Human Memory
The Principles of Learning
Basics of Memory

• Since all human’s brains are different, there are many different ways that humans are able to learn and remember information
  • **Visual Learners**
    • Learn by seeing
  • **Auditory Learners**
    • Learn by hearing
  • **Read-Write Learners**
    • Learn by reading and writing
  • **Kinesthetic Learners**
    • Learn by doing
The Process of Processing Information

- **Encoding** – Getting information into the memory system
  - Process of Learning Information
- **Storage** – Retaining information in memory over time
  - Process of Remembering Information
- **Retrieval** – Getting information out of memory storage
  - Process of Recalling Information
Humans have two main ways of remembering information and skills

**Automatic Processing** - The unconscious encoding of some information without effort
- Ex. Riding a bike, you remember how to do it, but have not taken any step to remember how

**Effortful processing** - Encoding that requires attention and conscious effort
- Rehearsal - Conscious repetition of information
  - Ex. Practicing the Piano
- Overlearning - rehearsal of info beyond the point where it has been learned
  - Ex. Memorizing the names of the Presidents by studying what each is famous for
Retaining Information

• Psychologist Hermann Ebbinghaus theorized the Forgetting Curve in 1885
• Related the amount of information retained over time
• Found the more time spent of learning the longer it is retained
  • Revisiting information leads to greater/longer retention
Specialized Memory Tendencies

• **Primary** and **Recency Effect** – The tendency to remember the first (primary) and last (regency) items in a sequence
  • Ex. When listing actors and actresses in a film preview the first and last actors/actresses listed are usually the one that people most relate to the movie
    • Also typically the highest paid

• **Chunking** – Organizing information into meaningful units
  • Remembering States by grouping them together by region
Specialized Memory Tendencies

- **Mnemonic Devices** – memory tricks or techniques
  - Ex. HOMES – way to remember Great Lakes
- **Method of Loci** – Associating items to remember with imaginary places
  - Ex. Remembering birthday by picturing park it was held at
- **Peg-Word System** – Associating items with a list of peg words you have already memorized.
Rehearsal and Retention

• Effectiveness of rehearsal depends on when you do it. Research shows Distributed rehearsal more effective than Masses.
  • **Distributed rehearsal** – Spreading rehearsal out in several sessions separated by periods of time
    • Ex. Studying for a test by reviewing pieces of information every day the week leading up to the test
  • **Massed rehearsal** – putting together rehearsal time in one long session
    • Ex. Cramming for a test by studying everything the night before a test
Associating Meaning to Memories

• Rehearsal is important to encoding, but the meaningfulness of the information is also important. Associating memories with other methods helps greater retention

• Semantic Encoding – The encoding of memory by associating it with a picture, sound, smell, etc...
  • Ex. Associating screeching tires with memory of car accident

• Self-Reference Effect – Enhanced semantic encoding of information that is personally relevant
  • Ex. Victim is able to remember event much more vividly than bystander since event happened to them

Ex. Associating effects of Meth use with picture
Methods of Storage

- Humans have 3 distinct storage systems:
  - Sensory memory (least permanent)
  - Short-term/working memory
  - Long-term memory (most permanent)
- Separated into Explicit and Implicit Memories
  - **Explicit** - Memory of facts and experiences
  - **Implicit** - Memory of skills and procedures
Sensory Storage

• The brief, initial coding of sensory info in the memory system
  • **Iconic Store** - Storing of visual images until another picture replaces it
    • Usually lasts for about ½ a second
  • **Echoic store** - Storing of auditory information
    • Usually lasts for about 3-4 seconds
Short-Term/Working Memory

• Part of your memory system that contains information you are consciously aware of before it is stored more permanently or forgotten
  • We can only hold a few pieces of information in our short-term memory (maybe 4-7 items)
  • Rehearsal dictates how long you can retain info in this portion of our memory
Long-Term Memory

• Relatively permanent and limitless storage of the memory system
  • You can remember countless facts and events you have been encoded and stored at some point in long term memory.
  • Possibly lasts up to a century
Recalling Memory

• Ability to get information out of memory storage
  • **Recall** - Searching for information you previously stored
  • **Recognition** - Must identify items you learned earlier

• **Context Effect** - Ability to retrieve information when you are in an environment similar to the one in which you encoded the information

• **State Dependency** - Ability to retrieve information when you are in the same physical and emotional state you were in when you encoded the information