Tip sheet – Designing assessment using learning taxonomies

This Tip sheet provides some ideas on designing higher order assessments to better align with topic and course learning outcomes.

The Australian Qualifications Framework (AQF), which regulates Australian education and training, has a taxonomic structure defining qualification types. It is organised by what graduates can know, understand and do upon course completion. Whilst not aligned with any specific pre-existing learning taxonomy, nonetheless, the AQF provides guidance at a course level as to what level of learning is required. Using existing learning taxonomies to develop learning outcomes at a course and topic level helps in meeting AQF requirements.

As assessment needs to align with topic and course learning outcomes, these should address those higher order learning behaviours appropriate for higher education. There are two commonly used taxonomies organising learning behaviours into hierarchies, Bloom's taxonomy and SOLO taxonomy.

Bloom's taxonomy

In the 1950s, educational psychologist Benjamin Bloom developed a hierarchical classification of behaviours important in learning often depicted in a pyramid. Updated in 2001 by Anderson and Krathwohl, the bottom indicates simple cognitive behaviour of recall and fact recognition. This leads up to more complex behaviours, involving increasing mental abstraction. This hierarchy also classifies the types of questions used by educators in assessing students by verb form. The type of action required by the verbs used in an assessment question indicate the cognitive demands being placed on students.
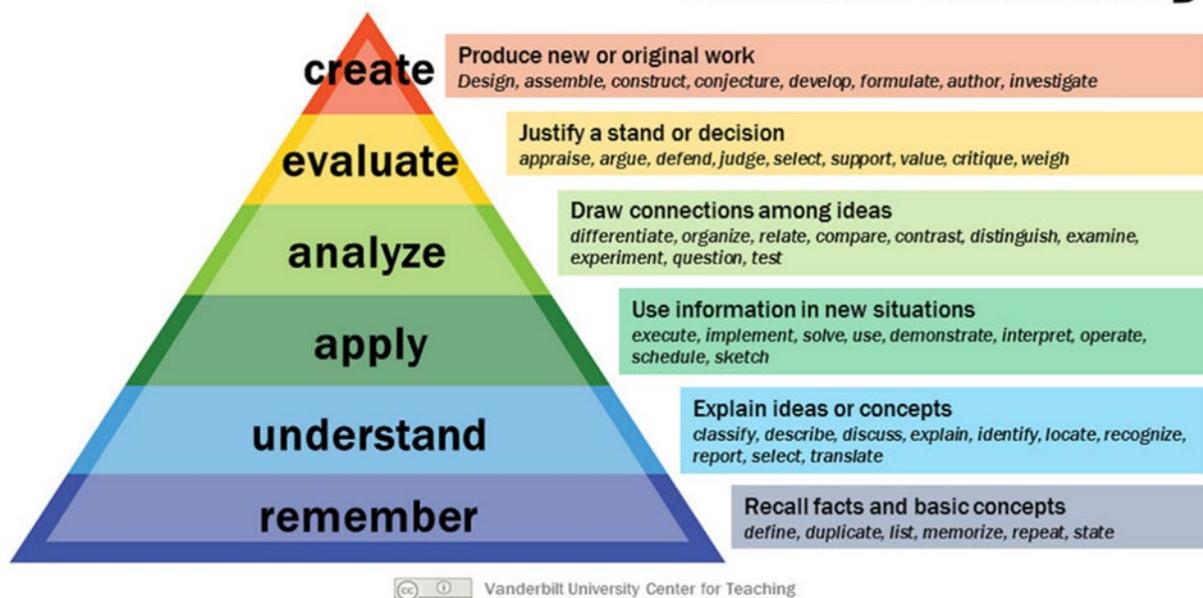

Bloom's is one of the most commonly used and peer reviewed taxonomies for developing learning outcomes and designing assessment. There are several modified versions, some of which use slightly differing language, and all are helpful to inform your thinking.

SOLO taxonomy

The SOLO taxonomy (standing for Structure of the Observed Learning Outcome), is another method of classifying learning outcomes in terms of their complexity. Developed by John Biggs in the 1980s, it

provides an alternative to Bloom's which some consider a more practical framework because it focusses on observable outcomes, not internal cognitive processes. The SOLO taxonomy helps measure how well a student understands a topic and describes 5 levels of understanding from simple to complex. It can be helpful for designing curriculum outcomes and assessment tasks that get progressively more difficult as students move through their learning.

The SOLO Taxonomy with sample verbs indicating levels of understanding
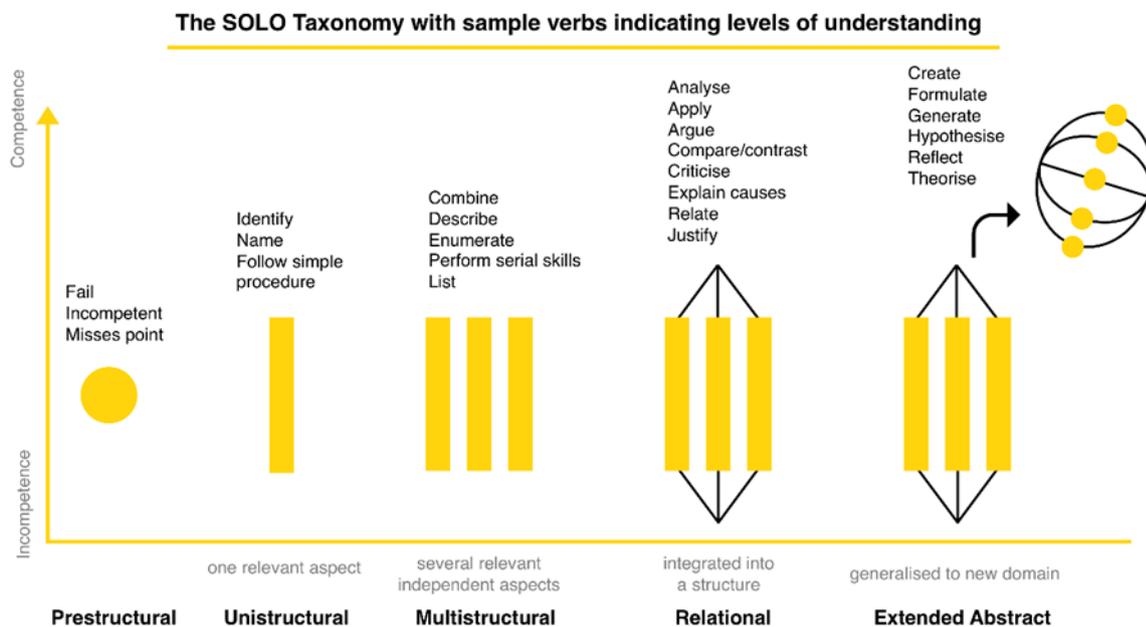
Adapted from Biggs, J. SOLO taxonomy ,<https://www.johnbiggs.com.au/academic/solo-taxonomy/>

Designing your assessment

Assessment needs to be well-designed, authentic and follow some key principles. So where to start?

1. Revisit the learning outcomes for your topic

What do the students need to be able to do on completion? Are the learning outcomes pitched at an appropriate level for the AQF level of your course or do they use mostly lower level learning behaviours like remembering or understanding? Revise these as needed.

2. Review your assessment

Assessment should be aligned with the learning outcomes. Consider how the learning activities scaffold the students toward the assessments (and thus achievement of the learning outcomes)? What steps are needed to support the students toward successful completion of their assessments. Do any of the learning activities need to change to better align with expected learning outcomes? Does the assessment need to change to better align with and assess expected learning outcomes? If so, …

3. Consider Blooms' (or SOLO) taxonomy levels

Each of the levels requires an increasingly higher level of abstraction and ideally in higher education, our goal is to move students up the levels from a minimum of 'application' behaviour. Consider the year level of the course, along with the assessment ideas you have. Familiarise yourself with these higher order learning verbs, how they can be used and get inspired. Visit Bloom's Thinking & Learning for ideas.

4. Explore the tools available to you in FLO

Given students submit via FLO, consider how you can use [different FLO tools](#) to encourage higher order learning in your students. If you are using quizzes, review how they are used to [encourage higher order thinking for students](#) and with critical thinking, consider how you could more effectively [use FLO tools for open questions](#).

5. **Create your assessments and have them moderated**

Brainstorm some different ideas for assessments based on how students could demonstrate their achievement of the learning outcomes. The students should competently be able to achieve these assessments if they have successfully undertaken the learning activities for the topic. Ask a colleague to [moderate](#) the assessment to ensure it will make sense to your students and is achievable.

Table 1 illustrates some examples of higher order online learning activities you could adapt for your own students. The tip sheet on [Creative Online Assessment](#) also explores a variety of ways to include meaningful digital assessment and many of those ideas can also be used simply as ungraded learning activities or formative (ungraded) assessments.

Table 1: Higher order assessment examples

Bloom's taxonomy level	Taxonomy verbs	Example assessments
Creating	adapt, build, change, choose, combine, compile, compose, construct, create, delete, design, develop, discuss, elaborate, estimate, formulate, happen, imagine, improve, invent, make up, maximise, minimise, modify, originate, plan, predict, propose, solve, suppose, test, theorise	- Research organizational problems in industry and make recommendations for solutions. Include online concept mapping and a final [Collaborate](#) presentation. - Create a [blog](#) that integrates evidence-based information about a chronic condition and strategies for its self-management.
Evaluating	appraise, assess, choose, compare, conclude, criticize, decide, deduct, defend, determine, disprove, estimate, evaluate, explain, integrate, interpret, judge, justify, mark, measure, opinion (i.e. provide one), perceive, prioritize, prove, rate, recommend, select, support	- Interpret data from the National Pollutant Inventory online database in the context of a specific environmental pollution scenario and evaluate the extent of likely environmental damage. Present information via a [wiki](#). - Students collaborate (via [Collaborate](#) or another online tool) to evaluate social and infrastructure issues impacting on housing development in a remote area. A [video](#) is created as the final product.

Analysing	analyse, assume, categorize, classify, compare, conclude, contrast, discover, dissect, distinguish, divide, examine, function, infer, inspect, interpret, motive (i.e. provide one), relationships (i.e. articulate), simplify, survey, test for, theme	- Analyse an Emergency Department patient presentation to determine likely causation for symptoms. Students must research the answer using digital resources and present an evidence-based care response. - Compare and contrast two (or more) images or videos of a workspace to determine which would have a better workflow. Include justification.
Applying	apply, build, choose, construct, demonstrate, develop, employ, execute, experiment with, identify, illustrate, implement, interview, make use of, model, operate, organize, plan, relate, select, show, solve, utilize	- Choose an online physical activity assessment tool to analyse their own physical activity data. - Look at a range of policy networks. Give an example of one type of network from the media, or your personal experience and explain how the example fits the policy type. Use a discussion forum to share views.

There are so many options for making the most of students' online learning experience. Contact your college's academic development support or contact your local eLearning support team via Service One to discuss options.

References

Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Allyn & Bacon, Boston.
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