Teaching and Educational Development Institute

# Biggs' structure of the observed learning outcome (SOLO) taxonomy

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SOLO, which stands for Structure of the Observed Learning Outcome, provides a systematic way of describing how a learner's performance grows in complexity when mastering many tasks, particularly the sort of tasks undertaken in school. A general sequence in the growth of the structural complexity of many concepts and skills is postulated, and that sequence may be used to guide the formulation of specific targets or the assessment of specific outcomes.

The task is not attacked appropriately; the student hasn't really understood the point and uses too simple a way of going about it *(pre-structural)*.

One *(uni-structural)*, then several *(multi-structural)*, aspects of the task are picked up and used, but are treated independently and additively. Assessment of this level is primarily quantitative.

These aspects then become integrated into a coherent whole *(relational)*; this level is what is normally meant by an adequate understanding of the topic. Assessment of this level becomes qualitative if it is to pick up its nature.

The previous integrated whole may be conceptualised at a higher level of abstraction and generalised to a new topic or area (*extended abstract)*; this too requires qualitative assessment. (Biggs, 1995)

SOLO might be used to classify generically the quality, as represented by the sophistication of the assumed underlying logic, of students' responses to assessment items (*warning:* if students have been 'told' a sophisticated answer in their classes then there need be very little thinking at all underlying its reproduction in an examination!).

### Examples of different performances

Imagine the essay topic: *Discuss the influences of nature and nurture on the development of children's ethical systems.*

A *pre-structural* response might, for example, say something along the lines of "Children are well known to develop ethical systems when they are young. Such systems affect the way they behave. Nature is about flowers and animals and the world around us. Parents, including most animals, nurture their offspring when the offspring are too weak or inexperienced to cope with the world unaided" and so on (a 'brain dump' stimulated by the words in the question is one example of a pre-structural response).

A *uni-structural* response might outline the influence of nature (genetic inheritance etc) on the development of a child's ethical system, or it might simply define and accurately describe ethical systems.

A *multi-structural* response might outline the influences of both factors, but never bring together and balance their influences.

A *relational* response will answer the question, describing the influences, their interaction and their balance.

An e*xtended abstract* response would cover the ground of the relational response, but then might, for example, go on to set this in the context of various theories of child development, or of ethical systems.

## Assessment tasks and SOLO levels

Some assessment tasks seem to limit the SOLO level of possible responses. For example:

*What is the anatomical name for the kneecap?*
and
*List four species of mosquito.*

These questions require at best a pre-structural response (a very brave student might go into the way anatomical names are arrived at and, eventually, deduce a correct answer - an extended abstract response - but this seems unlikely, and probably inappropriate in the circumstances; an extended abstract response for mosquitos seems even less likely).

*List four species of mosquito commonly found in tropical areas and outline the main health risk created by each of them.*

This question would seem at best to require a multi-structural response although, again, a courageous student might move to the relational (by, for example, comparing and contrasting the risks from the various species) or the extended abstract (for example, by describing and critiquing ways of classifying mosquitos or health risks).

Perhaps, then, assessment tasks might be set which invite responses at higher SOLO levels:

*List four species of mosquito commonly found in tropical areas and discuss their (relative) importance in public health programs.*

This example invites at worst a multi-structural response (just list each mosquito species and say how and why it is important), but easily affords a relational response (for example, by discussing the relative importance of the four species given some criteria) or an extended abstract response (for example, by discussing how one might assess importance and, more interestingly, how one

might judge the usefulness or appropriateness of a proposed criterion for importance). If the word 'relative' is included in the question then it clearly invites a relational response.

Here is a related example which positively invites an extended abstract response, while still requiring that students know something about mosquitos:

*Discuss how you might judge the relative importance of similar threats to public health; in your discussion use various species of tropical mosquito as examples.*

## Exercises

A couple of exercises follow. You might like to attempt these before you try to apply the SOLO taxonomy in your own course.

## Exercise 1

Write another task, which invites a relational or extended abstract response, to replace the mosquito one.

## Exercise 2

If you feel competent in the fields of anatomy and/or physiology, write some assessment questions to replace *What is the anatomical name for the kneecap?* which invite:

• multi-structural responses

• (much harder!) relational or extended abstract responses.

If you do not feel competent in these areas take a factual recall question in your own area and use that as the basis of the exercise.

## Further examples

Going back to the nature/nurture example used in the previous section we can formulate quite readily questions which invite answers at each SOLO level:

• Write down what you know about nature, nurture and ethical systems seems to invite a pre-structural response.

• Outline one influence on a child's ethical development seems to invite at best a uni-structural response.

• Outline all factors you can think of which might influence a child's ethical development seems to invite at best a multi-structural response.

• Discuss the influences of nature and nurture on the development of children's ethical systems (the original essay topic) seems to invite a relational response and readily allows an extended abstract response.

- Arguably at university at least sometimes one ought to set questions that invite an extended abstract response. *For example:*

  Discuss the influences of nature and nurture on the development of children's ethical systems; set your answer in the context of general theories of child development.

Or is this giving the game away, to the extent that it prompts a particular generalisation from students?

# References

Biggs, J. (1995). Assessing for learning: Some dimensions underlying new approaches to educational assessment. *The Alberta Journal of Educational Research,* 41(1), 1-17.

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