# Tip sheet - Aligning quiz questions with Bloom's taxonomy

Bloom's taxonomy is a classification system that organises learning into a hierarchy of increasing complexity and specificity (see diagram below). Tasks that are premised on remembering are denoted as having the least amount of complexity, with increasing sophistication being introduced as tasks align with higher levels within the hierarchy (Bloom, 1956). Although there are multiple such hierarchical systems in existence, Bloom's is the most used, has been revised and extensively peer reviewed, and can be used across a diverse range of subject matter (Anderson et al, 2001). As such, it is often recommended when guiding the writing of learning outcomes.
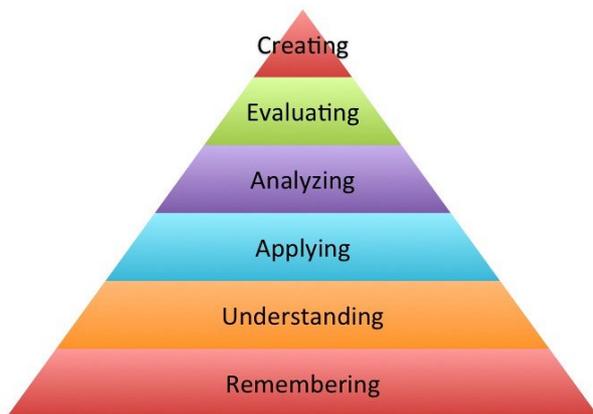
(Hernandez, 2011)

Bloom's taxonomy can be used to inform the design of numerous learning activities and resources, including quizzes. There can be a tendency for people to believe that closed-ended quiz questions are based on lower levels of the hierarchy, such as understanding and remembering. However, it is possible to craft closed-ended questions that align with most levels of the hierarchy. In higher education, it is preferable to use the higher levels of Bloom's taxonomy in order to align with Australian Qualifications Framework requirements for course to meet appropriate level learning outcomes.

To craft quiz questions of various levels of complexity, several considerations must be made before embarking on planning. These include:

- What needs to be assessed? For example, do students need to demonstrate that they can recall a procedure, or are you seeking evidence that they can accurately interpret complex information?
- Understanding what types of quiz questions are available, and how they work. Within the quiz tool in FLO, there are numerous question types. Many of these are closed ended type questions and are also automated (or automatically marked).
- Is the quiz for formative or summative assessment? Marking automation makes quizzes particularly useful for formative assessment, as it can enable students to efficiently obtain input regarding their progress with, and mastery of, subject matter. Further power can be added by attaching various types of feedback to individual questions or the quiz as a whole.
- What format best suits the questions? For example, text, images, videos and so on.
- How much time you have available to create questions? While it is certainly possible to develop well-crafted questions that assesses students' analytical skills, it may take some time to create robust questions that include elements such as scenarios, tables, graphs, video and images.
- How much time you have to create answers? As automated quizzes usually involve supplying correct and incorrect answers, considerable time will also need to be given to planning and crafting a range of potential answers for students to select from. While this will not be a consideration for True/ False questions, this is not the case when it comes to others such as Multiple Choice. Not only do you need to consider how many answer options your students will have to choose from, but you will need to determine how answer options relate to each other in terms of their similarity and level of complexity. Often, having vastly different answer options can make it more likely that students can eliminate potential answers through a process of deduction rather than through acquired skills or knowledge. In contrast, having a range of options that includes not only the correct answer but also the associated reasoning introduces further complexity. In fact, it is not uncommon for it to take longer to develop a wide range of thought-provoking answer options, than

it does a single quiz question. What is reasonable for the student cohort? For example, first year students will likely have considerably lesser developed evaluative skills than fourth year students, and quiz questions that assess evaluation should appropriately reflect student level of study.

Designing tasks that align with the various levels of Bloom's taxonomy also involves translating the intended objectives of each hierarchical level into actionable verbs. Depending on what the task comprises (e.g. online automated quiz, open-ended quiz, physical demonstration and so on), different verbs may be implicated. The table below shows a selection of verbs that may be used within the context of developing quiz questions, with those that are high-lighted being the preferred option in higher education. Please note that verbs for 'create' have been omitted, as 'create' based questions are not suited to quizzes.

Level within Bloom's taxonomy	Examples of related verbs that can form the basis of quiz questions
Remembering	Recognise, recall, label, remove, choose, match, find
Understanding	Infer, compare, contrast, estimate, identify, explain, exemplify
Applying	Execute, choose, modify, solve, represent, substitute
Analysing	Organise, divide, sequence, recognise, attribute, differentiate
Evaluating	Validate, check, predict, propose, relate, justify, verify

After defining the parameters of your questions (e.g. what is being assessed, skill levels, question format and type) and the verbs that you will use to translate levels of the taxonomy, you may still feel a little uncertain about how to proceed. Seeking out examples of what others have done may provide you with creative inspiration. As a starting point, view examples of various quiz questions and how they align with hierarchical levels within Bloom's taxonomy.

While there may be appeal in the idea of saving time on marking by generating an automated assessment item, it is important to have realistic expectations about the time involved in generating good, robust questions. Planning and developing quizzes will require investment of time in order to craft questions reflecting higher orders of learning and just as with other assessment types quizzes (and the questions included in them) also need to be linked to your learning outcomes and ensure your questions are designed to minimise collusion.

References

Anderson, L. W., Krathwohl, D. R., Airiasian, W., Cruikshank, K. A., Mayer, R. E., & Pintrich, P. R. (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational outcomes: Complete edition*. New York, NY: Pearson.
Bloom, B (Ed.) 1956, *Taxonomy of Educational Objectives, the classification of educational goals – Handbook I: Cognitive Domain (2nd ed.)*, New York, David McKay Company, Inc.
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