



Upcoming ITLAL Events in May 2014

From Game Design to Best Teaching Practices

Tuesday, May 13
10:00 AM - 12:00 noon
ITLAL Underground (LI 069)

What makes games so engaging? And how can we borrow some principles from game design to improve the learning environment of our classrooms? UAlbany faculty members Victor Asal (Political Science) and Alex Jurkat (Informatics) join forces to introduce UAlbany instructors to the art and craft of incorporating key concepts from games, play, simulations, etc. into university courses.

Team-Based Learning Academy

May 20 & 22
(By application)
ITLAL Underground (LI 069)

Join the next cohort of adopters of the teaching method that will transform students in your course from passive vessels waiting to be filled to active agents who take responsibility for their own learning. For details, visit the ITLAL web site (www.itlal.org).

Summer Teaching Boot Camp

May 21, 9:30 AM - 1:00 PM
Location TBD

GTA's: What do you do with all those huge blocks of time in summer courses? Join us to learn strategies for active learning, so those long stretches are filled with engaged students working on real challenges.

To register for events or request services, please visit
itlal.org

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What the Best College Teachers Know about how their students learn

*A few years ago Professor Ken Bain of Montclair State University conducted research on college teachers who had had enormous, consistent, measurable impact on their students. Bain wanted to know why these instructors were so effective over the long term, and to find out what they had in common. His pool of subjects included instructors (and their students) from all levels of higher education, including undergraduate, graduate and professional programs. It included teachers (and their students) of both large and small format courses. It included subjects teaching low-level, general education courses as well as highly specialized upper-level courses. Bain published his research in 2004, under the title *What the Best College Teachers Do*. In this piece we have distilled and summarized for Teaching@Albany readers the first chapter of Bain's book, "What do they know about how we learn?"*

"Know their stuff," and...

All the subjects of Bain's study had mastery of their disciplinary content. But, Bain observes, so do nearly all of the least effective teachers, so that can't be the critical difference. Bain found instead that the best teachers communicated their ideas about teaching pointedly in terms of engaging human beings rather than in terms of imperatives about specific disciplinary content. Their agenda was to transform student thinking at a profound level, no matter the subject—and sometimes in spite of the subject matter. Further investigation revealed that the best teachers had "cobbled together" a mostly intuitive but highly accurate understanding of how human brains respond to and process information. In particular, they recognized and—often unconsciously—exploited the role of metacognition (i.e., thinking about your own thinking) in deep, permanent learning, even though they had not necessarily been exposed to formal representations of the concept as described more recently in cognitive studies and neuroscience.

Four Shared Insights by the Best Teachers

Bain distills the best teachers' intuitive understanding of cognition down to four common notions that emerged from the research interviews and surveys. In the following paragraphs we summarize and elaborate on Bain's findings.

1. Don't start by presenting information. Students build solid understanding only by having their assumptions and preconceptions actively tested at the outset, before new information arrives. Start instead by putting students into situations where they have to think for themselves, even when they know next-to-nothing about the subject: "Look at this scenario and decide what you should do." "Consider this diagram: what will happen if..." All of Bain's subjects, in fact, dismissed the widespread practice of "give students a solid foundation of basic information first—and then ask them to think about it." No amount of basic information, they realized, is going to deeply affect student understanding if the underlying mental models and thought process are flawed.

2. Students need to experience early and often the failure of their mental models to interpret and predict events accurately. "Draw a picture showing how the moon's phases are produced..." will reveal on day one of freshmen Astronomy whether or not students are working with an accurate model of lunar and earth movement. "Predict what will happen if supply contracts..." will reveal on day one of an Economics course the accuracy of student understanding of a specific principle at play in a given scenario. Untrue notions and errant expectations need to be made visible before a more accurate mental model is possible. The teaching process should therefore challenge students' working theories at the beginning of the learning sequence so that students can actively and systematically unlearn what is not useful. They can then focus on constructing new models of reality using better information (such as targeted course content). Classrooms become places where students constantly try out their own thinking, come up short, get feedback, get better information, and try again.

3. Teach from questions, not content. Questions are the tools that the best teachers use to make visible students' misguided expectations and flawed mental models. For Bain's subjects, these are not just any old "what do you think about this?" questions. These need to be questions that prod and cleverly

induce students to divulge the underlying patterns of their thought process by asking them to speculate on causes of phenomena, predict effects from a set of conditions, construct analogies that reveal underlying structures, identify patterns from limited data, etc. Asking the right question in the right way helps students find holes in their understanding, which then creates a possibility to construct more accurate mental models, more complete knowledge. Questions are also the key to retention of information in memory. They help students cognitively index and store information for future use. Information's value (and likelihood to be retrievable from memory) is determined by whether and how it responds to a specific question or category of questions. Questioning drives memory and creates frameworks for new information to cling to.

4. Students have to care—and it's our job to make sure they do.

The best teachers all believed that in order for transformative learning to occur, they had to take direct responsibility for fostering curiosity, whether the students brought their own motivating interests to the course content or not. Teaching to the naturally interested or most competitive 10% was not an option. None of Bain's subjects shrank from their responsibility to structure learning so that students experienced a personal investment and satisfaction in the process. The best teachers actively try to awaken students' inquiring nature by making "the familiar seem strange" and "the strange seem familiar." These teachers learned to intrigue their students by turning their content into puzzles, mysteries, carefully staged confusion, and challenges to lazy common sense so that students could participate directly in the demystification of the discipline.

Rethinking the Role of Content

An overarching consistency among these four knowledge points is the best teachers' ongoing, shared battle against the common practice of "bulimic education," where students, in response to a learning environment driven by short term "rewards and punishment," gorge on information in preparation for a test, then purge it from their brains as soon as the test is over.

All of Bain's subjects expressed the notion that a "content-focused" rather than "human-focused" approach to teaching would lead to this short-term, vicious cycle of gorging and purging. Examples of their practices that help students avoid this trap of dysfunctional educational consumerism included:

- Written or stated course goals that show students what they will be empowered to DO (rather than merely know or understand) as a result of the course
- Daily tasks and activities that ask students to practice high-level inquiry, such as predictive thinking and hypothesis construction, even at the earliest stages of the course
- Content made available in response to student-initiated questions and inquiries, not as an antidote to ignorance and naiveté.

Furthermore, all of the best teachers were able to identify a range of motivating strategies for students with different needs or students

at various levels of cognitive and emotional development. The best teachers knew how to appeal to some students' need to be pushed intellectually, and for others, to their competitive drive, or even to the motivating social forces of the classroom.

Intellectual Development and Intelligence

Bain reports that many of his subjects had a mostly intuitive but highly accurate understanding of how intellect and intelligence develop. Their perspectives aligned with researched concepts such as the Perry Scheme, which describes students on a slow, looping, multi-staged journey from being passive about knowledge to being fully independent, autonomous thinkers. The best teachers deeply understood student potential in terms of what Carol Dweck calls a "growth mindset": students are not bound by a fixed capacity for learning. They become more intelligent—not just better informed—as a result of rich, challenging, learning experiences.

The best teachers were able to integrate this understanding into their instructional approaches: students need different experiences (and different questions) at various moments of their journey in order to promote their transformation. All of the best teachers indicated that they expected students to rise quickly above passive knowing and designed their courses around the kinds of advanced thinking required of their disciplines. In support of this approach, they consistently characterized their disciplines as "incomplete" or works-in-progress, to pull students into a more participatory attitude about disciplinary knowledge. Questions that function in this way help students develop more expert-like thinking, even at a very low level of knowledge:

- Urban Planning: If you were a city planner, what would you need to know in order to decide where to run the new light rail system?
- Chemistry: If you were a plastics manufacturer, what would you need to do in order to increase the rigidity of this substance?
- Literature: What would we need to know in order to assess the role/function of this character in the novel?
- Sociology: What would we need to do in order to ascertain the impact of social media on this family's relations?

In summary, Bain reports, the best teachers have embraced the idea that "Human beings are naturally curious animals. People learn naturally while trying to solve problems that concern them. People are most likely to enjoy their education if they believe they are in charge of the decision to learn." The best teachers tap into these fundamental forces of human nature and embed in the dynamic of these forces the information and skills characterized by traditional content and curricula.

Bain, K. (2004). *What the best college teachers do*. Cambridge, MA: Harvard University Press.

Dweck, C. (2006). *Mindset, the new psychology of success*. New York, NY: Random House.

Perry, W. (1970). *Forms of intellectual and ethical development in the college years*. New York, NY: Holt, Rinehart & Winston.



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