

Comp 388/441 - Human-Computer Interface Design

Week 7 - 26th February 2015

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Incentives, Offers, and Games - I

Motivating our users

- consider motivation, persuasion, or helpful *nudging* in our designs
- design our interfaces to encourage and help increase productivity
- particularly useful for certain types of applications and sectors
 - *user participation apps*
 - *productivity tools*
 - *community related apps*
- compare this type of application to gaming
 - *often adept at engaging and keeping a user's attention*
- consider how and where games are compelling and addictive
 - *adapt applicable concepts for our own design*

Incentives, Offers, and Games - 2

Compelling and addictive nature of gaming

- current trend in design to apply addictive qualities of gaming to application design
 - *known as **gamification***
- most games have some goals and rewards, which encourage and incentivise a user
 - *often a built-in incentive to reach the next level, a sense of satisfaction*
- games may include elaborate systems of player rankings
 - *rankings act as system of validation, offers easily quantified feedback to users*
- multiplayer games offer an element of direct competition
 - *user's sense of skills, standing, and validation enhanced by opportunity to compete and win*
 - ***high scores** on a leaderboard help this sense of competition*
- multiplayer games also offer sense of **social** connection and community
 - *head-to-head gaming, group playing, or simply ability to share, compare, discuss...*
- online role-playing games a good example of social awareness and collaboration

Gamification Examples

1. Good examples of the use of gamification within social context

Source - Yu-Kai Chou & Gamification

2. Khan Academy Knowledge Map

Source - Khan Academy

3. Play to Learn with Khan Academy

Source - GCO

4. Scratch Programming Language

Source - MIT

Games and Simulations - I

Changing the brain game...

"The immense amount of time spent with games during a child's formative years has led them to be literally 'hardwired' in a different way than those who came before."

Carstens, A., and Beck, J. Get ready for the gamer generation. Tech Trends 49. PP.22-25. 2005.

"Immense changes in technology over the past thirty years, of which video games are a major part, have dramatically and discontinuously changed the way those people raised in this time period think, learn, and process information...The change has been so enormous that today's younger people have, in their intellectual style and preferences, very different minds from their parents and, in fact, all preceding generations."

Prensky, M. Digital game-based learning. McGraw-Hill. P.17. 2001.

Games and Simulations - 2

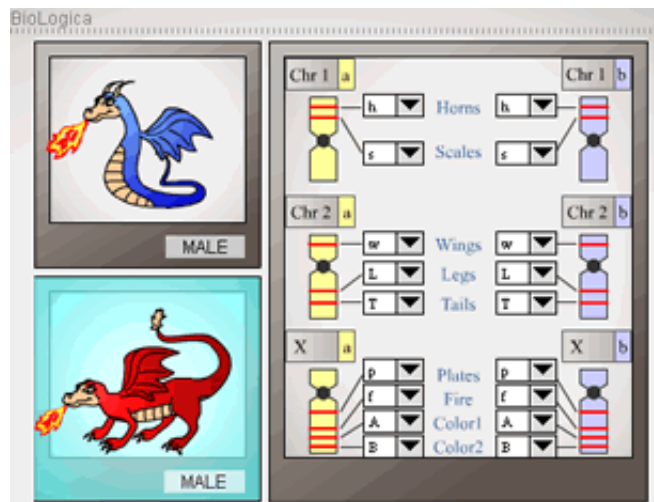
What are simulations?

- linear interactive tutorial versus a simulation
- model of a real world system
 - *respond in dynamic and rule-based ways to user responses*
- two basic types of simulation
 - *operational and conceptual*
- operational primarily used to teach procedural skills
- conceptual simulations

Games and Simulations - 3

What are games?

- online games include a broad array of formats and features
- common elements such as
 - *competitive activity with a challenge and goal*
 - *set of rules and constraints*
 - *specific context*



Source - BioLogica

Games and Simulations - 4

Match game to learning goal

"Jeopardy-style games, a staple of games in the classroom, are likely to be best for promoting the learning of verbal information (facts, labels, and propositions) and concrete concepts. Arcade-style games...are likely to be best at promoting speed of response, automaticity, and visual processing. Adventure games are likely to be best for promoting hypothesis testing and problem solving. It is critical, therefore, that we understand not just how games work, but how different types of games work and how game taxonomies align with learning taxonomies.."

Van Eck, R.N. "Digital game-based learning." *Educause Review* 41. PP.17-30. 2006.

- a game can often take over a tutorial
 - *Hays, R.T. 2005.*
- medical simulations
 - *Issenberg, S.B. et al. 2005.*

Processing Visual Information - I

- how do users actually process a page or screen within an application?
 - *designers and developers interested in working out how to guide a user*
 - *optimise viewing experience for user's focal point*
- graphical artists use emphasis and position to draw attention
- cartoonists carefully compose and sketch out cartoons
 - *draw attention to speech-bubbles etc in correct order...*
- we can compose our visual page elements to influence a user's viewing order
- by knowing common patterns for user viewing
 - *we can design our apps to accomodate such usage patterns*
 - *putting relevant information where users actually look*

Processing Visual Information - 2



Source - The Curious Dog Log

Processing Visual Information - 3

How do users read a page?

- Western readers follow a pattern for reading
 - *look at first word in the top left corner of a page*
 - *then scan across the line from left to right*
 - *read the words*
 - *skip to the beginning of the next line*
- reader's eyes scan across the line of text
 - *not a smooth action*
 - *user's focus jumps rapidly between given spots on the page*
 - *known as **fixation points***
 - *jumps from point to point known as **saccades***
 - *brain does not receive visual information during **saccades***
 - *brain capable of combining images received at each **fixation point***
 - *brain **sees in a line***

Processing Visual Information - 4

Perceiving more complicated pages...

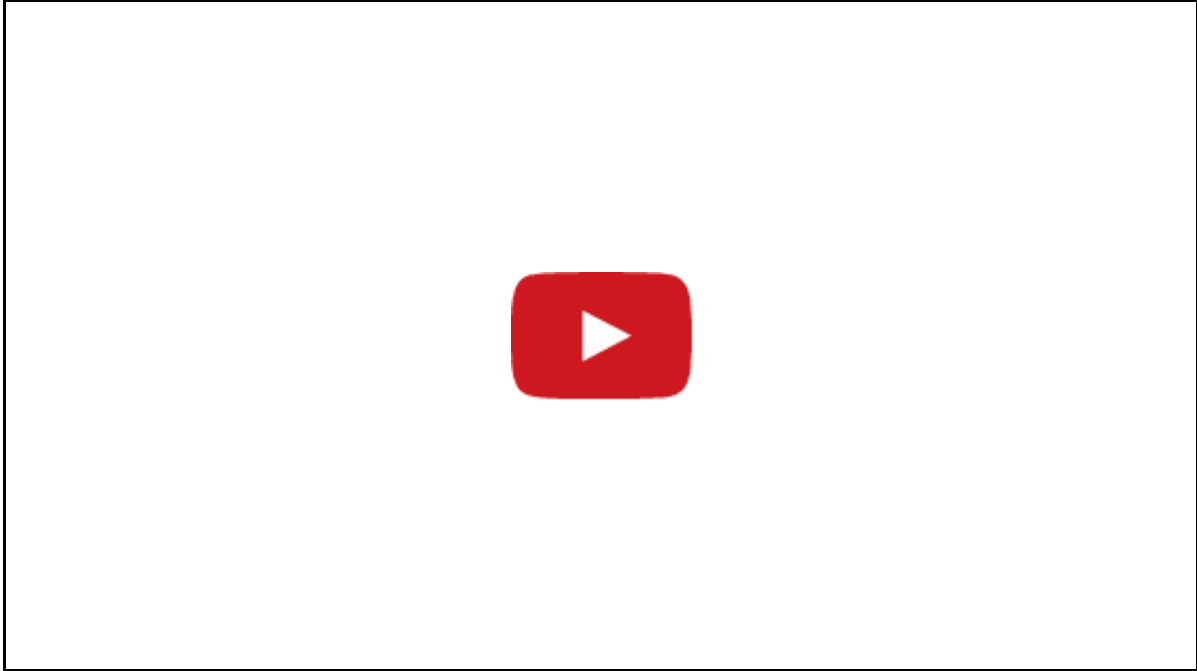
- consider page layouts with a more complex design and pattern
 - *slightly harder to discern exactly how a user's eyes move across the page*
- some generalisations we can consider and transfer
 - *users get an initial impression of a page or document*
 - *z-shaped pattern*
 - *upper left, read title, then scan from upper right*
 - *diagonal to lower left, then scan to lower right*
 - *return focal point to areas of interest*
- uncertain how flashy, loud images etc will impact this pattern
 - *tend to break or interrupt a user's pattern of scanning the page*
- user searching a page for something specific will often follow a different pattern

Processing Visual Information - 5

- researchers have conducted eye-tracking studies
 - *using specialised cameras and software*
- capable of identifying where and what a user views on screen
- software can replay a user's **scanpath**
 - *a series of **fixations** and **saccades***
- replay tells us the areas of interest and how long each user viewed
- aggregate **scanpaths** to form a **heatmap** diagram
 - *shows predominant areas of interest to our users*

Processing Visual Information - 6

Eye tracking a Google Chrome Advert in Japan



Google Chrome Japan - Source: YouTube

Processing Visual Information - 7

Eyetracking web usability - Part I

- websites present a different pattern for users
- user's tend to follow an **F** pattern
 - *read across the top*
 - *continue down the screen*
 - *read lines, at least partial, of text*
 - *tend to read paragraphs nearer the top of the screen*
 - *only scan text near the bottom of the screen*
- at the bottom of the screen
 - *users tend to make an additional quick scan down the left side of the screen*
 - *left sidebar with links draws particular attention*

Source - Nielsen, J. and Pernice, K. *Eyetracking web usability*. New Riders. 2009.

Processing Visual Information - 8

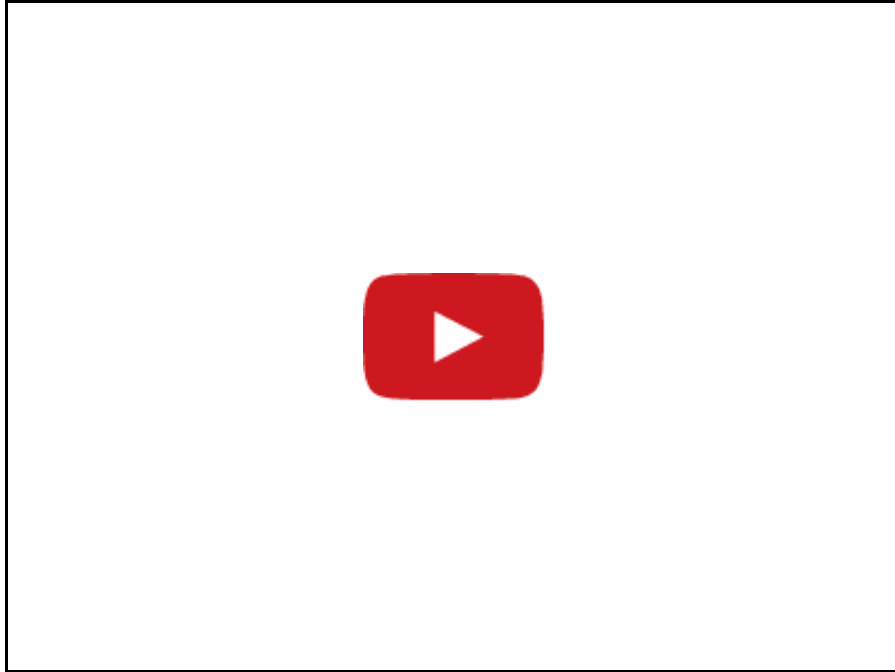
Eyetracking web usability - Part 2

- images and graphics attract a user's attention
 - *tends to be a strong response and reaction when they are relevant and integral to the content*
 - *users seem able to quickly discern relevant imagery from stock photos*
 - *stock photos quickly overlooked and ignored*
- banner ads now tend to be ignored by users
 - *users start their **F** pattern beneath these adverts*
 - *users begin viewing site beneath these adverts*
- users tend to ignore repetitive elements on multiple pages
 - *eg: logo, navigation bars...*
 - *only look again if they need something...*

Source - Nielsen, J. and Pernice, K. *Eyetracking web usability*. New Riders. 2009.

Processing Visual Information - 9

Demo of Eye Tracking



Eye Tracking Demo - Source: YouTube

Gestalt Laws of Perception - I

- Gestalt concept allows us to explain how humans perceive and comprehend visual information
- as interface designers such laws can be exploited
 - *create visual layouts and representations to improve communications, concepts, relationships...*
- Gestalt: **form, shape...**
 - *refers to the notion of a whole, a body, more than the mere sum of its parts...*
- Gestalt in psychology
 - *notion that humans seek sense of the world by imposing concepts of structure, order...*
- **Gestalt effect** suggests that our mind will naturally attempt to recognise coherent, whole forms...
 - *instead of perceiving individually smaller constituent parts that form the whole*

Gestalt Laws of Perception - 2



Source - Gestalt Principles

Gestalt Laws of Perception - 2



Source - World Wildlife Fund

Gestalt Laws of Perception - 3

- 1923, Max Wertheimer's paper *Laws of Organisation in Perceptual Forms*
- suggested a number of principles or laws that describe how the mind tends to perceive visual information
- for example, there are certain laws useful for consideration relative to design
 - *Law of Prägnanz*
 - Law of Proximity
 - Law of Similarity
 - Law of Closure
 - Law of Common Fate/Region
 - Law of Continuation
 - Law of Good Gestalt (or Good Continuation)

Gestalt Laws of Perception - 4

Law of Prägnanz

- basic law proposed by Wertheimer
 - *the other laws are derived from this basic law*
- Prägnanz can be roughly translated as **concise** in nature, or a sense of **simplicity**
- when we perceive a visual scene we try to interpret it,
 - *in the simplest, most concise, and easily recognisable form*
- the mind tries to perceive the scene as a whole
 - *rather than the sum of its constituent parts*
- consider an image of a square or rectangle
 - *not four sides*
 - *two horizontal and two vertical*

Gestalt Laws of Perception - 5

Law of Proximity

- items located in close proximity will be perceived as a single entity or group
- items in a group will also be perceived as distinct and different from other items
 - *eg: an electronic board with individual lights, bulbs...*
- close proximity causes the interpretation in our vision and brain
- change the proximity, and our perception will change as well
- interface design
 - *separate and isolate similar elements and user's perception of the whole will change*
 - *eg: keep form elements together to avoid isolation and false perception*
 - *coherent presentation of like elements to form the required whole*

Gestalt Laws of Perceptions - 6



Source - Web Designer Depot

Gestalt Laws of Perception - 7

Law of Similarity

- visual elements that share properties or attributes are perceived as belonging together
- conversely, visual elements with differing properties or attributes will be perceived as belonging to different groups
- eg: jumble elements together - squares, circles, triangles, rectangles...
 - *our vision and brain will try to organise and sort these shapes*
 - *colour will also act as a varying factor*
 - *we will try to group based upon multiple attributes - shape, colour...*
- file managers are a good example of this principle in interface design
- highlighting and other sort options naturally help our users

Gestalt Laws of Perception - 8



similarity

Source - Web Designer Depot

Gestalt Laws of Perception - 9

Law of Closure

- lines, or similar representative grouped elements
 - *more likely to be perceived as a common group if they appear to form*
 - the outline or *closure* of a given shape or surface
- still considered true if that outline is not complete
- our mind will fill in any gaps in these incomplete shapes
 - *eg: an incomplete circle*
 - *simpler to see as a circle than an arc of 330 degrees...*
- logos and other visualisations often use this trick

Gestalt Laws of Perception - 10

Closure



Source - APRK Topics

Gestalt Laws of Perception - II

Law of Common Fate/Region

- motion, and elements, moving in the same direction simultaneously
 - *still perceived as a similar grouping*
- drag and drop in interfaces
 - *uses this perception of grouping*
 - *act of dragging disparate elements imparts concept of group*
- the trail of the motion imparts a sense of unity to these interface elements

Gestalt Laws of Perception - 12



common region

Source - Web Designer Depot

Gestalt Laws of Perception - 13

Law of Continuation

- elements within an interface that appear to be a continuation
 - *perceived by users as belonging together*
- a user's focal point will continue along this line or sequence
 - *until the end or if broken by something else*
- peripheral vision will inform focal point...

Gestalt Laws of Perception - 14



continuation

Source - Web Designer Depot

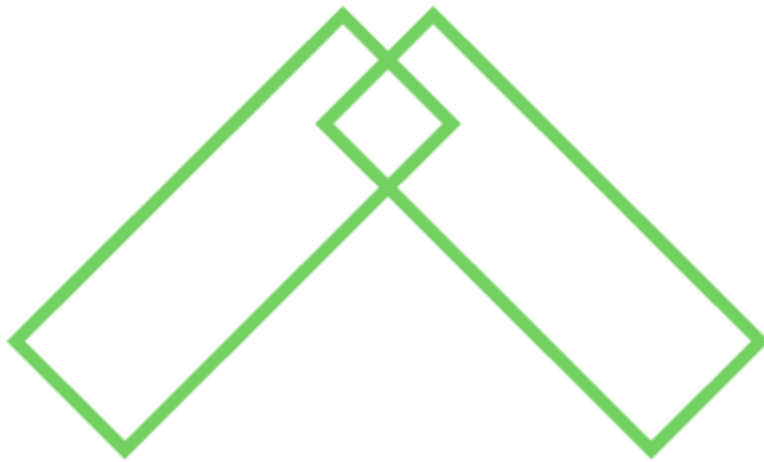
Gestalt Laws of Perception - 15

Law of Good Gestalt (or Good Continuation)

- our perception of smooth continued lines
 - *even if they are broken by an intersection or crossing*
- eg: multiple lines crossing still perceived as separate single lines
 - *we see individual lines*
 - *we rarely see the meeting of two angles*
- our mind has been taught to perceive the crossing of two lines as simpler
- data visualisation is a good example
 - *allows us to present multiple lines and expect our users to differentiate*
 - *multiple data results crossing...*

Gestalt Laws of Perception - 16

Good Gestalt



Source - APRK Topics

Visual Attributes - I

- elements used as components to build a graphical interface
 - *might include buttons, icons, drop-down lists, menus, checkboxes...*
- attributes are properties of these visual elements
 - *attributes as styling for a page's visual elements*
- patterns in design and layout aid a user
 - *reduces cognitive load, creates an aid to vision, perception, recognition...*
- elements with similar function should be style in a similar manner
- **contrast** presents itself as an intentional and easily recognisable difference
 - *eye-catching, attention grabber for a user...*
 - *can provide users with clues to elements, content...*

Visual Attributes - 2

- **size** is another way we can create differentiation in our designs
 - *generally easy for a user to discern and understand*
- size has been used for centuries in print design
 - *Lombardic capitals in mediaeval manuscripts and books*
- size is often perceived as visual dominance
 - *a sense of greater importance*
 - *size can make a difference within certain aspects of interface design*
- size has been applied in the use and development of grid layouts in web design
 - *allow us to easily define relative sizes for content, blocks...*
 - *larger centre panels often perceived as more important than headers, sidebars...*
- data visualisation uses this principle for differentiation
 - *quickly and effectively communicate larger data values*
 - *relative weights of data*
- assigning size attributes needs to consider relative weighting of importance
 - *relative value of elements to task at hand...*

Visual Attributes - 3

- **colour** can play a vital role in the presentation of an interface
 - *also plays important role in user perception*
- after size, colour is perceived as next important attribute
 - *aids user differentiation*
- colour can help guide a user to certain aspects of an interface
- elements that share identical colours often perceived as in the same group
 - *contrasting colours present a useful juxtaposition of elements*
- cultural pre-conceptions aside
 - *certain colours have perceived inherent meaning*
 - *red for danger, errors...*

Visual Attributes - 4

- users are often able to quickly and easily differentiate shapes and patterns
 - *Gestalt principles in practice*
 - *easily differentiating squares from circles and triangles*
- easily differentiate content and elements
 - *apply shapes as outlines, borders, content differentiation...*
- elements placed at an angle to one another perceived as jarring and mismatched
- grid design and layouts further heighten this issue of angles
- angles perceived as creating a sense of **visual tension**
 - *often distracting for a user*
- angles can, however, be used to highlight and contrast elements

Visual Attributes - 5

- weight in interface design
 - *refers to the thickness of a line, font...*
 - *its relative presentation within a design*
- can be a quick and easy differentiating factor within our designs
- a variation on the concept of **contrast**
- text styling can be a very useful and practical difference in designs
- texture can also play a useful role in our designs
- texture has a broad use in graphic design
 - *often perceived relative to the overall visual look and feel of a block of text*
 - *its overall visual effect*

References

- Carstens, A., and Beck, J. *Get ready for the gamer generation*. Tech Trends 49. PP.22-25. 2005.
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