Strengthening Teacher Development in Africa

Basic concepts to design quality classroom-based formative assessment

2 JULY 2019
Addis Ababa
Basic concepts to design quality classroom-based formative assessment

Application of Bloom’s taxonomy in classroom assessment
Why set objectives?

1. Help teacher to focus attention and effort
2. Cues for asking questions that stimulate classroom discussion
3. A framework for ensuring that you encourage students’ higher-order thinking skills
Bloom’s taxonomy

Knowledge
Comprehension
Application
Analysis
Synthesis
Evaluation

Original
## Bloom’s taxonomy

<table>
<thead>
<tr>
<th>Categories</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Recall specific facts, ideas, or terms</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Interpret what learned</td>
</tr>
<tr>
<td>Application</td>
<td>Use learned knowledge to solve problems</td>
</tr>
<tr>
<td>Analysis</td>
<td>Dismantle concepts</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Make predictions</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Rate conclusions</td>
</tr>
</tbody>
</table>

### Bloom's Taxonomy Categories

- **Knowledge**: Recalling specific facts, ideas, or terms.
- **Comprehension**: Interpreting what is learned.
- **Application**: Using learned knowledge to solve problems.
- **Analysis**: Dismantling concepts.
- **Synthesis**: Making predictions.
- **Evaluation**: Rating conclusions.

The complexity increases from Knowledge to Evaluation.
Bloom’s taxonomy

- Remembering
- Understanding
- Applying
- Analyzing
- Evaluating
- Creating

Revised
Bloom’s taxonomy

Original (Bloom)

Knowledge
Comprehension
Application
Analysis
Synthesis
Evaluation

Revised (Anderson)

Remembering
Understanding
Applying
Analyzing
Evaluating
Creating
Revised taxonomy: What changed?

<table>
<thead>
<tr>
<th>Original (Bloom)</th>
<th>Revised (Anderson)</th>
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<tr>
<td>Knowledge</td>
<td>Remembering</td>
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<td>Comprehension</td>
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<td>Application</td>
<td>Applying</td>
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<tr>
<td>Analysis</td>
<td>Analysing</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Evaluating</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Creating</td>
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</tbody>
</table>

Increasing complexity
Revised taxonomy

Changes

- Titles changed from noun to verb form to reflect the thinking process involved
- Knowledge category renamed and re-organized
- Comprehension and synthesis re-titled
- Order of synthesis (create) and evaluation (evaluate) interchanged
- Knowledge made a separate dimension
### Revised taxonomy

#### Cognitive Process Dimension

<table>
<thead>
<tr>
<th>Knowledge Dimension</th>
<th>Remember</th>
<th>Understand</th>
<th>Apply</th>
<th>Analyze</th>
<th>Evaluate</th>
<th>Create</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factual Knowledge</td>
<td></td>
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<tr>
<td>Conceptual Knowledge</td>
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<tr>
<td>Meta-cognition Knowledge</td>
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</table>
Cognitive process dimension

1. Remembering

Can the student **recall** information?

**Verbs**

- Recognise
- List
- Define
- Name
- Describe ...

*e.g. Name five non-metals.*
2. Understanding

Can the student explain ideas or concepts?

Verbs

- Interpret
- Exemplify
- Summarize
- Infer
- Paraphrase ...

*e.g. Explain why an atom acquire a positive charge after losing an electron.*
Cognitive process dimension

3. Applying

Can the student use the new knowledge in another familiar situation?

Verbs

- Implement
- Carry out
- Use
- Employ
- Illustrate ...

e.g. Use the universal indicator to determine the pH of substance x.
Cognitive process dimension

4. Analysing

Can the student differentiate between constituents and parts?

Verbs

- Compare
- Attribute
- Deconstruct
- Organize
- Examine...

e.g. Distinguish between cations and anions in chemical reactions.
Cognitive process dimension

5. Evaluating

Can the student **justify** decision or course of action?

- Check
- Critique
- Judge
- Revise
- Rate ...

*e.g.* Why dip a litmus paper in water before using it to test the level of acidity of a solid substance?
Cognitive process dimension

6. Creating

Can the student generate new products, ideas or ways of viewing things?

Verbs

- Design
- Construct
- Plan
- Produce
- Build ...

e.g. Prepare a new acid/base indicator and design a colour chart for it.
A). Factual knowledge

The basic elements student must know to be acquainted with a discipline or solve problem in it.

Sub-types
Knowledge of

- terminology
- specific details and elements

e.g. Metals, no-metals, gas, solid ...
Knowledge dimension

B). Conceptual knowledge

The interrelationships among the basic elements within a larger structure that enable them to function together.

Sub-types

Knowledge of

- Classification and categories
- Principles and generalizations
- Theories, models and structures

e.g. Halogens, alkali metals, reactivity tables ...
C). Procedural knowledge

How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods

Sub-types

Knowledge of

- Subject-specific skills and algorithms
- Subject-specific techniques and methods
- Criteria for determining when to use appropriate procedure

e.g. Flame test, litmus test, separation methods ...
Knowledge dimension

D). Metacognitive knowledge

Knowledge of cognition in general as well as one’s own cognition

Sub-types

- Strategic knowledge
- Knowledge about cognitive task
- Self knowledge

E.g. Awareness of own knowledge
Objective
The student will learn to employ the fractional distillation separation technique.

Noun
the fractional distillation separation technique

Verb
Employ

Knowledge dimension

Cognitive process dimension

The student will learn to employ the fractional distillation separation technique.
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<th>Cognitive Process Dimension</th>
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<td>Describe</td>
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<td>Procedural Knowledge</td>
<td>Tabulate</td>
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<tr>
<td>Meta-cognition</td>
<td>Appropriate use</td>
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Reference


Thank you

Learn more:
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