

APPLYING CONSTRUCTIVE ALIGNMENT TO OUTCOMES-BASED TEACHING AND LEARNING

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What is constructive alignment and how does it differ from traditional teaching and assessment?

Traditionally, teachers used to plan their teaching by asking such questions as: What topics or content do I teach? What teaching methods do I use? How do I assess to see if the students have taken on board what I have taught them?

Teaching here is conceived as a process of transmitting content to the students, so the methods tend to be expository, and assessment focused on checking how well the message has been received—hence the common use of lectures and demonstrations, with tutorials for clarification, and exams that rely on reporting back.

Outcomes-based teaching and learning, of which constructive alignment is one form is based on such questions as: What do I intend my students to be able to do after my teaching that they couldn't do before, and to what standard? How do I supply learning activities that will help them achieve those outcomes? How do I assess them to see how well they have achieved them?

Constructive alignment starts with clearly stating, not what the teacher is going to teach, but what the outcome of that teaching is intended to be. This is expressed as the Intended Learning Outcome (ILO), which is a statement of what the learner is supposed to be able to do and at what standard. When students attend lectures, however, their main activity is receiving, not doing. Hence we need to devise Teaching Learning Activities (TLAs) that require students to apply, invent, generate new ideas, diagnose and solve problems—or whatever other things they are expected to be able to do after they graduate. Similarly we need Assessment Tasks (ATs) that tell us, not to how well students have received knowledge, but how they can use it in academically and professionally appropriate ways, such as solving problems, designing experiments, or communicating with clients. The university's Graduate Attributes express these in a generic form that needs to be adapted to suit each programme, and which the units variously address as appropriate. It is often difficult to assess these applied and higher order outcomes in the examination room context.

Some FAQs

Why call it constructive alignment (CA)?

“Constructive” refers to the idea that students *construct meaning* through relevant learning activities; “alignment” refers to the situation when teaching and learning activities, and assessment tasks, are aligned to the Intended Learning Outcomes. Alignment is best achieved by designing TLAs and the assessment tasks that activate the same *verbs* as are stated in the ILOs.

Why use constructive alignment?

The short answer is that CA is logical, effective and both teachers and students find it more satisfying than traditional teaching. A benefit for students, possibly even more than teachers, is that the ILOs tell them precisely not only *what* they are supposing to be learning, but *how* and to what *standard*.

For these reasons, CA is used in university teaching in several countries, and in the UK and in Hong Kong also for quality assurance.

But isn't CA more resource intensive?

At first, yes it is. The intended topics in the curriculum need to be reworked into the form of Intended Learning Outcomes, which does require time and good cooperation between programme leaders and subject coordinators. The TLAs need to be thought over, and *practicable* changes made in the current teaching method so that students' learning activities are more likely to lead them to achieve the ILOs. Assessment tasks need then to be redefined and grading criteria (rubrics) worked out by colleagues. The main difficulty here is a change in *mindset*, rather than resource-demanding activities.

The main difficulty is time, but once CA is up and running there should be little difference in teacher time between this and "the old way". Assessing holistically by using rubrics that define standards to be met is likely to be faster than counting up 'marks' in the old way. It is certainly more interesting for the teacher, and more informative for students.

Doesn't CA atomise the curriculum into independent low level competencies, making higher level outcomes unattainable?

Definitely not. Competency-based assessment as used in vocational programmes may look similar superficially, but CA is quite different. Competency-based assessment is skill-based, whereas the outcomes in CA are what you decide them to be, as high level as you can reasonably expect. Outcomes with verbs such as "apply to unfamiliar contexts", "invent", "generate", "create" and so on are obviously not trivial. When designing ILOs it helps to use the SOLO taxonomy for selecting verbs of the appropriate level (see below).

CA requires a major rethink of university assessment methods.

Yes, it does! To be maximally effective, CA requires a change from a quantitative and analytic mindset, that does atomise knowledge into marks, to one that uses and grades assessment tasks *qualitatively* and *holistically* wherever possible. High level outcomes, academic or professional, refer to whole acts, not to the independent components of those acts. Assessing the components of a task is very helpful in providing feedback to students, but ultimately students have to be assessed holistically in a way that is authentic to their discipline.

Writing Intended Learning Outcomes (ILOs)

Let us first distinguish between *declarative* knowledge, which is not the result of the student's activities, and *functioning* knowledge, which is. Declarative knowledge is what the teacher "declares" in class and is accessible in libraries and search engines; it is the sort of knowledge that has traditionally been emphasised in university teaching. It is of course most important that students do have a sound and well structured declarative knowledge-base but equally if not more important is that they can *use* that knowledge to give them control over their world. In professional and academic programmes alike, the important thing is how well students can put their knowledge to work, in solving problems, or generally operating more effectively in their particular context. In deciding what our ILOs are to be, therefore, we need to decide what ones are to address declarative knowledge and what functioning knowledge as the verbs are very different. The SOLO Taxonomy orders verbs in terms of increasing complexity from *unistructural* and *multistructural*, in which complexity increases quantitatively, to *relational*, where components of the learning task are integrated to form a structured whole, to *extended abstract* where that whole is generalized to a new domain.

Some typical declarative and functioning knowledge verbs by SOLO level

| | <i>declarative knowledge</i> | <i>functioning knowledge</i> |
|--------------------------|--|--|
| <i>unistructural</i> | memorize, identify, recite. | count, match, order. |
| <i>multistructural</i> | describe, classify. | compute, illustrate. |
| <i>relational</i> | compare and contrast explain, argue, analyze. | apply, construct, translate, solve near problem, predict within same domain. |
| <i>extended abstract</i> | theorize, hypothesize, generalize. | reflect and improve, invent, create, solve unseen problems, predict to unknown domain. |

ILOs need to be written at both programme and unit levels. ILOs of both kinds contain three essential elements: a statement of what the student is supposed to be able to do at the end of the programme or unit, a *verb*; the *content area* to which the verb applies; or *the levels of understanding* or performance in those content areas that are to be achieved.

Programme ILOs are derived from several sources: attributes of the ideal graduate from the University, requirements of professional bodies, the judgments of programme committees. From these, the general *aims* of the programme can be listed in about 5 or 6 statements. The next task is to convert these into Programme ILOs.

The simplest way of doing so is to reword the aims into about 5 or 6 Programme ILOs, each with a generic verb, such as "to communicate effectively within the health care context." One or more units may then be aligned to this Programme ILO, each addressing different aspects of what it would take to meet this outcome at the required level of competence. A

Programme ILO by Unit ILO matrix can then be drawn up to check that all Programme ILOs are addressed by one or more Unit ILOs but also to check that there are no redundant or overlapping Unit ILOs.

Unit ILOs are where constructive alignment proper starts. It is here that the verbs and the standards of achievement need to be clearly worked out. The acid test of an ILO is: *does it make clear to the teacher what sort of task is required to assess it, clear to the student what he or she has to do, and are the standards required clear to both teacher and student?*

It is helpful to use the SOLO or Bloom Taxonomies (or both) in thinking about these verbs and standards. For example, “describe” basically means listing a “satisfactory” number of points and is multistructural in SOLO terms, whereas “explain” requires a linking concept and is relational. These verbs refer to declarative knowledge: what students *know about* a topic. They do not tell us what students can *do* with that topic knowledge, which a verb like “design a ...” does. The appropriate verb helps to establish the level of the ILO.

It is important to get Unit ILOs right. They define what is to be learned, and provide the link to designing TLAs and ATs (see below).

The following URL provides a guide to writing ILOs, elaborating the above:
<http://senate.gla.ac.uk/academic/ilo/guide.pdf>

Designing TLAs

When the ILOs contain verbs like “design”, “reflect”, “hypothesise”, “generate”, etc., expository teaching methods like the lecture may be important to tell the student *about* the task, but clearly other supports will be necessary to help the student *do* the task. The key is to provide a context that requires the same action by the student that is already contained in the ILO verb(s). The TLAs for “Solve problems in unfamiliar domains” involve presenting problems in contexts the students have not been taught directly to solve. This would probably need *enabling* TLAs, such as providing carefully structured hints either directly or by software. Students can then in groups or in a chat room discussion reflect on each hint, and out of their shared conceptions of the problem and the available information, work towards a solution.

It is worth remembering that making the students do the work is not only educationally sound—directly relating to the attribute of lifelong learning—it lets the teacher off being the constant source of information. TLAs can be teacher-managed, peer- managed or self-managed. Each has its place, serving different ILOs.

Some URLs useful for designing TLAs:

General and on-line:
<http://www.merlot.org/merlot/index.htm>

TLAs for active learning:
<http://www1.umn.edu/ohr/teachlearn/tutorials/active/index.html>

Good TLAs in different subjects and disciplines:

<http://www.heacademy.ac.uk/SubjectNetwork.htm>

And what all good TLAs should be doing, giving formative feedback to students:

<http://www.brookes.ac.uk/services/ocsd/firstwords/fw21.html>

Designing Assessment Tasks (ATs)

Assessment Tasks for a given ILO, or perhaps more than one ILO, are aligned to that ILO(s) by presenting the student with a task that requires them to use the operative ILO verb. In order to perform the assessment task the students have to enact that verb or a closely related one. The best form of alignment is where the TLA is itself the assessment, as in problem based learning. The students, or usually groups of students, are presented with a problem to solve, and with hints and resources to work out how to do it (the TLA); *how well* they do it is the assessment task. The summative assessment task may be the same kind of problem used in the TLA, or in final years, a different kind of problem, to test the students' ability to generalise. Not all ILOs need to be assessed where they are enabling higher order ILOs or that are subsumed by them. For example, if a student has been able to meet an ILO containing "explain", there is probably no need to assess "describe" or "identify".

There are two separate steps in designing suitable assessment tasks: 1. selecting a practicable task that embodies the target verb; 2. judging how well that task has been performed. NOTE: Usually we grade on how well the *task* has been performed (we assess the lab report, the assignment...) but strictly we should be assessing how well the *ILO* has been met on the basis of the student's performance on various tasks (see below "Are we assessing the task or the ILO?").

Selecting a practicable task that embodies the target verb is relatively simple. A range of assessment tasks may be required to address the range of Unit ILOs. The crucial point is to design assessment tasks that require students to enact the target ILO verbs. It may be that the traditional examination will be suitable for "describe" "explain" ILOs, but unsuitable for other ILOs. Further, the examination context itself (fixed time, invigilated) often distorts the estimate of the student's performance by time stress and reliance on memory although the latter may be mitigated by using open-book exams (but that may increase time stress). If there are reasons why assessment *has* to be carried out in an invigilated situation, reliance on memory can be lessened by presenting a novel problem or situation by video or a "gobbet", to which the student has to respond with "analyse", "interpret" etc.

The best assessment tasks reflect real life by being "authentic" to the profession or discipline, but non-invigilated or off-campus assessment may raise plagiarism fears. An answer to that is that the more the task requires *personal involvement* by the student - e.g., a case study during placement, a reflective journal - the less likely the student is to "get it off the Net" or from someone else.

Examples of assessment tasks may be also found in the websites below.

Twelve tips for good assessment practices:

<http://www.cshe.unimelb.edu.au/assessinglearning/07/index.html>

Good assessment practices by subject:

<http://www.cshe.unimelb.edu.au/assessinglearning/04/index.html>

Assessing group work:

<http://www.brookes.ac.uk/services/ocsd/firstwords/fw26.html>

<http://www.cshe.unimelb.edu.au/assessinglearning/03/group.html>

Assessment ideas:

<http://celt.ust.hk/ideas/afl/Mexam/index.html>

In many cases, the Unit ILOs are not of equal importance, some may be relatively more important than others. Care has to be taken that the weighting of the assessment task is appropriate in reflecting the relative importance of the Unit ILOs. For instance, it has been common to give the exam a weighting of 50%, every other task (“coursework”) 50%, which almost inevitably means the lower level ILOs are over assessed at the expense of the higher level ones. The obvious answer is to change the weights between exam and other assessment tasks or to give more than one AT to the more important Unit ILOs.

Judging how well the assessment task has been performed - Marking versus Grading

Probably most teachers “mark” students’ work: that is, using a quantitative scale, usually in percentages, to rate how well students are doing, or to award marks “bottom up” as the student makes correct points. The final grade is allocated according to the number of marks accumulated.

CA fits most comfortably with holistic grading, that is, allocating P, C, D, HD on the basis of the *quality* of students’ work, not on the number of marks accrued. Deakin has a grading scheme, according to which cumulative percentages in a unit define cut-off points for P, C, etc. That does not mean one has to “mark” by awarding points. One can grade qualitatively using rubrics, and quantifying according to well the categories are met.

Developing Grading Criteria (Rubrics)

The grading criteria, or rubrics, are the key to easy and successful grading. See examples of grading criteria directly for UNIT ILOs and indirectly for the ATs in Pre-workshop 3. Such criteria need to suit the task presented. Generating them is a joint collegial responsibility so that all teachers in the department agree. The judgment is made according to the grade to be awarded: if the performance barely makes the category it is a “minus”, if an excellent example of that grade of performance a “plus”. The numerical grade point can then be read from the grade point scale for the purpose of calculating final grades. For example see: <http://www.tcet.unt.edu/START/assess/oral.htm> (Rates oral communication in terms of nonverbal skills, vocal skills, and content).

Some URLs useful in designing grading criteria:

What are rubrics, how are they designed, and a rubric bank:

<http://www.tcet.unt.edu/START/assess/rubrics.htm>

Rubrics for assessing cooperative learning:

<http://www.uwstout.edu/soe/profdev/rubrics.shtml>

Deriving Final Grades from several ATs

Final grades may be derived in different ways. A common practice is to convert grades to the numerical grade point, average the sum, then convert the averaged grade point back to a final grade. But this raises the possible case of a student who did moderately okay in a few ATs but failed in one will still get an overall pass. Worse still is that the failed AT may be assessing some more important high level UNIT ILOs.

There are other ways of deriving a final grade holistically by considering student's performance in the different UNIT ILOs addressed by the AT (see examples below).

Holistic Grading by ILO

In the following, 4 ATs are assessing 5 ILOs, 3 ATs contributing twice to the assessment of different ILOs, as for example a project or case study might be so. The suggestions for awarding the final grade are for illustration only; obviously each teacher or unit/programme committee will have to decide the grading details for themselves.

| ILOs | AT1 | AT2 | AT3 | AT4 | |
|----------------|-----|-----|-----|-----|---|
| 1. Relate | √ | √ | | | Award Grade as follows: A – 1 and 2 'A', other ILOs 'B' B – all ILOs B/C, an odd 'A' C – if 3, 4 & 5 achieved D – if marginal or only 2 ILOs are achieved |
| 2. Apply | | √ | √ | | |
| 3. Identify | | | √ | | |
| 4. Explain | | | | √ | |
| 5. Communicate | | | | √ | |

A specific example

“Curriculum and Instruction” was a unit in a programme for educational psychologists.

Grading will be based on students attaining the following ILOs.

1. Apply the principles of good teaching and assessment to chosen contexts.
2. Relate selected aspects of curriculum design and management to the educational system in Hong Kong.
3. Apply the content and experience in this subject to enhance your effectiveness as an educational psychologist.
4. Show examples of your reflective decision-making as an educational psychologist.

Final grades will depend on how well students can demonstrate that they have met all the ILOs.

- A. Awarded if all of the ILOs have been clearly met, evidence provided of original and creative thinking, perhaps going beyond established practice.
- B. Awarded when all the ILOs have been met very well and effectively.
- C. Awarded when the ILOs have been addressed satisfactorily, or where the evidence is strong in some ILOs, weaker but acceptable in others.
- F. Less than C, work plagiarised, not submitted.

Are we assessing the task or the ILO?

In outcomes-based assessment, the ILO is the target. Grades are awarded *directly* on how well the ILO has been achieved. This sounds obvious enough, but this is not what we have been used to doing: traditionally, we award grades on how well the task has been performed—the lab report, the examination, the project—while students for their part want to know how well they have done on their report or project. How can we meet these two needs: grading the ILO, and providing information to students by grading the task?

There is no problem when there is only one assessment task per ILO: the task and ILO are identical. But when there is more than one task per ILO, or one task serves several ILOs as would be the case with a complex project, the situation is more complex. In this case, we may consider *indirect* grading through assessing and grading the task holistically.

Further Reading

Biggs, J. & Tang, C. (2007) *Teaching for Quality Learning at University* Maidenhead: Open University Press/McGraw Hill.

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