Brescia's Levels of Understanding

Adapted from the SOLO Taxonomy for Brescia University College

About SOLO

The Structured of an Observed Learning Outcome (SOLO) Taxonomy, developed by Biggs and Collis (1982), is the foundation of the Brescia Competencies' developmental curriculum. SOLO's levels describe how students come to understand complex concepts, regardless of the context or discipline. SOLO aligns with Brescia's approach to educating women as it allows students to integrate their lived experience and previous knowledge into their overall understanding of course content.

The SOLO taxonomy is a learning process or cycle: each new 'level' requires students to demonstrate the one(s) previous, although any new information may drop students back as they incorporate that knowledge into their overall understanding. They will experience bumps along the way, cycling through the levels of SOLO as you introduce them new concepts, not always at the same rate. For all of us, of course, some learning comes easier than for others. The goal, though, is to give your students opportunities for deep thinking in every course – if we give students practice with Level 3 thinking about a Level 1 concept, then the leap to true, consistent higher-order thinking is not as difficult.

How to use this document

The purpose of this document is offer guidance on writing 'levelled' learning outcomes within Brescia's context. The goal of writing learning outcomes, of course, is to describe where you expect students to end up after successful completing your course (or lesson, or program, etc). As a result, this document is organized to 'keep the end in mind': for example, Level 1 is where you expect students to be at the end of their first learning experience.

This document includes the following for each of Brescia's levels of understanding:

1. A brief description of the level, using SOLO as a guiding framework
2. Suggestions on how to support students' learning throughout that level
3. Some guiding thoughts on when to choose each level when writing your learning outcomes
4. A list of helpful 'verbs,' separated by the cognitive, affective, and psychomotor domains
5. Some example teaching and learning activities for each domain

In creating the list of verbs and teaching activities, this document also considered Bloom's Revised Taxonomy (Krathwohl, 2002), since that approach is complementary to SOLO (Biggs & Tang, 2011).

Make sure to use this document in conjunction with our other supplementary resources on writing learning outcomes, constructivist alignment, and, most importantly, the Brescia Competencies Handbook.

LEVEL 1 (Unistructural)

Level 1 students can articulate the basics of the discipline: they are beginning to use jargon and recognize theoretical assumptions, and can identify the types of evidence or information the discipline uses. Students are able to correctly identify something but do not have an understanding of "the whole," or how different concepts are related.

To bring students up to Level 1 from 'pre-structural', misconceptions and incorrect assumptions that impede understanding need to be identified. Students need to learn the 'ground rules' – what is acceptable, what is not, what is considered 'knowledge' or 'correct' and what is not, etc.

Choose a level 1 learning outcome when introducing students to key concepts of the discipline for the first time, explaining rules which must be understood before more complex concepts can be introduced, etc.

Verbs for Level 1: Cognitive Domain		Cognitive Teaching and Learning Activities
arrange calculate count define find identify name paraphrase	pick recall recognize reproduce seek sketch transmit	Names different types of information sources based on provided characteristics (e.g. newspaper versus blog versus academic journal) Paraphrases the main argument or thesis of an academic reading in their own words
Verbs for Level 1: Affective Domain		**Affective Teaching and Learning Activities**
acknowledge ask	attend listen	Answers recall-based reflection questions (e.g. explain what happened; how did people react; how did you feel)
Verbs for Level 1: Psychomotor Domain		**Psychomotor Teaching and Learning Activities**
choose describe detect	differentiate isolate select	Names effective non-verbal communication strategies Listens to stories from different cultural perspectives and detects similarities and differences Describes lab safety procedures

LEVEL 2 (Multistructural)

Level 2 students start to explore and characterize concepts, applying them to typical scenarios. "Students understand several relevant aspects of a whole idea although they may not understand the relationships very well" (Potter & Kustra, 2012). Their breadth of knowledge is vastly improved from Level 1, but not necessarily their depth: students can make some connections between ideas but often cannot explain the meaning behind those connections nor explain the 'big picture' underpinning their organization.

To bring students from a Level 1 to a Level 2, concepts need to be 'overlearned' so that attention can be freed up to start identifying relationships and connections. Discussing, writing about, explaining concepts will assist them in thinking about multiple concepts at the same time and make ideas easy to recall. This shift from Level 1 to Level 2 is often quantitative in nature – as in, they continue to learn *more*.

Choose a Level 2 learning outcome when introducing students to concepts that build upon those learned at Level 1 but still may be viewed as 'separate' (e.g. additional theories or approaches). Alternatively, you may be complicating the concepts from Level 1 (e.g. more variables, different applications or scenarios) but you are not yet asking students to evaluate or critique those approaches.

Verbs for Level 2: Cognitive Domain		Cognitive Teaching and Learning Activities
apply characterize describe do examine explain	illustrate interpret list prove rework solve	Solves a mathematical problem using a supplied equation Applies theoretical concepts from the course to a case study or 'real-life' problem
Verbs for Level 2: Affective Domain		**Affective Teaching and Learning Activities**
answer assist comply conform discuss	greet help label present tell	Names micro-aggressions displayed during conversation between two people Students relate their behaviours or emotional reactions to those of others in a similar situation, such as in professional or disciplinary scenarios
Verbs for Level 2: Psychomotor Domain		**Psychomotor Teaching and Learning Activities**
copy display explain follow move	react reproduce respond show volunteer	Prepares dish using supplied recipe and/or cooking instructions Volunteers for specific role when working in teams

LEVEL 3 (Relational)

By Level 3, students are engaging in deeper learning. They can integrate ideas into a whole and identify connections between concepts. In many cases, this includes finding relationships between theory and the 'real world', as the significance and priority of issues becomes clearer. Some Level 3 students are able to apply their learning to new situations. For many, the shift in learning is qualitative in nature, meaning *how* they understand the concepts is what changes.

To bring students from a Level 2 to a Level 3, they need practice identifying, analyzing, and dismantling relationships between concepts, including organizing them in new ways. The leap from Level 2 to Level 3 is a big one, arguably their most challenging in university. 'Overlearning' continues, although each new concept that is introduced can now be analyzed from a qualitative perspective within the context of the 'whole'. Students must learn to ask 'how does this new information fit with my overall understanding?'

Choose a level 3 learning outcome when asking students to make the leap to seeing 'the whole' or the bigger picture. At level 3, you're asking students to evaluate for the first time, to judge, justify, compare, and re-organize. In some cases, this is the highest level of understanding students may demonstrate, so choose this level when assigning tasks that require analysis and basic abstract thought.

Verbs for Cognitive Domain: Level 3		Cognitive Teaching and Learning Activities
adapt analyze appraise argue classify combine compare/contrast conclude construct	demonstrate derive distinguish evaluate exemplify implement plan structure substantiate	Develops an original argument based on appropriate secondary evidence Evaluates a patient's diet plan or a company's marketing strategy Analyzes literary texts through one or more theoretical lenses, drawing connections between literature and social norms or historical events
Verbs for Affective Domain: Level 3		**Affective Teaching and Learning Activities**
appreciate demonstrate invite join justify	propose respect share compare relate	Reflects on the professional or disciplinary values taught in class and identifies areas of similarity or conflict with their cultural, spiritual, or personal values

Verbs for Psychomotor Domain: Level 3		Psychomotor Teaching and Learning Strategies
adapt	fix	Creates an educational display board during experiential learning placement
assemble	manipulate	
construct	observe	
display	organize	Chooses appropriate statistical test(s) for given data set and analyzes that data in SPSS
Add adverbs or adjectives to indicate specific measures of accuracy, speed in student performance		

LEVEL 4 (Extended Abstract)

Students at a level 4 are the ideal graduate: they can generalize, judge, and adapt their knowledge, both within your course as well as to new, real, and outside scenarios. In other words: they can thrive in 'the mess'. Not every student will reach Level 4 before graduating; a Level 4 student can sort through complexities to identify the underlying principles or constructs at play, articulate biases and/or alternatives, and can anticipate realistic outcomes. Students at this level can *extend the abstract* – bridge disciplines, create new approaches, provide unique observations. In the Ursuline tradition, Level 4 students do not accept the status quo: they think critically and objectively about what previous knowledge or information applies to a situation, layer on rich, qualitative analyses, and then make predictions or hypotheses that extend the 'given' to a wider range of possibilities.

To encourage students to move from a Level 3 to 4, they should be given extensive practice at evaluation and synthesis so that creation and abstract thinking is a logical next step. When forced to repeatedly use their knowledge in "increasingly unfamiliar, varied situations, their ability to generalize and adapt will grow" (Potter & Kustra, 2012). Teaching and learning strategies at this level, therefore, often engage more than one learning domain.

Choose a level 4 learning outcome when asking students to complete culminating, capstone, original, or abstract tasks. At level 4 you expect students to bring in knowledge or interpretations from other disciplines or your field as a whole, to apply knowledge to unknown situations, or to demonstrate originality or creativity.

Verbs for Cognitive Domain: Level 4		Cognitive Teaching and Learning Strategies
assess	judge	Conducts an original research study, including: developing a manageable question, choosing appropriate methodology(ies), collecting, analyzing, and interpreting data, drawing conclusions, and using a sophisticated approach to communicate their findings
create	originate	
develop	predict	
evaluate (some senses)	synthesize	
generate	theorize	
generalize	validate	
hypothesize		

Verbs for Affective Domain: Level 4		Affective Teaching and Learning Strategies
act discriminate display influence modify qualify	question relate revise serve solve verify	Reframes previous actions or failures within the constructs of the profession or discipline: how will I deal with this the next time? What might work and why? Are there different options? Can I make changes to benefit others (Ryan & Ryan, 2012)
Verbs for Psychomotor Domain: Level 4		Psychomotor Teaching and Learning Strategies
adapt build compose create design	originate make reorganize revise	Participates in experience learning opportunity that requires application and evaluation of disciplinary theory and practices, self reflection and analyses, and formation of personal approach to future work

Graphic Representation of Brescia's Levels of Understanding
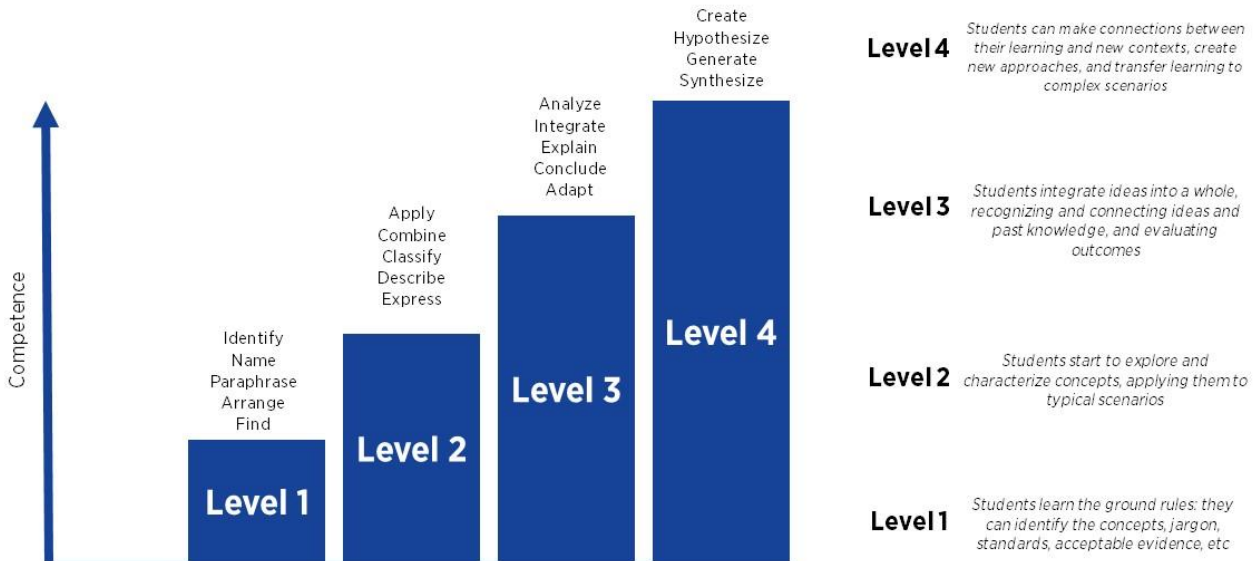
A note on Level "0" (Pre-structural)

Those familiar with SOLO will know the taxonomy includes a 'pre-structural' level at the beginning stage, prior to the start of students' participation in the learning environment. In Brescia's context, this would constitute a level "0" or students whose misconceptions or errors get in the way of understanding. As a result, the pre-structural level is not included in Brescia's adaptation and description of SOLO.

Verbs to avoid when writing learning outcomes

Avoid using verbs that describe internal or unobservable thought processes when writing learning outcomes:

- Understand
- Appreciate
- Comprehend
- Know
- Accept
- Be aware of
- Perceive
- Value

Ask yourself the following questions when trying to teach internal processes:

- How will you know when students have achieved your learning outcome?
- Do you AND your students know when your learning outcome has been achieved?
- What evidence of learning would you be willing to accept?
- What types of behaviours or performance would you accept from someone who has acquired this internal process?
- Are you expecting demonstration of this internal process as part of the course grade?

References

Biggs, J. B., & Tang, C. S. (2011). *Teaching for quality learning at university: what the student does* (4th ed). Maidenhead: McGraw-Hill.

Krathwohl, D.R. (2002). A revision of Bloom's Taxonomy: an overview. *Teaching into Practice, 41*(4), 212-218.

Potter, M.K. & Kustra, E. (2012). *A primer on learning outcomes and the SOLO taxonomy.* Retrieved from: University of Windsor Centre for Teaching and Learning on July 9, 2019 from www.uwindsor.ca/ctl/sites/uwindsor.ca.ctl/files/primer-on-learning-outcomes.pdf