



# **OUR ATTENTION IS LIMITED; OUR MEMORY IS IMPERFECT**

From Chapter 7 of DWTMIM  
by Jeff Johnson

# TYPES OF MEMORY

## Short-Term Memory

- Information is retained for brief intervals

## Long-Term Memory

- Information is retained for long intervals

# MEMORY ALLEGORY



# LONG-TERM MEMORY FORMATION

- Consists of changes in neurons involved neural activity pattern
  - Makes the pattern easier to reactivate
- More permanent changes occur when neurons form new connections with others

# LONG-TERM MEMORY ACTIVATION

- Reactivation of the same pattern that formed the memory
- **Recognition** is when similar perceptions reactivates the same patterns
- **Recall** is when activity in other parts of the brain reactivate a neural pattern

# SHORT-TERM MEMORY

- A combination of phenomena
  - Perception
  - Retrieval from long-term memory
  - Attention

# PERCEPTION

- Each perceptual sense has its own brief short-term memory
  - Result of residual neural activity after a perceptual stimulus ends
- Residual perceptions are potential inputs to working memory



# LONG-TERM MEMORY RETRIEVAL

- Reactivated long-term memories are also possible inputs for working memory
  - Accomplished via either recognition or recall
- Each long-term memory corresponds to specific neural pattern
- Memory patterns are candidates for our attention



# ATTENTION

- Brain has multiple attention mechanisms
  - Can be voluntary and involuntary
- Focuses awareness on subsets of perceptions and activated long-term memories

# WORKING MEMORY

- Our combined focus of attention
- Whatever is in that focus is what we are conscious of at any moment
- A few perceptions and long-term memories that are activated enough that we are aware of them for a brief period

# CHARACTERISTICS OF ATTENTION

- Your brain cannot process everything around you
- Rather very selective samples of the environment are taken
- Perception is filtered and biased by the goals of the individual
- Attention is drawn to:
  - Movement
  - Threats
  - Faces of other people
  - Sex and food

# ATTENTION EXAMPLE



# CHARACTERISTICS OF WORKING MEMORY

- Capacity of working memory is very low
- Focusing attention on the new takes away focus from the old
- Information is easily lost

# CHARACTERISTICS OF LONG-TERM MEMORY

- Actually is a memory store
- Memories are spread among many sections of the brain
- Plagued with weaknesses
  - Error-prone
  - Weighted by emotions
  - Retroactively alterable

# WORKING MEMORY AND UI DESIGN

- UI should help people remember essential information
- Don't require users to remember what they have done, their focus is only on their primary goal
- Main examples include:
  - Modes
  - Search Results
  - Calls to action
  - Instructions
  - Navigation Depth

# MODES

- Some user actions have different effects depending on the mode the system is in
- Software designers should try to provide such tools
- More consistency in the operation of different functions, the less users have to learn





# SEARCH RESULTS

- People often don't remember the search terms they just typed
- Search results sometimes don't show the search terms, leading to users possible forgetting what they original looked up

# SEARCH RESULTS EXAMPLE

**BIGBADTOYSTORE**

**TRANSFORMERS** **DC COMICS** **MARVEL** **STAR WARS** **MORE**

**Best Sellers** | **Featured Pre-orders** | **New Arrivals** | **Sale Items** **Cart** | **My Account** | **Help**

1-19 of 19 results **Sort By** Bestselling **Results per page** 20

**APPLIED FILTERS**  
Search Text: monsterarts

**Brand:**  
Godzilla (13)  
King Kong (2)  
Alien (1)  
Monster Hunter (3)

**Series:**  
Exclusives (3)

**Featured In:**  
Godzilla Singular Point (Anime Series) (3)  
Godzilla: Final Wars (2004) (3)  
Godzilla: King of the Monsters (2019) (2)  
Godzilla vs. Kong (2021) (4)  
Godzilla vs. Hedorah (1971) (1)  
Godzilla vs. King Ghidorah (1991) (1)  
Godzilla Against Mechagodzilla (2002) (1)  
Monster Hunter: World (Video Game) (2)

**Character:**  
Godzilla (5)  
Ghidorah (2)

**Godzilla Singular Point S.H.MonsterArts  
Godzilla Ultima** **IN STOCK**  
By: Bandai Spirits  
**\$119 99**

**Godzilla: Final Wars S.H.MonsterArts  
Godzilla** **IN STOCK**  
By: Bandai Spirits  
**\$94 99**

**Godzilla: King of the Monsters  
S.H.MonsterArts King Ghidorah (Special  
Color Version)** **IN STOCK**  
By: Bandai Spirits  
**\$239 99**

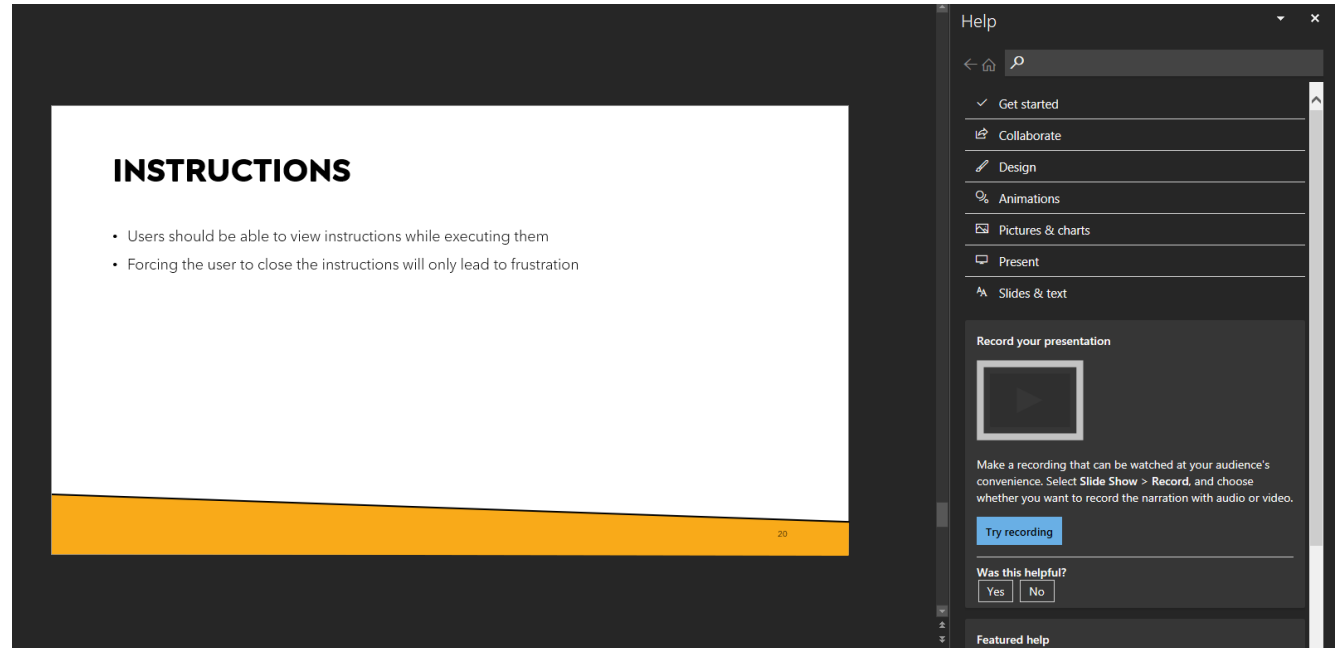
**Godzilla: Final Wars S.H.MonsterArts  
Gigan (Great Decisive Battle Ver.)** **IN STOCK**  
By: Bandai Spirits

# CALLS TO ACTION

- Avoid putting competing calls to action on a page
- Each page should have one dominant call to action
- Any additional calls to action will only overwhelm the user

# INSTRUCTIONS

- Users should be able to view instructions while executing them
- Forcing the user to close the instructions will only lead to frustration



# NAVIGATION DEPTH

- Broad and Shallow navigation hierarchies are easier to use
- Navigating 12 levels of menus would exceed most user's working memory
- Provide navigation "breadcrumb" paths to continuously remind users where they are

# LONG-TERM MEMORY AND UI DESIGN

- People need tools to augment long-term memory
- Software designers should try to provide such tools
- More consistency in the operation of different functions, the less users have to learn

**THANK YOU**

