for this ideal visual indicator that caps lock is active within the input field itself, - in sync with user locus of attention.

Jakob's Law of Usability (Internet UX)

- Users spend most of their time on other sites

- Leverage existing mental models, V can create superior user experiences - user can focus on their task rather than learning new models.

- Users will transfer expectations they have built around one familiar product to another that appears similar.

- Minimize discordance by empowering users to continue using a familiar version for a limited time.

- users prefer your site to work the same way as all the other sites they already know.

- Design for patterns for which users are accustomed.

Jakob's Law of Usability (Internet UX)

- Users spend most of their time on other sites (than your website!!!)

- More like a Law of Nature!. (listen to his video ; it was even debated in UK parliament both Houses!!)

- User will know how to use your website and will start focusing on your product, services,

- In cases of violation people **will not know how to use** and will be confused - **BACK button is always there on the Browse**r!!

- Design Conventions /other practices as adopted with most websites. Do not violate just for the sake IT; it would only kill the product!!

Tesler's Law on Product Complexity!

- **Tesler's Law / Law of Conservation of Complexity**

- **- for any system there is a certain amount of complexity which cannot be reduced.**

- *Every application must have an inherent amount of irreducible complexity. The only question is who will have to deal with it.* - **Larry Tesler - XEROX PARC**

- way users interact with applications was just as important as the application itself

- removing user complexity - > complexity will not be removed from the system but will move from users to the development team

Tesler's Law

- Unless you have a sustainable monopoly position, the customer's time has to be more important to you than your own

- Interface clutter results in users hunting for what they need - - reduces their efficiency while increasing the perceived difficulty level of the software!!

- No matter how you do it!!! ,

- removing complexity can improve the value of your software to users, but keep in mind the law of conservation of complexity when making product decisions.

- Nielsen's Mantra – LESS IS MORE (less features more user empowerment!!)

GESTALTS LAWS OR PRINCIPLES

- **Gestalt**" is German for "unified whole"

- 20th-century German psychologists Max Wertheimer, Kurt Koffka and Wolfgang Kohler

- set of laws addressing this natural compulsion to seek order amid disorder, where the mind "informs" what the eye sees by making sense of a series of elements as an image, or illusion

- advertising, encapsulating company values within iconic logos

- **The whole is other than the sum of the parts.**

- natural- "tricks" of perspective / best practice design standards by grouping similar elements, recognizing patterns & simplifying complex images

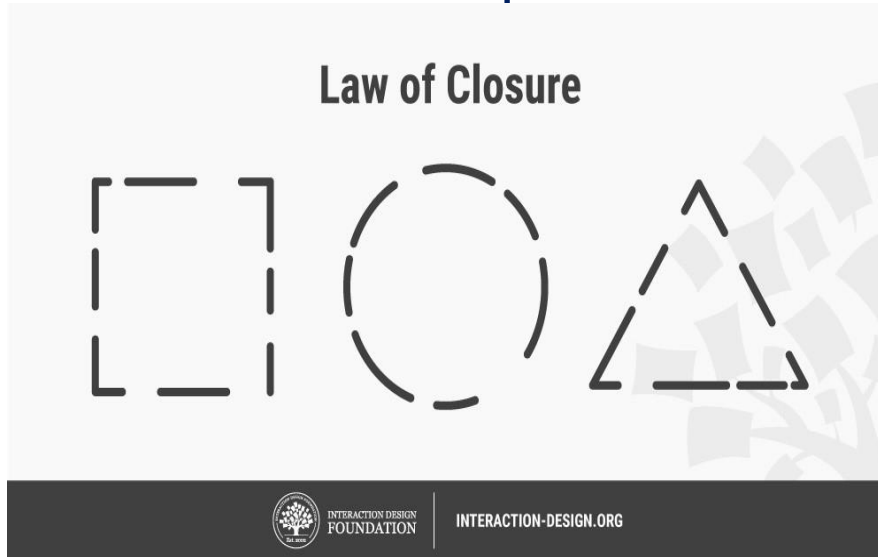# GESTALTS LAWS OR PRINCIPLES

- Brain processes information in a fascinating way

- perception manipulated by how we see objects & relate them to each other based on spacing. Gaps, incongruities or disturbances are overlooked by our brain based on the laws of organization.

- Viewers subconsciously group together separated objects to perceive them as a whole.   Gestalt theory are organized into six categories
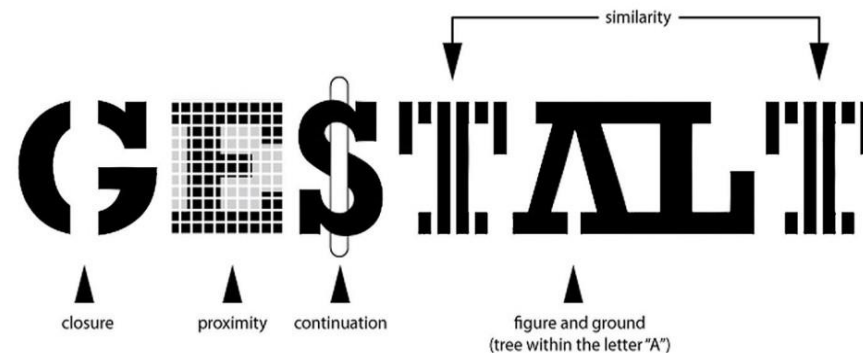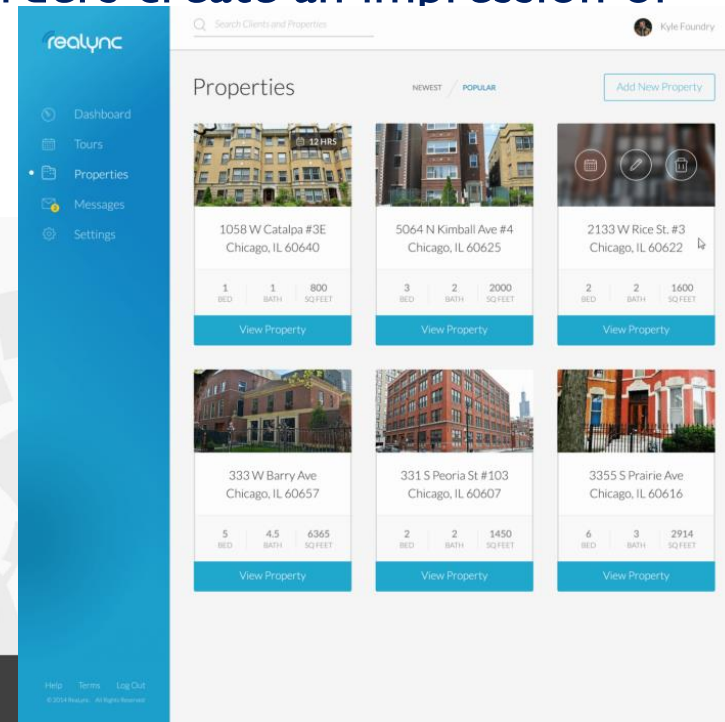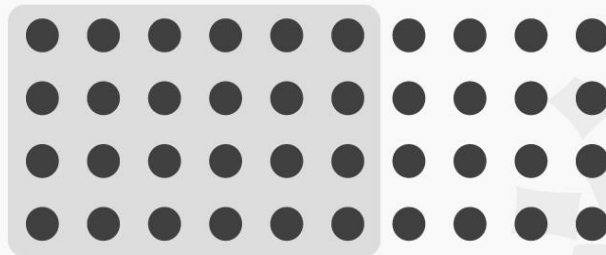
GESTALTS LAWS OR PRINCIPLES

- **Closure (Reification**): Preferring complete shapes, we automatically fill in gaps between elements to perceive a complete image; so, we see the whole first

- An incomplete object is perceived by the brain as a whole by mentally filling in missing information.

- What better example than the IBM Logo

GESTALTS LAWS OR PRINCIPLES

- **Common Region**: We group elements that are in the same closed region.

- By adding borders around an element (or a group of items), you separate it from surrounding elements.

- Subtle shadow and clearly visible borders create an impression of individual objects.

Law of **Proximity** **(Emergence)**:

* We group closer-together elements, separating them from those farther apart.
* When elements are placed close together they are perceived as a group.
* When the three lines in are placed at random, further away from each other, they are not perceived as one unit.
* The close proximity of the slanted lines is what unifies them to be seen as one image.

Product #1 [Edit] Product #2 [Edit] Product #3 [Edit]   Product #1 [Edit]   Product #2 [Edit]   Product #3 [Edit]

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