Speaking of Teaching

THE CENTER FOR TEACHING AND LEARNING • STANFORD UNIVERSITY

SPRING 2005
NEWSLETTER

Vol. 14, No. 2

Teaching for Transformation: From Learning Theory to Teaching Strategies

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No matter what you teach, you face the challenge of bringing students from point A—what they currently know—to point B—the learning goals of a course. In many courses, the distance between points A and B is huge, and the path is not obvious. Students must not only acquire new skills and information, but also radically transform their approach to thinking and learning. This newsletter explores theories and teaching strategies that address this universal teaching challenge.

The Challenge

Even though students may have no experience in your class or your field, they enter your classroom with a long history of academic training and life experience. For this reason, presenting new information is not enough to guarantee optimal learning. Students must recognize the limitations of their current knowledge and perspectives. This means that you cannot simply unload your knowledge on students. What is required is a true transformation of students' existing knowledge.

Instructors from all fields face this challenge. In the sciences and mathematics, it is common for students to have learned an oversimplified definition or approach in high school. Students making the shift from classical to modern physics, for example, cannot simply layer new information onto old understanding. In the humanities, students may, for the first time, be asked to develop original interpretations of texts or to consider conflicting interpretations of texts instead of seeking the one, instructor-approved, "correct" interpretation. This new approach must replace the approach that students have learned, practiced, and been rewarded for. In the social sciences, instructors often have the difficult job of helping students unlearn common sense beliefs that may be common but unjustified. In all these cases, students' previous knowledge must be completely revised, not merely augmented.

Transformative Learning Theory

Transformative learning theory (see Mezirow, 1997) addresses this common teaching challenge. The theory describes the conditions and processes necessary for students to make the most significant kind of knowledge transformation: paradigm shift, also known as perspective transformation. Mezirow (1991, p. 167) describes perspective transformation as:

> *...the process of becoming critically aware of how and why our assumptions have come to constrain the way we perceive, understand, and feel about our world; changing these structures of habitual expectation to make possible a more inclusive, discriminating, and integrating perspective; and finally, making choices or otherwise acting upon these new understandings.*

Transformative learning is in clear contrast to the more common process

Transformative learning requires an environment that encourages and rewards intellectual openness.

of assimilative learning, the type of learning that takes place when students simply acquire new information that can easily fit into their pre-existing knowledge structures. Whereas some college-level courses are aimed at assimilative learning, most courses require at least some level of transformative learning.

emotionally charged experience. Students have successfully used their current paradigms to excel in school and understand the world. They may reasonably be reluctant to abandon what they believe is the right way to think, create, and solve problems. Resistance to perspective transformation is common, even among students who are motivated to learn (Illeris, 2003). For this reason, instructors who wish to facilitate transformative learning must create an environment that encourages and rewards intellectual openness (Taylor, 1998).

The instructor must strike a careful balance between support and challenge.

According to transformative learning theory, paradigm shift/perspective transformation is the result of several conditions and processes:

1. an activating event that exposes the limitations of a student's current knowledge/approach;

2. opportunities for the student to identify and articulate the underlying assumptions in the student's current knowledge/approach;

3. critical self-reflection as the student considers where these underlying assumptions came from, how these assumptions influenced or limited understanding;

4. critical discourse with other students and the instructor as the group examines alternative ideas and approaches;

5. opportunities to test and apply new perspectives.

When these processes occur, students are more likely to revise their underlying assumptions, adopt a new paradigm, and apply this new paradigm (Cranton, 2002).

Transformative learning theory also recognizes that changing one's perspective is not simply a rational process. Being forced to consider, evaluate, and revise underlying assumptions can be an

Teaching Strategies

The content of your teaching will necessarily make some strategies more suitable than others, but instructors of any field can make intentional use of transformative learning theory. Below, we consider strategies for each process involved in transformative learning and offer examples of what Stanford faculty members are doing to bring these strategies into their classrooms.

The Activating Event

The activating event can be anything that triggers students to examine their thinking and the possible limitations of their understanding:

- Understand your students' backgrounds. To create an effective critical event, you must anticipate what students believe and know. Invest some time at the beginning of each quarter to learn about students' backgrounds. In addition to basic classroom interactions, anonymous pre-tests, surveys, and early graded or non-graded assignments can all be effective tools.
- Provide conflicting viewpoints. Conflicting perspectives can motivate students to examine their own perspectives. You can provide these viewpoints in readings or in the classroom.
- Create a disorienting dilemma. Specifically, challenge what students believe. You can do this with a case study, quote, experiment, picture, demonstration, or story that does not fit their expectations. The goal is to confuse and intrigue students and thus increase their motivation to learn whatever you will be presenting in class.
- Set students up for failure. Failure-driven approaches to teaching recognize that students are most motivated to learn when their current knowledge is insufficient to solve an interesting problem. When students reach a problem-solving impasse, they should recognize that new information or a new approach is needed. It is not enough to hand students an unsolvable problem; you must convince them that the impasse can be resolved and create conditions that encourage their success. Instructors can present the missing piece in many ways; from a simple explanation to helping students derive an idea or approach themselves.

Identifying Current Assumptions

The best strategies for helping students identify their current assumptions all require that students explain their thinking:

- Use a critical questioning technique. Ask students to explain their reasoning and the reasons behind their reasoning. Help students identify their assumptions by offering counter-examples, alternative scenarios, or differing perspectives.

- Ask students to make a prediction about an experiment, event, or procedure. Have students explain their predictions, in discussion or as a quickly written exercise. This can be particularly effective when the actual outcome will provide a disorienting dilemma.
- Have students talk through their thinking or problem-solving strategy. This is particularly helpful if you use a failure-driven approach as the critical event. Give students a challenging question or problem and have them talk through the thought process. This can be done with partners, small groups, or through direct interaction between student and instructor.
- Ask students to evaluate a specific position, solution, or reading and justify their critique. This can be done as a small group discussion or as a written assignment. If you provide conflicting readings or alternative solutions, ask students to defend one and provide in-depth reasoning. Follow-up with a class discussion.
- Ask students to keep a class journal of questions, observations, and experiences. Encourage students to keep track of "Aha!" moments (when they suddenly understood a new concept or viewpoint), as well as conflict and confusion. To encourage participation, you can give students five minutes at the end of each class to write in their journals. At various times in the quarter, have students turn the journal in or exchange journals with a classmate.
- Ask students to respond to a specific class experience or reading. Provide a set of semi-structured questions to guide their reflection. For example, what surprised you and why? How does this experience/reading conflict with your previous experience or understanding about the subject? Does this experience/reading change your thinking about it?
- Ask students to create a "perspective history" timeline. For any given topic, from critiquing art to analyzing the ethics of business, ask students to reflect on life experiences and academic experiences that have influenced their current perspectives. When was the first time they remember forming an opinion about this topic? What people and events shaped their assumptions? Have they changed perspectives over time? What people and events triggered this change?

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Encouraging Critical Reflection

Transformational learning is both a social and solitary process (Taylor, 1998). The most solitary part of transformational learning is critical reflection, which requires that students privately examine their current assumptions. Critical reflection is likely to occur outside of the classroom, as the student absorbs and integrates what happened in the classroom. Writing assignments are an excellent way to invite students to engage in solitary reflection:

Encouraging Critical Discourse

Critical discourse is the most social aspect of transformative learning. Create opportunities for students to reflect through conversation:

- When you introduce a new strategy, concept, or paradigm in class, ask students to analyze the approach and compare it with their previous assumptions. You can lead the discussion yourself or break the class into small groups for analysis or discussion.
- Make time during class for more extended periods of discussion and debate. Not all discussion is critical. For example, transformative learning is unlikely to occur when you allow students to use discussion to reinforce their existing perspectives or to persuade others of their viewpoint. All students need to have their assumptions respectfully challenged. You can invite a student to play devil's advocate—challenging everyone's assumptions—or you can play the role yourself. You can also ask students to explain and defend a viewpoint they disagree with. This will challenge students' thinking habits and bring to the discussion points that might not otherwise have been raised.
- Keep the conversations going outside of the classroom. Online discussion boards or email lists provide an opportunity for students to continue challenging assumptions and considering new perspectives.
- Group projects or study groups can encourage small-group critical discourse, especially when the assignment involves analysis, comparison, and integration of ideas, readings, or approaches.

Giving Students an Opportunity to Test a New Paradigm or Perspective

For transformational learning to move from thought to action, students need opportunities to apply new knowledge (Taylor, 1998). Create activities and

assignments that empower students to apply new approaches with a high likelihood of success:

- Return to the disorienting dilemma or failure-driven exercise and have students approach it with their new knowledge.
- Give students one problem or assignment and ask them to approach it with multiple perspectives or problem-solving approaches. You can assign different approaches/perspectives to specific students and discuss the varying outcomes in class, or you can ask students to tackle the same assignment more than once.
- Create classroom exercises, such as role-playing or debates, that give students the opportunity to try on new perspectives.
- Ask students to observe and interpret events, experiments, readings, or experiences using their new knowledge. Journals, assignments, online discussions, and exams can all be used for this purpose.

Fostering Intellectual Openness

For transformative learning to occur, the instructor must strike a careful balance between support and challenge. Trust among students and the instructor is especially important in any course that uses writing and discussion as a primary strategy for critical reflection and discourse. On the other hand, Cranton (2002, p. 66) argues that although student empowerment and support are important, an "environment of challenge" is the central ingredient for transformative learning. Students must have their beliefs and assumptions actively challenged. Boyd and Myers (1998) recommend that instructors practice "seasoned guidance" and "compassionate criticism." Push too hard and students resist; push too little and the opportunity for learning quickly fades. To be an agent of change, you must understand the process of change and provide both the catalyst and support necessary for transformative learning.

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Classroom Strategies from Stanford Professors

In the introductory seminar, **BioSci 15N: Environmental Literacy, Professor Stephen Schneider** takes students from an activating event through the critical discourse phase of transformational learning theory and sets the stage later in the course for more opportunities to test and apply.

One of Professor Schneider's favorite teaching strategies is to "set the students up" and lead them "down a primrose path," which ultimately reaches a point when he asks, "what's wrong with these arguments?" Students realize with some surprise that their own understandings and values are insufficient to address the complex problem at hand (activating event).

A team role-playing exercise then provides the framework in which students confront and make explicit their own values, reflect on the origin of these values, and engage in critical discourse geared toward creating a balanced and informed argument. To achieve this, the sixteen students are divided into four teams. In the "Meyers-Simon" debate, two teams face off on opposite sides of an environmental policy issue.

A post-debate interview by the third team, the media team, leads to a weekend of assignment coordination, following which the media team returns a variety of news reports reflecting very different media styles: tabloids, mainstream popular media, business news, etc. As in real life, both facts and values will have played out through often contentious and polarized rhetoric at this point in the process.

The challenge for the fourth team, the evaluators, is to sort through these components, tapping additional sources of reliable information as needed, to prepare a balanced and credible final report such as one might hope to see advising a properly informed political process. Whereas some students might change what they value during this exercise, the real goal is to produce future leaders who know how to separate fact and value in arguments and who, when ultimately exercising values to try to make a difference, will do so honestly, completely, and without exaggeration.

Professor Ursula Heise's interdisciplinary course, Technology, Ecology and the Imagination of the Future, introduces advanced English and Science, Technology and Society (STS) students to scientific, literary, and cinematographic projections of the environmental future in its relation to new and old technologies. Risk theory is among the theories and topics that this course explores. While most students are familiar with risk as a factor in their daily lives, they are less aware of the theories that inform risk assessments and projections for the future. Professor Heise has designed the following three assignments as a way to confront students with their own assumptions about risk.

In a brief, first, in-class writing assignment, students are asked to outline, a) whether and in what contexts they have encountered or used the concept of risk; b) what they assess to be the risks currently most threatening to them; and c) whether they think other people would agree with this assessment. This exercise leads into a first analysis of how we perceive certain risks at the expense of others. It also prepares students for the discussion of a complex theoretical text looking into different risk analysis paradigms.

Next, for a homework assignment students have to find representations of risk from their own reading or environment and comment on them with some of the tools proposed in the theoretical materials.

Finally, students are assigned the computer game *SimCity,* which requires the player to function as the mayor of an evolving city. In this simulation game, students have to make decisions on emergencies as well as on long-term planning, which illustrate some of the practical problems of decision-making in the face of uncertainty. The student class discussion of the experience with this game focuses primarily on the risk scenarios the mayor has to face, what resources the game offers to address them, and what narrative templates and visions of the technological and ecological future the game is based on.

These three assignments help the students move from a classic assessment of the ecological future to an understanding of the more global and political dimensions of risk assessment and its impact on projections of the future.

Professor Eduardo Miranda started using interactive Excel spreadsheets in **CEE 223, Design and Construction of Concrete Structures,** and found the tool so effective that he now uses the spreadsheets in all of his classes. His goals are twofold: 1) to engage students in a more active and participatory role in lectures and 2) to promote deep thinking about the impact of one or more parameters on an engineering outcome.

Students are asked to predict what will happen as a selected variable changes and then, importantly, to discuss and debate why they expect that outcome. Professor Miranda then alters the variable(s) in Excel as directed by the students, and they all watch the results play out in real time.

In a specific example from **CEE 287, Earthquake Resistant Design,** students consider the impact of adding lateral stiffness to buildings. Students are asked to predict whether deformation and acceleration demands in buildings will increase or decrease or not change much if the lateral stiffness is increased. After collecting opinions and reasons for the various possible outcomes, Professor Miranda then uses previously prepared Excel spreadsheets to numerically solve systems of differential equations, which involve thousands of time steps in a few seconds, and graphically show how the building will respond to an earthquake when increasing or decreasing the lateral stiffness. He then uses the same spreadsheet to ask how the outcome would change if the building were built on soft soil as opposed to rock.

Whereas some outcomes might be fairly predictable, it is often the case that a given change has a counterintuitive impact on the outcome, an unanticipated nonlinear impact, or surprisingly little impact at all. Rather than describing and talking about these outcomes, Professor Miranda likes students to think, discuss, and experiment with these outcomes in real time during a normal class.