

# A critical reflection on constructive alignment in theory and practice

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**Abstract:** This essay provides a critical reflection on constructive alignment (CA) in higher education. In CA, teaching and learning activities are aligned with intended learning outcomes that need to be adequately assessed. The essay focuses on the work by educational psychologist John B. Biggs, who together with Kevin Collis, developed the SOLO taxonomy for the qualitative assessment of learning outcomes. It describes Biggs' notion of teaching as forming a complex whole - a system - where the different components of teaching and learning interact with each other and strive towards a stable equilibrium. The essay relates Biggs' work to early influential predecessors, discusses the assessment process, and how CA predominantly is skewed to reinforce cognitive learning on behalf of the affective domain in Bloom's Taxonomy. It concludes by questioning to what extent CA can be used to align more complex, interdisciplinary based university programs, such as Sustainability Science and Natural Resource Management.

Nyckelord: Constructive alignment; Bloom's Taxonomy; Affective Domain, Sustainability Science

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## **1. Introduction**

This essay focuses on one of the most challenging tasks in teaching and learning in higher education (HE), namely that of synchronizing the teaching and learning activities with that of the intended learning outcomes (ILOs), and the assessment of those outcomes. By using educational theories and principles in the theory related to Constructive Alignment (CA), this paper represents a critical reflection on the challenges of adopting CA in practice in HE. While acknowledging that Constructive Alignment in university teaching has been extensively dealt with in the higher education literature (e.g. Biggs 1996; Furman 1998; Norton 2004; Larkin and Richardson 2013; Wang et al. 2013; Kandlbinder 2014; Tam 2014), the theoretical departure for this essay is based on the work by educational psychologist John B. Biggs, who together with Kevin Collis, developed the SOLO taxonomy for the qualitative assessment of learning outcomes. The focus upon Biggs is due to that he is acknowledged as the originator of the CA-model. The essay is structured as follows: Part 2 consists of a review of the literature dealing with CA, based on the works of Biggs, but supplemented by sources that underly Biggs theoretical position. Part 3 consists of a critical reflection of CA in theory and practice. Part 4 offers some concluding remarks.

## **2. The CA-model**

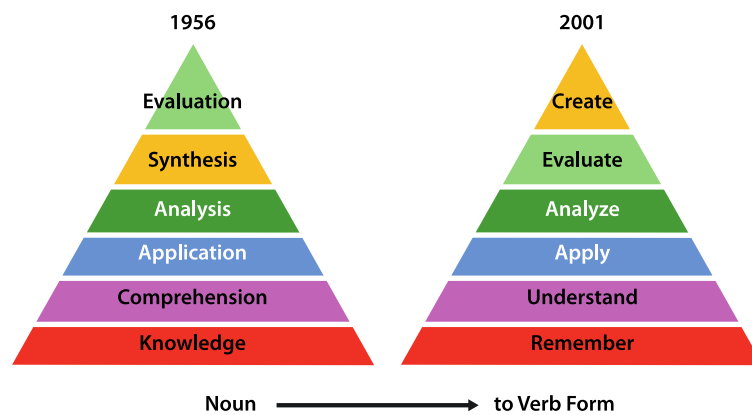
A Scopus search (conducted on October 30, 2019) reveals that 592 documents have been published which to a various degree deals with Constructive Alignment (CA), with the highest number of documents published in the Social Sciences (330), followed by Engineering (141) and Computer Science (139); and with only 6 publications published within the Earth and Planetary Sciences.<sup>1</sup> Educational psychologist John B. Biggs criticized the default modes of contemporary teaching in the form of mass lectures and formal examinations. Standard teaching methods, he argued, often comprise activities such as listening, interpreting, note-taking, comprehending, and potentially reflecting. Most of these methods make, however, students passive (Biggs 1996).

If deep-level learning is to be achieved, it needs to occur along a hierarchical pattern of understanding, ranging from “misunderstanding to articulated understandings of a high order” (Biggs 1996:351). To what extent Biggs was inspired by Bloom’s ‘Taxonomy of Educational

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<sup>1</sup> The search was conducted on documents that had CA in the abstract, title, or keywords, and included documents published in journals, books, book series, conference proceedings, and trade publications.

Objectives' (Fig. 1) is hard to determine. However, he criticized the type of learning that focused on repeating information, whether such learning provided surface-level learning or deep-level learning. Instead, an assessment of the students' work in terms of its quality was more important.

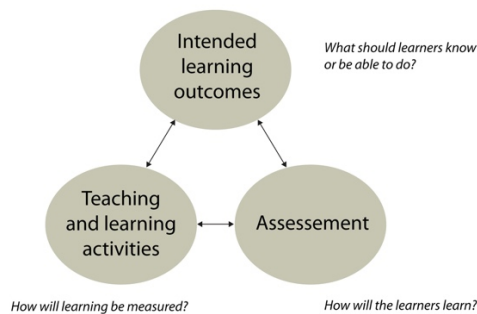


**Figure 1.** Bloom's Revised Taxonomy. Bloom (1956) lists six hierarchical levels of understanding that underly the goal of the learning process in higher education, including: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation (Bloom 1956). Anderson et al. (2001) revisited the cognitive domain in Bloom's learning taxonomy and changed the names in the taxonomy from nouns to verbs and slightly rearranging them (right-hand triangle of the figure). (Modified and adapted from Wilson 2001).

Teaching, according to Biggs, forms a complex whole - a *system* - where the different components interact with each other and strive towards a stable equilibrium (Biggs 1996). Hence, for a system to be effective it is necessary to calibrate the different components so as to achieve equilibrium. Biggs formed his CA-model around the idea that teaching should not simply be a matter of adding 'good' components to the teaching process (Biggs 1996:350); rather student learning and the principle for designing 'good' educational events need to be 'aligned', ranging from individual lessons to courses and to whole programs (Malmqvist et al. 2011). In the CA-model, teaching and learning activities are aligned with intended learning outcomes that in turn need to be adequately assessed (Fig. 2). If assessment addresses lower cognitive level activities than those objectives stipulated in the curriculum, the result will be achieved at a lower level, and the system is therefore not adequately synchronized (Biggs 1996).

Biggs (1993) argues that what the student does depends on what he/she perceives, interprets, and intends to do. Hence, teachers have the important task to explicitly articulate intended

learning outcomes of a course, or program. These outcomes need to be specified in course- and program curriculums. It is often the case that a program consists of several course modules. Hence, an important task of CA therefore becomes to ensure that the syllabuses of each course module are ‘interconnected’ and that they form a complete whole and match the overall education goals of the programs, as well as display a progression over the program’s life-span.



**Figure 2.** Constructive Alignment (CA). According to Biggs (1996; 2003) CA involves four major steps of aligning: 1. Defining the intended learning outcomes (ILOs); 2. Choosing teaching/learning activities likely to lead to the ILOs; 3. Assessing students' actual learning outcomes to see how well they match what was intended; 4. Arriving at a final grade. (Modified and adapted from Crawley et al. 2014).

### 2.1 Historical origins of CA

While Biggs is regarded the founder of constructive alignment, his theories draw on previously developed theoretical propositions and principles in teaching and learning. For example, the CA-model has its roots in ‘constructivism’, which can be traced back to Jean Piaget's theory of cognitive development that argues that knowledge is constructed in the mind of the learner, by the learner’s own activities, and by drawing on what the learner already knows (Stewart 2012). Piaget criticized behaviorist ways of learning where knowledge was seen as decontextualized, and as something that exists independently of the learner, and where knowledge can be learned, tested, and applied more or less independently of particular contexts. In contrast, constructivism places the student at center and the teacher should adopt a "focal awareness ... of the learner's world" (Biggs 1996:349).

In developing the CA-model, it is evident that Biggs also drew on the research by S. Alan Cohen (1987:16) and his idea of ‘instructional alignment’ (IA). The IA framework implies that the curriculum and the assessment methods are aligned to improve results of learning

instruction effect sizes. Cohen, in turn, was inspired by the work of John Carroll's model of school learning, which showed that the result of an effective instruction is contingent upon the degree to which the learner has a clear picture of the instructional outcome (Carroll 1963). Carroll also argued that the *time* factor is central for learning effectiveness and is a function of the actual time needed for learning and the time actually spent for learning.

Cohen was inspired by the framework for Instructional Design known as the Criterion Referenced Instruction (CRI) that was developed by Robert Mager and Peter Pipe (1983). According to this framework effective instructional objectives should have three components ([https://en.wikipedia.org/wiki/Robert\\_F.\\_Mager](https://en.wikipedia.org/wiki/Robert_F._Mager)):

- Performance – Singles out what the student should be able to do after the instruction
- Condition – Singles out the conditions under which learning is occurring
- Criterion - Describes how well the student must perform in order to pass for approval

Malan (2000) describes CRI as a form of 'mastery learning' where a learning outcome or mastery of competencies is compared with a predetermined external standard. Interestingly, the CRI framework was so effective for learning that it contradicted the conventional expectation of a normal distribution of assessment results – a fact that rendered it less popular among school practitioners at the time when normal distribution was more widely used in evaluations of learning assessments (Cohen 1987). Lai and Biggs (1994), on the contrary, argue that mastery learning is effective with students who adopt a surface approach to learning, but ineffective for deep-level learning.

### **3. Some critical reflections on the CA-model in teaching and learning activities**

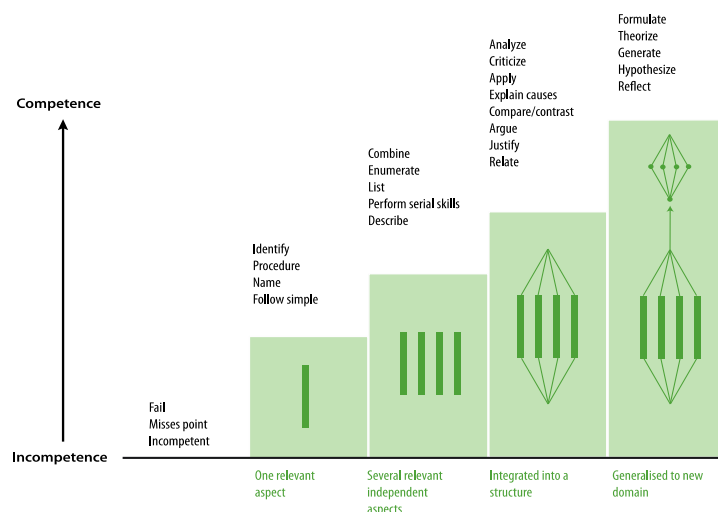
#### *3.1 The assessment process*

Learning for Biggs is a gradual and cumulative process, with “qualitative changes taking place in the nature both of what is learned, and how it is structured” (Biggs 1992:1). He argues that even when essays are used in assessments, they are normally used in testing recall rather than recognition, and are just as quantitative in conception as multiple choice tests and short answer examinations and they rarely go beyond Bloom's comprehension level (Biggs 1996:357). Such

tests may be adequate for assessing learning at a low cognitive level, such as “spellings and formulae, but not for dealing with more complex, developing concepts” (Biggs 1992:2). Instead Biggs suggests that one should include in the assessment the “students’ progressive interpretations of their experience with assessment technology” (ibid). Accordingly, a grading procedure should:

- “reflect where students stand in relation to this orderly development of competence, rather than in relation to each other
- inform both teacher and student not only where the student currently is, but what needs doing to improve that position
- be able to be combined with other grades in order to meet administrative requirements for awarding of levels of pass, and the like.” Source: Biggs (1992:2).

To what extent Biggs idea of qualitative assessment is congruent with ‘formative assessment’ is hard to determine because he does not deal with it at any length, an exception being Biggs (1998), where he contends that formative assessments lead to deep approaches of learning in contrast to summative assessments that lead to surface learning approaches.



**Figure 3.** The Structure of the Observed Learning Outcome (SOLO) taxonomy. (Modified and adapted from UNSW Sydney 2017, <https://www.futurelearn.com/courses/educational-design/0/steps/26435>).

Considering Carroll’s notion of *time* as a critical factor for learning effectiveness, both a teacher and a student at a university course will have considerable less time to learn and assess qualitative learning using the SOLO taxonomy (Fig. 3), compared to a teacher and a student at

the level of the primary or upper secondary school where the student-pupil relationship may extend over a considerable time period.

### *3.2 The CA impact in Higher Education*

Biggs and Collis' SOLO taxonomy (1982), as well as Bloom's 'Taxonomy of Educational Objectives', have for sure influenced modern-day higher education systems. For example, most master programs in Sweden follow the official learning goals stated in the Higher Education Ordinance (Högskoleförordningen) (1993:100), established by the Swedish Council for Higher Education (Universitets och högskolerådet). While the HE Ordinance's learning goals fulfill most specifications of the cognitive domain of both the taxonomy of SOLO and of Bloom, both suffers from being skewed toward the cognitive domains of learning. The Affective Domain (Krathwohl et al. 1964) in Bloom's Taxonomy is hardly assessed at all in HE. While one may foresee problems (political, ethical and ideological) in assessing the Affective Domain, not let alone the Psychomotor Domain (Harrow 1977) in Bloom's taxonomy, it is somewhat a limitation that HEIs predominantly tend to measure cognitive skills of students. Hence, it is of no surprise that summative assessments continue to be the dominant assessment to evaluate student performance in HE (Williams 2014). A contributing factor for this is the increased pressure for accountability and performance of HE (Nyström 2018), which in turn has been reinforced by the Bologna process in order to harmonize the higher education systems in Europe and making the grading systems more compatible at the international level.

By virtue that cognitive skills are promoted in HEIs, the teacher's job of creating a learning environment that supports the learning activities appropriate for achieving the desired learning outcomes in CA might be heavily skewed towards cognitive learning, leaving out other relevant learning outcomes. Hence, the goal that Biggs call for might in fact be hard to achieve in practice. This limitation may have spurred higher education teaching theorists to argue that HEIs should not only provide deep-level learning, but 'life-long learning' (Kreber 2005). Boyer, for example, pledges HEIs to become more vigorous partners in the search for answers to our most pressing social, civic, economic, and moral problems. Hence, academic environments need better affirm their historic commitment to what he calls the 'scholarship of engagement' (1996:18). Boyer criticizes higher education for serving merely private benefits, rather than a public good, and promoting the view of the campus as a place where students get credentialed and faculty get tenured, while the overall work of the academy does not seem particularly relevant to our most pressing societal challenges.



In the same vein, Kreber (2005), brings forward the notion that the scholarship of university teaching should foster 'lifelong learning' and conceptualizes such scholarship as "the intellectual, practical and critical work done by college and university teachers that facilitates student development toward significant educational goals" (ibid:389). Besides having the goal to foster students' development of self-management, autonomy and social responsibility, Kreber argues that universities have a role to play in protecting our planet and contribute to sustainable development. Colding and Barthel (2017) have provided ample examples of how such activity can come about at university- and college settings.

### *3.3 The grading difficulty*

While there seems to be a consensus in the literature of the usability of grading criteria in HE (Rust et al. 2003; Sadler 2005), there is disagreement about whether the two-step, or the multi-step grading systems are most effective in motivating student learning (Nyström 2018). Dahlgren et al. (2009) found that multi-step grading scales may have negative effects on assessment tasks while Pass/Fail grading scale nurture further incentives for learning. Otto (1972), on the other hand, found that students assessed with a Pass/Fail grading scale were less motivated to learn, adopted less study effort, and had lower lecture attendance.

Grading is of course an important part to ultimately assess the learning outcome in teaching. While asserting that faulty summative assessment is the greatest single factor for misaligning teaching (Biggs 2003), Biggs does not discuss grading at any greater length, except in relation to the SOLO taxonomy that can be used for multi-step grading. Symptomatically, Dahlgren et al. (2009:186) argue that "the relation between grading systems, assessment and learning has been more or less neglected" in HE. This might be due to that standardized criteria for assessment are difficult to apply (Dahlgren et al. 2009). To this difficulty one could add the difficulty of designing a grading system that also takes qualitative aspects into account in the assessment of student learning outcomes. Interestingly, degree projects (DPs) are currently used in Sweden to measure quality as an indicator of an entire education program and the quality of DPs influences university funding (Malmqvist et al. 2011). CA has a potential to improve the quality of DPs by aligning teaching and assessment activities with intended learning outcomes (ibid). DPs constitute the final assessment point in most university programs, and if DPs are weighted, grade point average (GPA) scores can be calculated where the quality of the DP carries an important weight (Nyström 2018).

#### **4. Concluding remarks**

The usefulness of CA in practice is somewhat mixed. On the one hand, it can provide a useful structure for designing and aligning courses in a more coherent and logical fashion and to create a learning environment that supports the learning activities that is necessary for achieving desired learning outcomes. On the other hand, it is questionable whether CA in HE actually can improve qualitative, deep-level learning as long as current HEIs are entirely skewed towards cognitive learning. In this regard, a rediscovery of the Affective Domain in Bloom's Taxonomy holds a somewhat unexplored potential to rejuvenate teaching and learning at HEIs. Moreover, it is questionable whether CA can be used to align more complex, interdisciplinary based university programs such as master programs in Sustainability Science and Natural Resource Management. As studies show, reconciling sustainability requires a complex interdisciplinary approach beyond those found in most traditional environmental education institutions (Dale and Newman 2005). A confounding issue to add to this dilemma is that teaching and learning in interdisciplinary HE has been incompletely studied (Spelt et al. 2009). Developing interdisciplinary programs using CA will for sure require more time as traditional discipline-based structures may comprise an obstacle to interdisciplinary collaboration (Pharo and Bridle 2012). This does not mean that CA is of limited use for designing high-quality interdisciplinary programs, but rather that more research is needed to see how the framework may be used in more complex teaching and learning programs.

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