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MODERN LEARNING THEORIES

Each approach to gaining the attention of learners to engage their understanding and provide useful experiences has strengths and limitations. Motivation is key to sparking an interest and desire to learn, and each approach treats this driving force.

<table>
<thead>
<tr>
<th>Behavioral Theories</th>
<th>Cognitive Theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on reinforcing appropriate behavior and introducing new material built on what students have learned.</td>
<td>Based on thinking and reasoning skills for learning complex ideas.</td>
</tr>
<tr>
<td>Learning is defined as a change in behavior.</td>
<td>Learning is defined as the process of gaining or changing insights, outlooks, perspectives or thought patterns.</td>
</tr>
<tr>
<td>External environment influences learning.</td>
<td>The <em>needs, interests, values and feelings</em> of learners influence their learning.</td>
</tr>
<tr>
<td>Learning occurs in small steps reinforced by small successes.</td>
<td>Students learn through discovery.</td>
</tr>
<tr>
<td>Know whether students have learned by observing changes in their behavior.</td>
<td>Internalization of knowledge and <em>attitudes</em> must be inferred from observed behavior. There is more to learning than observed behavior.</td>
</tr>
<tr>
<td>The instructor designs the learning environment.</td>
<td>The instructor manages and facilitates the instruction.</td>
</tr>
<tr>
<td>Learners are passive and respond to stimuli.</td>
<td>Learners actively process, store and retrieve information for their own use.</td>
</tr>
<tr>
<td>Used mostly for sensorimotor skills or limited precise outcomes.</td>
<td>Used mostly for cognitive and <em>affective</em> domain outcomes. Learners comprehend by stating in own words and applying.</td>
</tr>
</tbody>
</table>
MODERN LEARNING THEORIES

<table>
<thead>
<tr>
<th>Constructivist Theories</th>
<th>Humanist Theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on the idea that learners create their own unique education because learning is based on prior knowledge and pursuit of <em>intrinsic</em> goals</td>
<td>Based on the idea that each person is unique and has important perspectives, <em>feelings, values and concerns</em> that need to be addressed</td>
</tr>
<tr>
<td>Learning is defined as interactive, dialogic and reflective</td>
<td>Learning is defined as personal and is <em>intrinsically</em> driven</td>
</tr>
<tr>
<td>Social context influences learning and is important because learning is social (What situation is the learner in? What does the learner need to be able to do? What is the learner’s purpose?)</td>
<td>Social context dictates members’ learning practices (What is important to this person? What does this person value?)</td>
</tr>
<tr>
<td>Active learning is necessary, include a variety of learning strategies</td>
<td>Freedom of choice is necessary to allow learners to serve personal goals</td>
</tr>
<tr>
<td>Collaborative learning is valuable</td>
<td>Collaborative learning must be egalitarian</td>
</tr>
<tr>
<td>Emphasis on concepts vs. procedures, concept analysis</td>
<td>Emphasis on individual perspective, sense of mastery and self-satisfaction</td>
</tr>
<tr>
<td>Mental models, analogies, metaphors (flow of information, research process, Boolean logic, databases, the Web, the Internet, computers, etc.)</td>
<td>Meaningful activities and material with high relevance</td>
</tr>
<tr>
<td>Demos, examples (good and bad that need fixing) and samples for worksheet exercises, writing search strategies and getting feedback, verbalizing search strategies aloud</td>
<td>Personally engaging methods are necessary to foster learning, e.g., journaling, service learning, collaborative learning, active learning, interning, field exercises</td>
</tr>
<tr>
<td>Instructor mentors peer interaction and continuity of building on known concepts</td>
<td>Instructor facilitates interaction with material and/or group members</td>
</tr>
</tbody>
</table>
Gagne’s Nine Events of Instruction

1. **Gaining attention**
   Motivate students, giving them reason to pay attention
   Tell students why it is important to learn this material
   Relate it to other courses, their future work or career, and personal life

2. **Informing learners of objectives/outcomes**
   Let students know what is expected of them
   Assists in lesson design, test and evaluation items

3. **Stimulating recall of prerequisite learned capabilities**
   Relate new information to previously learned information
   Help students make connections to concepts learned elsewhere
   Helps instructor evaluate whether students have assumed knowledge

4. **Presenting stimulus material**
   Presentation of content through selected methods and techniques
   Use a variety of material: readings, assignments, exercises, discussions, etc.

5. **Providing learning guidance**
   Assist students in moving knowledge from short-term to long-term memory
   Involve students in thinking, talking and working with material in a variety of ways

6. **Eliciting performance**
   Provide practice activities
   Help students apply theory to actual practice

7. **Providing feedback**
   Let student know how well they do on exercises
   Describe what needs to improve and why

8. **Assessing performance**
   Evaluate student learning using formative and summative methods

9. **Enhancing retention and transfer**
   Provide opportunities to apply knowledge in a variety of situations
   Provide several opportunities for repetitions of processes
   Require application of accumulated knowledge

Six Phases of Instructional Design

1: RECOGNIZE THE LEARNER’S NEED

- What do you expect students to be able to feel and know/think/understand and do?
- What do you want learners to get out of this instruction?

2: ANALYZE THE PRESENT SITUATION-- Needs Assessment

- What do students currently feel and know/think/understand and do?

3: DEVELOP INSTRUCTIONAL GOALS

- What should I teach?
- What will they do?

4: IMPLEMENT INSTRUCTIONAL PLAN

- How should I teach?
- How will we know they are learning?

5: ASSESS THE OUTCOMES

- To what degree did students attain the learning goals?
- Was their learning successful?

6: REVIEW ASSESSMENT DATA & REVISE AS APPROPRIATE

- Was my teaching successful?
- What can be changed to improve results in the future?

Needs Assessment Worksheet

1. Gather information directly from learners (Needs Assessment, Pre-Test)

Who are the learners?

What is their experience so far? What do they already know that is related to this instruction and which of these is the most important?

What difficulties are the learners experiencing? What is the problem that might be solved through instruction?

What do they need to be able to do?

2. Conduct a performance analysis

Are deficiencies due to need for different:
  - knowledge
  - skills
  - attitudes
  - signage, handouts, or other aids
  - other:

3. Identify discrepancies

Identify "the gap" between where they are and where they need to be (SLOs)

Identify "what is" i.e., the reality of where they are

Identify "what should be" in ideal terms (SLOs)
4. **Identify resources and constraints on those resources**

What resources are available?

What constraints exist?

5. **Identify priorities and goals (ACS SLOs)**

What will the successful learner:

Do (sensorimotor skills)

Think (cognitive skills)

Feel (affective skills)

6. **Write overall instructional goal statement**

Your instructional goal statement must include:

a. The target group
b. The cause of the problem
c. The kind of problem (need new skills, knowledge, attitude, etc.)
d. Statement of what will be different when the goal is achieved (SLOs)
User-Based Bibliographic/Information Literacy Instructional Design

Keyed to Instructional Design Stages

1: Obtain structured self-reports from student users (recognize and analyze need--needs assessment)

2: Extract learning outcomes using content analysis (needs assessment)

3: Classify user outcomes in the BI taxonomy of skills (needs assessment)

4: Expand outcomes into ACS units (develop goals)

5: Create performance exercises and test items for ACS objectives (develop goals)

6: Pre-test students to determine skill level (needs assessment baseline data)

7: Administer instruction and exercises (implement instructional plan)

8: Post-test students to determine change in skill level (assess outcomes)

9: Obtain new self-reports to identify new needs (assess outcomes, needs assessment)
Writing Integrated Learning Outcomes
[formerly behavioral objectives]

Each integrated objective must include SAOAC and ACS and ACRL SPIO:

a) Situation (What activity will stimulate students to perform what I intend to teach?)
b) Ability [verb] (What skills do learners use while performing this activity?)
c) Object (What is the outcome of the learners’ performance?)
d) Action (How will learners accomplish the task?)
e) Constraints (Are special tools needed? What criteria will be used to define success or level of proficiency? What minimum value should be obtained?)

Example SAOAC with ACS:

Given a list of information sources (Situation), learners will classify (Ability) (Cognitive) the list (Object) (a product you provide) by identifying primary and secondary sources on a worksheet (Action) (Sensorimotor) (shows evidence of learning) with ninety percent accuracy (Constraint or Target).

ACS Taxonomy of Learning Outcomes for Information Searching Competence

<table>
<thead>
<tr>
<th>Skill Level</th>
<th>Affective Domain</th>
<th>Cognitive Domain</th>
<th>Sensorimotor Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td>A3</td>
<td>C3</td>
<td>S3</td>
</tr>
<tr>
<td>Feeling Empowered as a Searcher</td>
<td>Acquiring Familiarity and Intuition with Disciplinary Knowledge</td>
<td>Practicing Careful Documentation Routines</td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>A2</td>
<td>C2</td>
<td>S2</td>
</tr>
<tr>
<td>Being Supportive of the System Environment</td>
<td>Understanding Search Strategy</td>
<td>Identifying Implicit Features of the Information Setting</td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>A1</td>
<td>C1</td>
<td>S1</td>
</tr>
<tr>
<td>Showing Acceptance of Information Structure</td>
<td>Decoding Information Displays and Terminology</td>
<td>Recognizing Information Elements and Locations</td>
<td></td>
</tr>
</tbody>
</table>


### Examples of Integrated ACS Outcomes

<table>
<thead>
<tr>
<th><strong>AFFECTIVE</strong> [values, feelings]</th>
<th><strong>COGNITIVE</strong> [thinking, deciding]</th>
<th><strong>SENSORIMOTOR</strong> [actions, moves]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students value knowing about hierarchical relationships among subject terms.</td>
<td>Students define correctly cross reference designations, including, Narrower, Broader, Use For, Use, and Related terms.</td>
<td>Students trace paths successfully through cross reference structure.</td>
</tr>
<tr>
<td>Students strive for accuracy in typing search statements.</td>
<td>Students know how to correct syntax input errors.</td>
<td>Students type search statements accurately.</td>
</tr>
<tr>
<td>Students feel in control when using command language.</td>
<td>Students predict correctly the consequences of a given command.</td>
<td>Students read keyboard template to select correct function key.</td>
</tr>
<tr>
<td>Students show persistence in locating materials, without giving up too soon.</td>
<td>Students know the procedures to follow when material is not in its call number location on the shelf.</td>
<td>Students check surrounding shelves and sorting shelves before going to the Circulation Desk.</td>
</tr>
<tr>
<td>In using databases, students are concerned with the time period covered in the source.</td>
<td>Students interpret dates of coverage given on title screens, correctly placing the date wanted within the dates listed.</td>
<td>Students consistently look for dates of coverage on title screens of databases.</td>
</tr>
<tr>
<td>Students show willingness to take initiative in translating into their own words the content of databases.</td>
<td>Given explanations of the content of various databases, students will connect their topics to the appropriate database.</td>
<td>Students click on the correct database in the title list.</td>
</tr>
</tbody>
</table>
Identify the learning domain (ACS) and level (1-3) for each objective:

The user will be able to:

1] Explain the appropriate uses of different types of periodical literature.

2] Make positive statements about expectations for the success of library research projects.

3] Match information structure characteristics to types of periodical literature.


5] Be willing to learn the distinguishing characteristics of different types of sources.

6] Identify the characteristics of various types of periodical literature.

7] Demonstrate confidence during the use of various types of information sources.

8] Identify the information structure elements within citations.

9] Value the usefulness of bibliographic control for documenting periodical articles.

10] Appreciate the opportunity to experiment with new search tools.

11] Use controlled vocabularies to construct search statements.

12] Show enthusiasm when given library research assignments.

13] Accept a librarian’s suggestion about appropriate sources.

14] Evaluate a source of information using established analytic criteria.
Model Integrated ACS Outcomes

INSTRUCTIONAL GOAL
Students will compose accurate bibliographic citations for term paper assignments.

PERFORMANCE INDICATOR
1. Students will distinguish between essential and non-essential elements in formatting bibliographic citations. (ACRL 2.5.c,d)

OUTCOMES

1.S Sensorimotor Outcome
Given an entry from a periodical database, the learner will compose a complete and correct bibliographic citation.
   a. abbreviations are acceptable
   b. any standard bibliographic style may be used
   c. partial credit will be given if one component is incorrect (essential components include: ...)
   d. with ninety percent accuracy.

1.C Cognitive Outcome
Given an entry from a periodical database, the learner will extract only the essential components to compose a bibliographic citation.

1.A Affective Enabling Outcome
Given a rating instrument, learners will demonstrate that they value using correct reference style.
Composing Integrated ACS Outcomes

Write an Instructional Goal that encompasses these ACS outcomes. Then write the SAOAC elements to complete the integrated outcomes.

INSTRUCTIONAL GOAL

STUDENTS:

ACRL Standard Three
The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.

ACRL PERFORMANCE INDICATOR 2:
The information literate student articulates and applies initial criteria for evaluating both the information and its sources.

Students apply evaluation criteria to retrieved citations to determine which items to print or save.

AFFECTIVE OUTCOME:

Students are willing to select only relevant and authoritative items to print or save.

COGNITIVE OUTCOME:

Students are able to assess the relevance and credibility of each item retrieved.

SENSORIMOTOR OUTCOME:

Students are able to mark items to be printed or saved.
Composing Integrated ACS Outcomes

Complete the missing elements to create integrated outcomes.

**A. INSTRUCTIONAL GOAL**

**STUDENTS:**

**STANDARD:**

**PERFORMANCE INDICATOR:**

**AFFECTIVE OUTCOME:**

Students will value knowing about hierarchical relationships among subject terms.

**COGNITIVE OUTCOME:**

Students will define correctly syndetic structure codes.

**SENSORIMOTOR OUTCOME:**

Students will trace paths successfully through syndetic structure.

**B. INSTRUCTIONAL GOAL**

**STUDENTS:**

**STANDARD:**

**PERFORMANCE INDICATOR:**

**AFFECTIVE OUTCOME:**

Students feel in control when searching with field codes.

**COGNITIVE OUTCOME:**

Students correctly predict the consequences of using a given field code.

**SENSORIMOTOR OUTCOME:**

Students read dialog box to select correct field code.
Affective Outcomes:
Affective Target Behaviors That Enable
Cognitive and Sensorimotor Outcomes

Involve learners in:

1) Maintaining a positive attitude and disposition.
2) Being in a positive state of mind and mood.
3) Being willing to comply with instructions.
4) Trusting the established process and procedures.
5) Resolving to overcome felt resistance.
6) Defeating rigid presuppositions.
7) Being interested in the instructor’s intention and purpose.
8) Valuing being accurate, paying attention to detail and order, double-checking.
9) Developing the motivation to learn.
10) Being willing to cultivate new motives and thought processes.
11) Facing challenges with determination and self-discipline.
12) Wanting to develop proficiency, mastery.
13) Striving to be up to date, au courant, keeping up, staying ahead, staying out front, in the know, up on things.
14) Maintaining perseverance and persistence.
15) Monitoring expectations, assumptions, and imaginings.
16) Restoring composure after regression (shame, frustration, anger, regret, resentment, compulsive thoughts of self-deprecation, negative self-talk, etc.)
17) Resuming progress after lapses in coordination, logic, or rationality.
18) Overcoming intimidation, fear, and technophobia.
19) Appreciating the benefits, advantages, and uses of resources.
Action Verbs for Creating Measurable Learning Outcomes

**AFFECTIVE VERBS**
Accepts
Acclaims
Advocates
Alert to
Agrees with
Appreciates the importance of
Appreciates the value of
Approves
Assumes responsibility for
Attempts
Attentive to
Attracted to
Avoids
Calm
Careful
Challenges
Chooses to
Confidence in
Continues to
Cooperates
Copes with
Courteous
Defends
Develops positive relationship to
Devoted to
Disagrees
Disputes
Encourages
Engages in
Explores a new perspective
Feels comfortable with
Feels confident
Feels free to
Finds pleasure in
Follows along
Friendly tone
Helps out of concern for
Identifies with
Joins in
Listens to
Obeys
Optimistic about
Participates enthusiastically
Participates in
Patience
Perceives
Perseveres
Persist
Picks
Praises
Receptive to
Resists
Satisfied
Selects
Self-corrects
Expresses sense of accomplishment
Sense of direction
Sensitive to
Shares out of interest
Shows preference for
Shows tolerance of
Shows curiosity
Shows enthusiasm
Supports
Takes initiative
Values
Voluntarily engages in
Volunteers
Wants to
Willing to answer
Willing to engage in
Willing to respond to

**COGNITIVE VERBS**
Analyzes
Ascertains
Assesses
Changes
Classifies
Compares
Defines
Describes
Designs
Determines
Develops
Diagnoses
Differentiates
Discriminates
Distinguishes
Estimates
Evaluates
Explains
Formulates
Integrates
Isolates
Judges
Organizes
Plans
Qualifies
Rates
Ranks
Recalls
Reviews
Revises
Solves
Sorts
Surveys
Verifies

Controls
Coordinates
Copies
Corrects
Counts
Creates
Demonstrates
Diagrams
Documents
Encodes
Enters
Extracts
Gathers
Gives
Groups
Guides
Helps
Identifies
Informs
Initiates
Inspects
Installs
Instructs
Lists
Locates
Logs
Matches
Measures
Modifies
Monitors
Names
Observes
Opens
Operates
Presses
Recognizes
Records
Scans
Scores
Sequences
States
Traces
Troubleshoots
Types

SENSORIMOTOR VERBS
Accumulates
Activates
Adds
Adjusts
Advises
Aids
Aligns
Amends
Applies
Arranges
Assembles
Assigns
Builds
Checks
Cites
Collects
Completes
Conducts
Constructs

Controls
Coordinates
Copies
Corrects
Counts
Creates
Demonstrates
Diagrams
Documents
Encodes
Enters
Extracts
Gathers
Gives
Groups
Guides
Helps
Identifies
Informs
Initiates
Inspects
Installs
Instructs
Lists
Locates
Logs
Matches
Measures
Modifies
Monitors
Names
Observes
Opens
Operates
Presses
Recognizes
Records
Scans
Scores
Sequences
States
Traces
Troubleshoots
Types
Active Learning Principles

• Let users perform steps themselves.
• Let learners work together to plan and execute steps.
• Guide users orally, with brief written instructions on screen, or concise handouts.
• Follow-up on their progress intermittently.
• Avoid touching user’s keyboard and mouse.
• Point to screen areas to orient a user’s focus.
• Create opportunities for small successes by chunking instructional content.
• Reassure learners by validating their small steps.
• Model positive self-regulatory sentences.
• Allow users to overhear you helping someone else.
• Design the information retrieval environment to emphasize what you want users to value.
Active Learning Model

Discovery Learning

Instructional Design:

1. Preliminary hands-on practice
2. Explanation and discussion
3. Follow-up hands-on practice

Learner’s Process: Do → Listen, Observe, & Discuss → Do Again

1: Uninformed Practice:

Assign preliminary exploration of a source/tool.

2: Active Listening:

Explain the formal aspects of a tool or process.
Invite discussion.
Ask questions.
Get responses.

3: Informed Practice:

Follow-up with additional hands-on practice.
## Active Learning Exercise: Question Analysis Chart

<table>
<thead>
<tr>
<th>GEOGRAPHY</th>
<th>TIME SPAN</th>
<th>TARGET/INTEREST GROUPS</th>
<th>IMPLICATIONS</th>
<th>DISCIPLINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NATIONAL</td>
<td>HISTORICAL OVERVIEW</td>
<td>WOMEN</td>
<td>HEALTH</td>
<td>SOCIOLOGY</td>
</tr>
<tr>
<td>INTERNATIONAL</td>
<td>CURRENT YEAR</td>
<td>LABOR</td>
<td>ECONOMIC</td>
<td>PSYCHOLOGY</td>
</tr>
<tr>
<td>REGIONAL</td>
<td>SPECIFIC EVENT</td>
<td>CHILDREN</td>
<td>POLITICAL</td>
<td>ENVIRONMENTAL STUDIES</td>
</tr>
<tr>
<td>LOCAL</td>
<td>DECADE</td>
<td>TEACHERS</td>
<td>SOCIAL</td>
<td>AMERICAN HISTORY</td>
</tr>
<tr>
<td>SPECIFIC PLACE</td>
<td>CENTURY</td>
<td>POLITICIANS</td>
<td>PSYCHOLOGICAL</td>
<td>LITERATURE</td>
</tr>
<tr>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
</tr>
</tbody>
</table>

1: Using the research topic for this course, analyze your question by charting all of the possibilities that apply to your topic. Be specific, e.g., U.S. instead of national).

2: Reformulate your research problem into a concise question.

3: Select one element from each column and create a research question using all five of the elements.

---

Task Analysis Technique

1] What is the problem?
2] What general skills are necessary?
3] What specific skills are necessary for each general skill?
4] What attitudes, behaviors, actions or knowledge is necessary to accomplish each specific skill?

1] PROBLEM: Teach Students How to Avoid Plagiarism

<table>
<thead>
<tr>
<th>Ethical Reasoning Skills</th>
<th>Information Research Skills</th>
<th>Documentation Skills</th>
<th>Writing Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valuing other’s written work.</td>
<td>How to find out what others have said on a subject.</td>
<td>How to document the bibliographic elements and the location of information in sources.</td>
<td>How to quote relevant passages and cite references in text.</td>
</tr>
<tr>
<td></td>
<td>How to search the online catalog.</td>
<td>How to use a style manual to construct complete citations.</td>
<td>How to use a style manual to format citations in text, and bibliography or notes.</td>
</tr>
<tr>
<td></td>
<td>How to select and search relevant databases and indexes.</td>
<td>How to take accurate and complete bibliographic notes on sources.</td>
<td>How to clearly state one’s own ideas as distinct from the ideas in the cited references, i.e., distinguish the ideas and reports of others from those of the student.</td>
</tr>
<tr>
<td></td>
<td>How to select and search relevant Web sites.</td>
<td>How to evaluate the reliability of retrieved information.</td>
<td>How to comment on, synthesize, and organize retrieved information in the text.</td>
</tr>
</tbody>
</table>
## Summary of Kuhlthau’s Six-Stage Model of the Information Search Process

<table>
<thead>
<tr>
<th>ISP STAGES</th>
<th>ISP TASKS</th>
<th>AFFECTIVE Feelings</th>
<th>COGNITIVE Decisions</th>
<th>SENSORIMOTOR Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Initiation</td>
<td>Recognize need</td>
<td>Uncertainty</td>
<td>General Vague</td>
<td>Seeking background information</td>
</tr>
<tr>
<td>2. Selection</td>
<td>Identify</td>
<td>Optimism</td>
<td>Scheduling Planning</td>
<td>Conference with others</td>
</tr>
<tr>
<td>3. Exploration</td>
<td>Investigate</td>
<td>Confusion/Frustration</td>
<td>Becoming informed about a topic</td>
<td>Seeking relevant information</td>
</tr>
<tr>
<td>4. Formulation</td>
<td>Formulate</td>
<td>Clarity</td>
<td>Narrowed focus</td>
<td>Selecting ideas</td>
</tr>
<tr>
<td>5. Collection</td>
<td>Gather</td>
<td>Sense of direction &amp; confidence</td>
<td>Defining &amp; supporting focus</td>
<td>Making notes of relevant information</td>
</tr>
<tr>
<td>6. Presentation</td>
<td>Complete</td>
<td>Relief Satisfaction or Disappointment</td>
<td>Clearer More focused</td>
<td>Personalized synthesis of topic</td>
</tr>
</tbody>
</table>

# Information Management Taxonomy of Solutions for Users' Affective Symptoms

<table>
<thead>
<tr>
<th>Affective Function</th>
<th>Users' Affective Symptoms</th>
<th>Information Management Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3</strong> REASSURING</td>
<td>Feeling enthusiasm vs. displeasure</td>
<td>Affirming to users the eventual outcome as being successful</td>
</tr>
<tr>
<td>CONSOLING (to promote acceptance and support)</td>
<td>Feeling empowered vs. helpless</td>
<td>Affirming the principle that &quot;users are never at fault&quot;</td>
</tr>
<tr>
<td></td>
<td>Accepting vs. rejecting</td>
<td>Presenting lifelong information literacy as an attainable goal</td>
</tr>
<tr>
<td><strong>2</strong> ADVISING</td>
<td>Experiencing fun vs. tedium</td>
<td>Sharing convenient tips &amp; information with users</td>
</tr>
<tr>
<td>COACHING (to strengthen information intentionality)</td>
<td>Feeling confident vs. anxious</td>
<td>Giving feedback (what will happen if...)</td>
</tr>
<tr>
<td></td>
<td>Experiencing clarity vs. confusion</td>
<td>Identifying something on a diagram or analyzing an example</td>
</tr>
<tr>
<td><strong>1</strong> ORIENTING</td>
<td>Being patient vs. impatient</td>
<td>Telling users how long things take (secs., mins.)</td>
</tr>
<tr>
<td>ENCOURAGING (to overcome resistance to information seeking)</td>
<td>Feeling guided vs. lost</td>
<td>Telling users about common errors from generational lists</td>
</tr>
<tr>
<td></td>
<td>Being thankful vs. complaining</td>
<td>Showing concern for users' technical difficulty</td>
</tr>
<tr>
<td></td>
<td>Being realistic vs. disappointed</td>
<td>Being told what is reasonable to expect</td>
</tr>
<tr>
<td></td>
<td>Feeling being taken care of vs. being uncared for</td>
<td>Being told where something needed can be found</td>
</tr>
</tbody>
</table>
## Nine Search Statement Error Types

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Making a Boolean inversion</td>
<td>dolphins OR migrate&lt;br&gt;dreams AND daydreams</td>
</tr>
<tr>
<td>2. Not using Boolean operators</td>
<td>dolphins migrate [AND is missing]&lt;br&gt;dreams daydreams [OR is missing]</td>
</tr>
<tr>
<td>3. Using common natural language</td>
<td>airplanes AND pollution of air&lt;br&gt;dolphins migrate to different places to find more food</td>
</tr>
<tr>
<td>4. Omitting concepts</td>
<td>dolphins [migrate is missing]&lt;br&gt;dreams [sleep is missing]</td>
</tr>
<tr>
<td>5. Adding unnecessary concepts</td>
<td>white tigers AND world&lt;br&gt;air OR habitat</td>
</tr>
<tr>
<td>6. Using inappropriate alternate terms</td>
<td>dolphins OR whales&lt;br&gt;daydreams OR wondering</td>
</tr>
<tr>
<td>7. Neglecting word form variations</td>
<td>dolphins OR migrate&lt;br&gt;white tigers AND extinction</td>
</tr>
<tr>
<td>8. Misspelling or inappropriate syntax</td>
<td>dolphins OR porpises AND migration&lt;br&gt;dreams AND daydreams:</td>
</tr>
<tr>
<td>9. Using “funny” Boolean logic</td>
<td>(dreams OR daydreams) AND (daydreams OR dreams)</td>
</tr>
</tbody>
</table>
Error Prevention Techniques

- Show users typical errors
- Show consequences of typical errors, let them test what happens with and without Boolean operator
- Show how to solve the problem when an error occurs
- Prepare error awareness materials and use in instruction
- Demonstrate error correction steps at the workstation
- Have students discuss errors and strategies for avoiding and correcting them
- Arrange the environment so you can better monitor progress
- Create user-tested labels, signs, prompts, help screens, error messages, online tutorials, handouts, etc.