Mapping out learning outcomes

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1950s– developed by Benjamin Bloom
- Means of expressing qualitatively different kinds of thinking
- Adapted for classroom use as a planning tool
- Classifies thinking skills into six levels, from the most basic to the higher order levels of thinking

1990s– a team lead by Lorin Anderson (former student of Bloom) revisited the taxonomy
What was revised

- Evaluation
- Synthesis
- Analysis
- Application
- Comprehension
- Knowledge

Original taxonomy

- Creating
- Evaluating
- Analysing
- Applying
- Understanding
- Remembering

Revised taxonomy
The names of six major categories were changed from noun to verb forms. The taxonomy stresses that thinking is an active process; the reason why verbs were more accurate. The subcategories of the six major categories were also replaced by verbs. Some subcategories were reorganised. Since “knowledge” is a category not a process, in the revised taxonomy this category was replaced with the word remembering. Following the same reasoning: Comprehension became understanding and synthesis was renamed creating in order to better reflect the active nature of the thinking process.
Why the changes?

- Easier applicability in schools at all levels
- Easy tool for planning of teaching and assessment of learning outcomes
- Useful for a larger audience
BLOOM’S REVISED TAXONOMY

Creating
Generating new ideas, products, or ways of viewing things
Designing, constructing, planning, producing, inventing

Evaluating
Justifying a decision or course of action
Checking, hypothesising, critiquing, experimenting, judging

Analysing
Breaking information into parts to explore understandings and relationships
Comparing, organising, deconstructing, interrogating, finding

Applying
Using information in another familiar situation
Implementing, carrying out, using, executing

Understanding
Explaining ideas or concepts
Interpreting, summarising, paraphrasing, classifying, explaining

Remembering
Recalling information
Recognising, listing, describing, retrieving, naming, finding
Can the student recall or recognize the learned information?

List, define, memorize, repeat, quote, select, match, reproduce, group select, record, underline, cite, etc.

Thinking process involves mostly memorization, recall of information, or recognition.
Assessment for remembering

- Quiz
- Definition recall
- Factual listing
- Worksheet
- Matching items test
- Label
- List of information
- Workbook
- Reproduction
- Vocabulary
- Concept map of the topic
- Chart
Can the student explain, interpret, and translate ideas that were learned?

Restate, classify, explain, discuss, give examples, reorganize, observe, research, associate, describe in own words, review, summarize, identify, locate, recognize, report, select, translate, paraphrase

More than a strict recall of factual knowledge
Assessment for understanding

- Report to class
- Write or retell in own words
- Write a brief outline
- Summarize the main ideas
- Prepare a flow chart
- Illustrate and describe
- Brief description and explanation of main ideas
Can the student use the information in a new context different than the one learned?

- Implementing and carrying out a task
- Using tools and executing
- Translate, manipulate, calculate, exhibit, demonstrate, collect, solve, adapt, apply in non familiar context, change, interpret, operate, choose, demonstrate, dramatize, employ, illustrate, schedule, sketch, solve, write
Assessment for applying

- Demonstration
- Simulation
- Illustration
- Presentation
- Interview
- Journal
- Diary
- Performance
Can the student distinguish between the different parts?

Compare, contrast, criticize, organize, differentiate, discriminate, distinguish, examine, experiment, question

Investigate, research, revise, make a diagram, dissect, categorize, order, group, survey, test, inspect, arrange, separate
Assessment for analyzing

- Graph, diagram
- Spreadsheet
- Chart, matrix, checklist
- Outline
- Database
- Survey
- Report
- Prototype test
Evaluating

- Can the student make decisions based on reflection, critical thinking, and assessment to justify a stand or decision?
- Make a hypothesis, check, critique, experiment, judge, test, monitor, appraise, argue, defend, select, support, value, evaluate
- Rate, validate, predict, score, revise, determine, debate, rank, reject, probe, criticize, discriminate
Assessment for evaluating

- Report a study
- Panel of discussion
- Evaluation of a project
- Investigation
- Persuasive speech
- Debate
- Verdict, conclusion
Creating

- Can the student create a new product or point of view?
- Design, assemble, construct, plan, create, develop, formulate, devise, make, write
- Forecast, predict, set up, compile, originate, imagine, invent, organize, improvise, act, blend
Assessment for creating

- Project
- Plan
- New game
- Audio– visual and media
- News cast
- Advertisement
- Painting
- New design or prototype
Lower level thinking

- Remembering, understanding, and lower level applying

Used for:
- Evaluate student preparation, understanding of concepts, general conceptual learning
- Diagnostic of strengths and weaknesses
- Revisions and summary of topics learned
Higher order thinking

- Complex application, analysis, evaluation, and creation

Used for:
- Increase critical thinking and analysis
- Problem solving skills
- Discussions and debates
- Presentations and research
- Project creation and completion
Using Bloom’s taxonomy

- Teaching – learning – assessment loop
  - Mapping out student learning outcome objectives
  - Mapping out assessment methods for each objective
  - Evaluating the outcomes and revising the course objectives
# Learning outcomes map

“The student will learn to **apply the concepts** of angle, speed, and acceleration thru **building** a tennis ball launcher”

<table>
<thead>
<tr>
<th>Knowledge dimensions</th>
<th>Cognitive processes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Remembering</td>
</tr>
<tr>
<td>Factual</td>
<td></td>
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<tr>
<td>Conceptual</td>
<td></td>
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<tr>
<td>Procedural</td>
<td></td>
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<tr>
<td>Metacognitive</td>
<td></td>
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</tbody>
</table>

**Team project:**

Tennis ball launcher
The assessment loop

Assessment

Teaching <-> Learning
Success via Collaboration