Line-stop in the Classroom:  
Using Action Learning to Build a Better Education

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ABSTRACT

The end-of-semester evaluation is the most common method of formal course feedback, especially for large lecture formats. While useful, these evaluations come too late for students to gain in any practical outcomes. Aware that they are not going to benefit, students tend not to participate fully in these exercises. Furthermore, students usually do little more than identify course problems rather than solve them. This paper briefly explores a very simple action learning technique that borrows from industrial learning-by-doing methods. By providing a structured venue for student input, as well as establishing shared learning goals, students can become active participants in the design and operation of their education. The result is a series of incremental improvements that, over time, substantially increase a course’s educational quality.

INTRODUCTION

The very first class that I taught started out well enough. I had spent a number of weeks preparing materials and organizing the syllabus. I stayed up well into the night composing lectures. I consulted the latest in instructional guidebooks. But after a few weeks of teaching, I realized that there were significant problems. I could not wait until the end of the semester to find out how to improve the course. Problems needed to be solved then and there.

My particular solution, which I recognize has been lifted entirely from other fields, has served me very well. Though students do not realize it, the courses that I offer now are almost entirely products of this iterative improvement process. In my first semester of teaching, out of desperation I turned to the students in front of me, and to the innovation methods bound up in my field of study. By luck, I found a process that provides targeted advice and long-term guidance for instructional improvement.
THE FEEDBACK PROBLEM

Regardless of format and class size, an important part of good teaching is establishing good information flow. Unlike a book or canned courseware, good teaching relies on, at a minimum, two-way communication. For seminar formats with small numbers of students, the instructor can very easily establish a dialogue, eliciting critical information about how the students are learning and what they think about the instructor’s particular methods. With small classes, information flows also increase among students themselves, enabling even greater opportunities for sharing educational insights and study strategies.

With large lecture formats, however, the obstacles to good information flow increase. The instructor’s attention is now divided across a room full of people. Students, for their part, knowing that they are an anonymous face in the crowd, stop responding to the instructor. Students have limited opportunities to participate, and they no longer feel compelled to give the slightest hint that they are listening. Gone are the facial expressions and head nods, all the cues that tell a speaker that he or she is being understood.

Of course, an instructor exploits different kinds of feedback. The most basic type is “Did you understand what I said?” Where possible, the ultimate goal of an instructor is to draw out qualitatively deeper responses, transforming the student from a simple respondent to an original contributor and, hopefully, instructional partner. But there are other types of information that students have, by virtue of being students of many classes. Students are educational experts in their own right. Students are exposed to hour upon hour of different instructional styles and methods. One lecture of my largest course adds up to nearly 400 person-hours of observation. Even though the students are not practitioners, they are nonetheless fully aware of instructional practices.

Of course, this logic forms the basis for end-of-the-semester course and instructor evaluations. These are necessary and useful, but they go only so far. Students participate in them knowing that their comments will not impact their own education. Since we do not require that students provide input, we must make appeals to altruism. Even when students do respond, the answers tend to be superficial. We do not ask deep questions, nor do we expect students to take the time to really consider pedagogical dilemmas. Essentially we ask the following questions: “Did you like the class? Did you like the instructor? What was good and bad about each?”

What if we could establish a new venue for student feedback, one that allowed students to participate in the design and operation of the course, and one that was not overly consumptive of class or instructor resources? Such a system would need to be moved to an earlier point in the semester, so that students would have built-in incentives for course improvement. Such a system would need to educate the students about creatively solving problems, rather than simply identifying things they did not like.
LEARNING-BY-DOING INNOVATIONS

Fortunately, there are existing organizational methods for achieving these goals. And in my course on Science, Technology, and Society, I did not have to go far to find an appropriate model: learning-by-doing innovations (LBDI). LBDI occurs whenever improvements are made within the production phase, with the change embodied in either the process or the design of the product. This particular model of innovation stands in contrast to more top-down models that emphasize the role of scientific research. In LBDI, gains come from workers on the factory floor. This lesson is not insignificant. Whole industries have been transformed and overturned by these models.

There are obvious relationships between the factory and the university, especially in terms of where knowledge is located in the production process. As I note above, students represent a fantastic pool of instructional knowledge. Like factory workers who are not sufficiently educated to engineer an automobile, students are also not sufficiently educated to act as faculty. Yet we know better than to ignore their experience. We can adopt, almost entirely, the LBDI methods of the factory and exploit it in the context of the classroom.

LBDI is more popularly known through the quality-control measures of companies like Toyota, specifically “line-stop” and “QC circles”. Readers should not interpret QC in this context as a traditional method for maintaining standards. This completely misses the point. These are innovation methods that, at their core, empower workers to participate in the organization’s larger goals. It is thus important that the instructor work with the students in establishing shared learning goals. All too often in the rush to fulfill requirements and get high marks, students forget why they are there in the first place. These long-term learning goals are consistent with the pedagogical design of the course.

Once everyone in the course is working towards similar goals, the next task is to empower students. They need to become part of the course design process. Empowerment, though, must occur in conjunction with worker training. Like factory workers in real-world LBDI, students must have some base of experience before they can participate constructively. Thus, I usually initiate the LBDI exercise in the fourth week. The exercise itself is quite simple. I teach them about learning-by-doing, and ask them to apply it to the production processes of the university. Empowerment comes in understanding that they have the ability to stop the production process when they identify problems. This is “line stop,” a practice made famous by Toyota. Rather than wait for problems to be solved after an automobile has moved through the factory, line-stop forces problems to be solved immediately. By moving the QC process to the point of identification and focusing everyone’s attention on a specific problem, the entire organization begins to think about how to innovate and avoid these problems generally. For the LBDI exercise, the class itself is brought to a complete halt. The students are broken into teams (Quality Circles) and asked to identify, and solve course and university production problems.
There is always a desire on the part of the students to identify insoluble problems, such as “too much work” or “too many exams.” These are the necessary evils of the educational factory. And there are also contradictions in what students see as problems and solutions. In the end, however, there are almost always a number of good ideas. It is important that instructors act immediately and respond to the student proposals. Where solutions can be practically implemented, they should be done so in the first lecture after the exercise. Where there are contradictions between students, the instructor may examine the issue further and see if there is a middle ground. With those problems that can never be solved (e.g., having to do homework), the instructor can at least sympathize, and take the opportunity to link these tasks to the students’ (as opposed to the instructor’s) interests.

THE ACTION-LEARNING MODEL

The final sets of problems that students identify are those that require long-term attention. This brings us to the action-learning model (ALM). The quality-control process given above fits not only our models of innovation, but also existing social science methodologies, namely action research. It is not the place of this paper to explain the history and practice of action research and action learning. For our purposes, it is important to note that action learning depends on innovation cycles that, at their most basic, involve five steps: initial reflection (problem definition), planning, action, observation, and reflection. These should be self-explanatory. The most important point is that action learning describes an iterative process of incremental improvements.

Similarly, the LBDI process, when it is used every semester, becomes an action learning process. Legitimate course problems (and their potential solutions) that require long-term attention, feed into the course redesign process. In subsequent semesters, students provide feedback on those innovations. Like the automobile factories that practice LBDI, these iterative processes lead to a large number of incremental innovations. Over time, the small innovations dramatically improve the process and product.

Furthermore, because the improvements are usually small in nature, they do not require substantial resources from the instructor. A course does not have to be radically altered in order for it to see immediate benefits. Unlike some teaching strategies that require massive up-front investments for proper implementation, these changes can be enacted as resources permit. It is completely scalable, nicely complementing an instructor’s need to balance research, teaching, and administrative tasks.

CONCLUSION

As instructors, we have, sitting in front of us, a vast body of information that can make us better teachers. We already have formal tools that attempt to tap into student
opinion, but these present serious shortcomings. What this paper has attempted to provide is a simple methodology for making students part of the course design process. It does so in ways consistent with the students’ long-term pedagogical goals, while making only slight demands on an instructor’s time. For myself, the end result has been a steady and appreciable improvement in my courses, and guidance about where I need to go in the future.