Thinking frameworks supporting communication of thinking

Whole school approach to making thinking visible.

Heather Ernst
Lecturer in Mathematics and Science Education

Common framework and language are desirable concepts for supporting thinking in educational settings. Higher order thinking is more likely to be supported if students, teachers and parents all use a common language and have a shared understanding of what is involved. In this presentation, two Victorian F-12 schools are explored as case studies that highlight how a consistent whole school approach can be used to promote thinking. The frameworks of Bloom’s and SOLO (Structure of Observed Learning Outcome) are described and compared with examples from several content areas across all year levels. The popular Bloom’s taxonomy is excellent for designing learning tasks for differing thinking skills, while the SOLO framework can be used to classify students’ work according to the levels of thinking within individual tasks. Consistent use of a well-publicised framework across a school community can improve the learning and thinking of both students and teachers. Participants in this session will be challenged to think about how these frameworks can be used in their own settings.
We would like our students to be thinking,

Y
Blooms
DeBono
SMW

PMI

HOT
Habits of mind

Gardner
Teaching

SOLO
Critical

A tale of two schools,

Bloom’s and SOLO
A whole school approach

“We don’t teach standalone lessons on critical thinking. We introduce it at the beginning of the year, but then it just becomes part of the shared language. The teachers use it over and over again in the context of the lessons they teach.”

Principal
Bloom’s Taxonomy (Revised) is used for teachers when they assign tasks. They can use verbs to categorise tasks.

(Anderson & Krathwohl, 2001).


Western Victorian small rural F-12 school
Students ran classes

Children's work and checklist everywhere
SOLO - Structure of Observed Learning Outcomes; used to classify student responses to tasks.

<table>
<thead>
<tr>
<th>SOLO TAXONOMY</th>
<th>Prestructural</th>
<th>Unistructural</th>
<th>Multistructural</th>
<th>Relational</th>
<th>Extended abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define</td>
<td>Describe</td>
<td>Compare/contrast</td>
<td>Evaluate</td>
<td>Generalise</td>
<td>Predict</td>
</tr>
<tr>
<td>Identify</td>
<td>List</td>
<td>Explain causes</td>
<td>Generate hypotheses</td>
<td>Create</td>
<td>Hypothesise</td>
</tr>
<tr>
<td>Do simple procedure</td>
<td>Do algorithm</td>
<td>Classify</td>
<td>Analyse</td>
<td>Reflect</td>
<td></td>
</tr>
</tbody>
</table>

SOLO taxonomy explained using Lego

- **Prestructural**: No Lego
- **Unistructural**: One brick
- **Multistructural**: Multiple bricks in a simple arrangement
- **Relational**: Bricks forming a complex structure
- **Extended abstract**: Bricks forming a complex, interconnected structure
SOLO taxonomy

These three types of understanding - surface, deep, and constructed or conceptual understanding - are built on the Biggs and Collis (1982) SOLO model of student learning that has proven most valuable both in developing models of teaching and learning and also our understanding of assessment (Hattie, 2009, p29).

Large Grammar school, multi-campus, F-12

This is from the school website and handbook

Visible Learning

- Teachers to develop success criteria using SOLO verbs, which will be documented in courses and units in VOS and as part of classroom displays.

- Students to be able to articulate what the learning intention is and a display an understanding of the success criteria. This will be evident through the use of the SOLO verbs appropriate to the student’s needs.

- Teachers and students to engage in mediated learning through effective feedback.
How was whole school thinking implemented – BOTH SCHOOLS

- Self and Peer observation with focused classroom checklists (many)
- Curriculum documentation checklists
- Explicit list of teacher expectations
- Whole school PD
- The PD I attended at the SOLO school, was on The Differentiated Classroom (Tomlinson, 2014).
Examples of tasks, lower order thinking and higher order thinking.
Examples of tasks, lower order thinking and higher order thinking.

Why does it get dark at night?

The one question can be answered many ways.
**Why does it get dark at night?**

**Unistructural.** Because the sun goes to the other side of the world.

**Multistructural.** Because the earth is spinning and the sun is going round the earth.

**Relational.** It gets dark at night because the sun goes around the earth once for 12 hours and for the other 12 hours it is day as the sun is around the opposite side of the earth.

**Extended abstract.** The earth is spherical in shape and rotates about its north-south axis. As it rotates, at any one time the half of the Earth’s sphere facing the sun will be in light while the opposite half will be in shadow. As the earth is rotating continuously, a point on the earth’s surface will pass alternately through the lighted half and the shaded half.

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**SOLO : Cooperating in a team sport**

**Prestructural** – I need help to interact with others

**Unistructural** – I can participate in a team

**Multistructural** – I can participate in a team and take responsibility

**Relational** – I can interact in a team, adapting different roles to meet differing demands

**Extended abstract** – I can interact confidently with others in team situations, and make individual compromises based on identifying ways to improve outcomes
<table>
<thead>
<tr>
<th>SOLO Category</th>
<th>Structured Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prestructural (A)</td>
<td>Describe the clinical appearance of the lesion.</td>
</tr>
<tr>
<td>Unistructural (B)</td>
<td>What is your pre-diagnosis? Explain.</td>
</tr>
<tr>
<td>Multistructural (C)</td>
<td>Write the etiology of the lesion.</td>
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<tr>
<td></td>
<td>Which laboratory tests do you want? (Select the proper ones from the list.)</td>
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<td></td>
<td>What are your selection reasons?</td>
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<tr>
<td>Relational (D)</td>
<td>Write your opinion about the results of the tests you selected.</td>
</tr>
<tr>
<td></td>
<td>What is your decision according to the biopsy report and precise diagnosis?</td>
</tr>
<tr>
<td></td>
<td>Please outline your treatment plan.</td>
</tr>
<tr>
<td>Extended abstract (E)</td>
<td>Write a synthesis about the relationship among systemic diseases.</td>
</tr>
<tr>
<td></td>
<td>Evaluate the medication the patient used related to your diagnosis.</td>
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<tr>
<td></td>
<td>Predict the prognosis, and evaluate a consultation necessity.</td>
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Thinking prompts

• How can you use these ideas in your setting?
• Whole school approach, or variety of approaches?
• Do students need to master lower order thinking before they attempt higher order thinking?

References


https://e-asttle.tki.org.nz/content/download/1499/6030/version/1/file/43.4The%20SOLO%20taxonomy%202004.pdf


Tomlinson, C. A. (2014). The differentiated classroom: Responding to the needs of all learners. Ascd. VA.

PISA (2009). Take the test: Sample questions from OECD’s PISA assessments. OECD.

My own teaching of PSTs

Think/Pair/Write/Share
Mini whiteboards