

On the Tension and Balance Between “Change” and “Constancy” in University Classroom Teaching

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Abstract: University classroom teaching is shifting from a teaching-centered to a learning-centered paradigm, and with that shift an old tension has become harder to manage: a lesson is planned, yet what happens in the room is, by its nature, unpredictable. This paper takes that tension as its starting point and asks a narrower question, when an unplanned moment arises, on what grounds should a teacher decide whether to follow it or close it? The answer offered here takes the shape of three reference points, named Anchor, Load, and Cycle. The Anchor borrows from constructive alignment and ties the “constant” of any lesson to its intended learning outcomes (ILOs). The Load borrows from cognitive load theory and reads the impact of an emergent event on students’ working memory as a signal of whether the detour is bearable. The Cycle borrows from the First Principles of Instruction and asks, once the teacher has decided to follow the moment, where the discussion should be moved next. Taken together, the three points are meant less as a procedure than as a vocabulary, one that lets a teacher describe, after the lesson, why a particular detour was worth taking and why another was not.

Keywords: Classroom teaching; Constructive alignment; Cognitive load theory; First principles of instruction

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1. Introduction

A classroom is a place in which many things happen at once, and a long line of research on classroom organization has identified several features that make this so: many task streams run in parallel (multidimensionality); several events tend to occur in the same instant (simultaneity); the pace at which events unfold leaves little time for reflection, and any single mishap is, in effect, witnessed by everyone (immediacy); and the class as a group accumulates a shared semester-long history, so that each lesson is read against those that came before it (history) ^[1-3]. What follows from these features is plain enough. Teaching has never been the kind of activity that one can carry through by faithful execution of a written plan. However carefully a lesson is prepared, something always intrudes: an unanticipated question, a stretch of confusion that a whole row of students seems to share at once, a five-minute discussion that the class refuses to let go of and that runs to twenty.

For most of the twentieth century the lecture form kept this tension within bounds. The teacher held the floor; students

had limited room to redirect the lesson; the pace of the class was, in the main, set by the lecturer's pacing of their own material. That balance is no longer the one we work in. University classrooms are now moving, often quickly, from one-way delivery toward two-way and many-way exchange, and as they do so the pace of student learning ceases to be a passive variable. It begins to drive the lesson. Where once a puzzled face or a post-class question reached the teacher only obliquely, a signal that could be picked up or set aside without disturbing the schedule, the same puzzlement now arrives as a spoken question, in front of everyone, while the lesson is in progress. Ignoring it is no longer a small choice. A student who is publicly waved off learns something about whether to speak again, and so does the rest of the room.

What this leaves the teacher with is a recurring decision. Press on with the schedule and finish the planned material, at the cost of letting the moment pass? Or follow the moment and accept that the back end of the lesson will have to be compressed? Pressing on too often hollows out the interaction; students stop investing in questions whose pursuit they have learned will not be permitted. Following every interesting detour does the opposite kind of damage: the lesson loses its spine, and the course turns into a sequence of attractive but disconnected episodes rather than a built-up structure of knowledge.

The difficulty, in other words, is not that teachers lack commitment to either student-centeredness or to learning objectives. It is that the line between a legitimate adjustment and a loss of instructional control has not been drawn in any operational way. What is the "constant" that a teacher must hold to? And what kind of analytical framework can make that question answerable in the middle of a lesson, rather than only in retrospect?

2. Pedagogical analysis of "change" and "constancy"

To draw the line clearly, three questions need to be taken in turn. What is it, in the classroom, that must not change, and where should that constancy be located? On what basis does a teacher judge, in the moment, whether a change is warranted? And once the decision to change has been made, in which direction should the lesson be moved?

2.1. The anchor of constancy: Intended learning outcomes

Talk of "constancy" in instructional reform tends, at first, to reach for large categories, the fundamental mission of education, the cultivation of moral character (lìde shùnrén), the irreducible value of teacher–student exchange, and so on. Statements of that kind are not wrong; they simply do not help with the decision a teacher actually faces, which is whether to break off a discussion now in order to reach the next planned segment. An appeal to "moral cultivation" gives no purchase on that choice. The constant has to be defined at a finer grain, functionally, in terms that can be acted on. This paper proposes to locate it in the intended learning outcomes (ILOs) specified in advance for the course: the knowledge, skills, and habits of thought that students are expected to be able to display at the end of it.

Constructive alignment theory supplies the rationale ^[4]. On its account, the working structure of effective teaching has three parts that hang together: a clear statement of what students should be able to do after the course (the ILOs); learning and teaching activities through which they get to practice those capabilities; and assessments that read those same capabilities at the same cognitive level. The phrase "at the same cognitive level" carries most of the weight. If the ILOs are pitched at analysis and evaluation but the assessment only checks recall, the alignment is broken and the lesson, however lively, does not deliver what it claims to deliver. Within this triad, the ILOs do the anchoring work. They orient the activities, and they set the standard for assessment. So long as a spontaneous adjustment continues to point toward the same ILOs and continues to give students a real chance to practice them, the adjustment is, for purposes of design, legitimate. Once it begins to redirect the class toward outcomes the ILOs do not cover, or only cover thinly, the liveliness of the exchange is no defense.

Why locate the anchor here rather than in the lesson plan itself, or in the list of topics to be covered? Because in the original logic of constructive alignment, the ILOs sit at a different level of abstraction from teaching activities and assessments. A change to the ILOs requires the entire instructional system to be rebuilt; substituting one discussion case

for another within a lesson, or rearranging the order of activities, is exactly the kind of professional latitude the theory leaves to the teacher. To anchor constancy in the ILOs is therefore to say that adjustments at the level of activities and methods are allowed, indeed encouraged, provided the adjusted activity remains at the cognitive level the outcome calls for. The framework can in this way protect structural integrity and at the same time keep open the room teachers need for situational judgment.

Two practical consequences follow, the first concerns design. ILOs only do the anchoring work if they have been written with enough specificity to be observable. “Understanding the basic principles of fluid mechanics” is too vague to serve. “Being able to formulate the continuity and energy equations for a multi-branch piping system and to solve them simultaneously under given boundary conditions” is the kind of formulation that can be referred back to in the middle of a lesson. The second consequence concerns real-time decision-making. A single question runs through every detour: does this adjustment move the class closer to the ILO, or further from it? When the answer is “closer,” there is no reason to feel anxious about leaving the lesson plan behind. When the answer is “further,” the teacher should at least register the cost and consider what part of subsequent instruction will have to absorb it.

2.2. Discerning when to change: Cognitive load as a diagnostic signal

Once the anchor is in place, a second question opens up. How does a teacher decide, in the moment, whether an emergent event is worth following or should be wrapped up?

Cognitive load theory gives this question an analytical handle ^[5-7]. Its empirical premise is well established: human working memory is capacity-limited, and once the total load on a learner exceeds that capacity, learning stalls. The theory separates load into three kinds. Intrinsic load is set by the inherent difficulty of the material and by what the learner already knows. Extraneous load is what poor instructional design dumps onto working memory without adding anything to learning. Germane load is what deep processing demands when it is genuinely doing the work of building schemas.

Read through this lens, an adjustment triggered by classroom interaction does not affect cognitive load in only one direction. A well-handled probing question can shift resources toward germane load: the puzzlement a student has spoken aloud usually marks the very seam between what is new and what was already there, and a teacher’s response that closes that seam puts students’ processing into the service of schema construction rather than surface recall. The same exchange, mishandled, does the opposite. If the teacher reaches for too many new concepts and connections without pulling them together, extraneous load spikes, and what students are left with is a scatter of impressions rather than a usable line of understanding. Whether an adjustment is warranted is therefore not a function of how lively the discussion is. It is a function of whether the adjusted process holds extraneous load down and pushes germane load along the line that the ILOs have already drawn.

A clarification is in order, since one common misreading needs to be avoided. Intrinsic load is not something that a single classroom exchange can lower. Reducing it depends on slower processes, the steady accumulation of prior knowledge over the semester, or a structural reorganization of the materials themselves. Pairing a teacher’s response to a student question with “lowering intrinsic load” is conceptually loose. What such a response can do is allocate more germane load: it gives the student the deep processing they need in order to make sense of the new material.

In practice, this turns into a quick mental audit. What new informational units will pursuing this question put into working memory? Are they connected by some logic, or only loosely placed side by side? Is the prior knowledge students have arrived with strong enough to integrate the new material? When the audit suggests that overload is on the way, the right move is rarely “let’s come back to this later”, dampening a question that has just been spoken aloud is itself a pedagogical loss. The better moves are local: shrink the granularity of the elaboration, scaffold the immediate step rather than the whole structure, anchor the discussion in a single concrete case before generalizing. The point is to keep the load inside the working capacity of the room rather than to suppress the moment.

2.3. The direction of change: A problem-centered cognitive cycle

Cognitive load theory tells the teacher when to hold an emergent moment in check. It does not, on its own, say what direction the lesson should be moved when the moment is worth following. For that, the First Principles of Instruction supply a complement ^[8,9]. Drawing together a number of instructional design models, Merrill formulates a single proposition: learning outcomes are produced by cycles of cognitive processing organized around whole problems or tasks, with four phases, activation of prior knowledge, demonstration of new knowledge, application and practice, and integration.

What this gives the teacher is not a procedure but a sense of direction. The point of any adjustment is not to extend the discussion sideways at the same cognitive level; it is to move students into the next phase of the problem cycle. So, when a moment opens up in class, the diagnostic question is: which phase of the cycle is the discussion sitting in, and where should the teacher's intervention push it next?

Consider how this looks across the cycle. A discussion that is still in the activation phase, students drawing on prior experience or earlier-learned concepts to come at a new problem, is doing useful preparatory work and should be allowed to run, but only until the prior knowledge has come up to the surface in usable form; the move at that point is into demonstration. A discussion that has reached demonstration is at the pivotal moment, the moment at which students are trying to grasp the conditions under which a new concept or method actually applies. Hurrying through it for the sake of the schedule is exactly the wrong economy. Structured exposition and a worked case are worth the time they cost.

Application is the phase that most rewards being followed. When students begin to put a new concept onto a problem the lesson did not anticipate, say, when someone asks whether the energy loss at a sudden contraction in a pipe needs to be carried in the Bernoulli equation, and the lesson had been going to move on to pump characteristic curves, what is on offer is precisely the kind of deep processing that makes new knowledge stick. Even at the cost of ten minutes that had been earmarked for something else, the question deserves to be pursued to a conclusion the class can use. What rarely deserves to be pursued is a discussion that has begun to circle. When the same cognitive level keeps being revisited, or the conversation has started to drift away from the problem direction the ILOs anchor, it is time to bring the exchange to a close and pull the lesson back onto its track.

3. The “anchor–load–cycle” tripartite framework

The three reference points developed above can be put together as an analytical framework for thinking about the relation between change and constancy in classroom teaching. See **Table 1**.

Table 1. Framework overview

Element	Core function	Theoretical tool	Operational question for teachers
Anchor	Establishing the non-negotiable boundary	Constructive Alignment	“Does this adjustment bring instruction closer to or further from the ILOs?”
Load	Judging the immediate necessity of change	Cognitive Load Theory	“What new information will pursuing this question introduce? Can students integrate it effectively in their current state?”
Cycle	Indicating the direction in which to advance	First Principles of Instruction	“Which phase of the cycle is the current discussion in? Where should the teacher's intervention move it?”

The three elements are not stacked in a sequence to be run through one after another. They operate together, and they check one another. The Anchor functions as a constraint on the other two: an adjustment that pulls away from the ILOs has no legitimacy to fall back on, however lively the room and however manageable the load. The Load is a feasibility check inside that constraint—an elaboration that goes in the right direction will still cost the lesson if it overruns what

students can process at this moment. The Cycle does work that does not depend on whether a change has been made: even when a lesson runs exactly as planned, students should still be moved through activation, demonstration, application, and integration, rather than left at one cognitive level for forty minutes. What changes in moments of adjustment is that the Cycle becomes the most visible of the three, because the question is no longer “am I executing the plan” but “where am I taking the class next”—and that is a question the Cycle is built to answer.

4. Boundaries of applicability and reflection

Every framework comes with conditions attached, and the one offered here is no exception. Stating those conditions plainly does not weaken the proposal; it marks out where the proposal applies and where it should be used with care.

4.1. Implicit demands on teachers’ professional competence

Putting the framework to use presupposes a set of things the teacher already brings to the lesson. At the design stage, ILOs have to have been written specifically enough, and at a fine enough grain, to be observable; without that, the Anchor question has nothing definite to be referred back to. During the lesson, the teacher needs more than a textbook acquaintance with cognitive load theory, an experiential sense of what particular students arrive with, of where they tend to stumble, of how much new material this group can hold at once. Without that working knowledge, the load audit collapses into guesswork. And running through both of these is something harder to acquire: the capacity to monitor one’s own decision-making while the lesson is moving, to know that a choice is being made and to register the considerations that bear on it. For teachers early in their careers, sustaining that kind of metacognitive monitoring in real time is itself a long apprenticeship.

This suggests that the framework is better positioned not as a manual to be consulted in the heat of the moment, but as a structured tool for what happens after the lesson: reflection on one’s own recordings, conversation with colleagues, the gradual settling of explicit reasoning into something closer to professional intuition. Used that way, over enough lessons, the three reference points migrate from being checklist items to being the form in which the teacher remembers the class.

4.2. The influence of disciplinary differences on framework applicability

The illustrative material drawn on here comes from engineering courses (Fluid Mechanics and Pumps), and the framework takes some of its character from that source. Those courses share a certain shape: a knowledge structure with clear logical dependencies among concepts; ILOs that translate readily into observable problem-solving or design tasks; classroom interactions that, when they happen, tend to gather around relatively well-defined problems or cases. Courses in the humanities and social sciences do not always have this shape. There the ILOs themselves are often more open and more emergent, and what is sometimes most worth pursuing in a class session is exactly a movement away from outcomes that were specified in advance. An anchor that is too rigidly fixed could, in such a context, suppress rather than support emergent learning. Whether the framework needs different weightings in different disciplinary settings, or whether some of its elements should give way altogether in courses of a different epistemic shape, is a question that calls for further work.

5. Conclusion

The dilemma sketched at the start of this paper, stay with the plan or follow the moment, is one most university teachers now meet several times a week, and it has become more acute as the classroom has become more interactive. The three reference points proposed here, Anchor, Load, and Cycle, are not meant to dissolve the dilemma. They are meant to make it discussable. The Anchor, taken from constructive alignment, fixes what cannot move: the intended learning outcomes around which the course was built. The Load, taken from cognitive load theory, reads the cost of a detour against the

working memory of the students actually in the room. The Cycle, taken from the First Principles of Instruction, points to the next phase of cognitive processing into which an adjusted discussion ought to be carried.

What such a framework offers, in the end, is less a decision procedure than a vocabulary. A teacher who has it can say afterward why a particular detour was worth taking and why another was not, and can say so in terms a colleague can engage with. A teacher who does not have it tends to be left with judgments that work well enough at the time but cannot be passed on. The hope is that, over many lessons, the small acts of in-class decision-making stop being isolated fragments of private experience and begin to add up into something colleagues can build on together.

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