WELCOME TO THE “RISK ZONE”: COOPER UNION’S COLLABORATION WITH OUTWARD BOUND:

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The “Risk zone” is where learning takes place. It is the area of experience outside the comfort zone, where those people, things, ideas, and feelings which are most comfortable, safe, and well-known to each of us reside. When we are in the comfort zone, we are at ease, relaxed, content; however, we are not learning.

When we push ourselves, or are pushed by people and events, into the Risk zone, we encounter experiences that can be uncomfortable, risky, unsure and unknown. On the other hand, as we meet these challenges, overcoming the anxiety, lack of confidence and stress often associated with them, we also find ourselves learning. Eventually, many of those experiences originally perceived as risky become comfortable.

The Cooper Union School of Engineering’s innovative collaboration with Outward Bound uses the comfort zone model to illustrate the personal and professional journey female engineering students take during this experimental learning initiative.

Structuring a student’s experiences so that the student becomes an active participant in acquiring knowledge, developing skills, and solving problems is a key part of both Cooper Union’s team approach in the engineering classroom and Outward Bound’s expeditionary learning principles. The central organizing principle of Outward Bound’s experiential learning is making education an adventure and learning a personal discovery.

Cooper Union’s five-year collaboration with Outward Bound, funded by Consolidated Edison of New York, has developed a flexible and responsive package of engineering-related leadership training initiatives and exercises targeted at increasing the physical self confidence and personal self-esteem of female undergraduates studying science and engineering.

With an underlying focus on gender and diversity, Outward Bound has worked with Cooper Union to customize its expertise in physically-challenging outdoor expeditions (rock-climbing, low and high ropes, raft-building, hiking, sailing, rescue simulations, and orienteering) to the engineering classroom and corporate workplace needs of Cooper Union’s female engineering undergraduates (hands-on problem-solving, communication, teamwork, conflict resolution, risk-taking, innovation).

With an unmatched reputation among American institutions – Andersen Consulting, Motorola, Xerox, MTV, the White House – for providing both senior-level executives and managers with organizational solutions to team-building and leadership development,
Outward Bound stresses immediate and consequential applications of knowledge: for example, safety knot tying in rock climbing becomes a living laboratory for a discussion of friction and angles in physics. Cooper Union's innovative collaboration with Outward Bound is the first of its kind at any U.S. undergraduate engineering school and offers significant potential for replication at other engineering and professional schools.

In team-building and problem-solving initiatives, students engage in individual and group exercises designed to develop camaraderie, bonding, and teamwork. While exploring how to design physical or engineering innovations, engineering students experience interpersonal conflicts, paradigm shifts, alternative modes of communication (through muting and blindfolding), and leader vs follower issues.

An example of Outward Bound's experiential methods and its connection to the workplace goals of Cooper Union is The Web of Life exercise. Faculty and students stand in a circle, and each person says one thing they can offer to the group and one thing they need from the group.

As each person speaks, he or she passes a ball of rope to another person in the group. The end result is a structure that looks like a spider's web. The group is then asked to see if the web will support the weight of a member of the group, one of whom volunteers and then is supported by the others.

This exercise is a visual representation of the members' contract with one another, teamwork and sharing, trust and risk-taking. It is, as well, a powerful visualization of what is often referred to as the female style of leadership, which involves networks, interconnectedness, fluidity, parity and collaborative support.

This leadership model offers a vital balance -- different but equally effective -- to the traditional male management style of the pyramid that values hierarchy, control, toughness, winning, competition, and the impersonal. While still found in engineering, academia and business, the pyramid today is seen as too slow and unresponsive to the fast-changing needs of the information age and global economy. The visual connection to the world wide web is evident.

Suddenly, in an "aha" moment, abstract corporate leadership theories -- the pyramid versus the web -- become real and vivid. Long after students have forgotten scholarly references, the image of the web remains alive and vital.

Given that the science and engineering disciplines have historically been taught by men and that the corporate engineering culture is still very much male-oriented, with only 8% of practicing engineers women, the need to provide women engineering students with the professional and personal resources necessary for success in engineering and science remains an important goal.
In selecting undergraduate participants for its collaboration with Outward Bound, Cooper Union reverses its own ratio of women to men (currently 30% women and 70% men) and invites 70% women and 30% men, with all sophomore women receiving an invitation to participate. This intervention has proven successful for both male and female participants.

A four-year summary of student assessments from 1996 to 1999 notes that the top skills learned by both women and men were: teamwork, confidence, risk-taking, communication and leadership. The following responses from year 1 to year 4 were recorded in the assessments by both female and male students and note the change in the percentage of students who felt the following areas increased or improved:

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<tr>
<th>WOMEN Participants Responses</th>
<th>1996 to 1999 Year 1 to Year 4</th>
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<tbody>
<tr>
<td>Increase in self esteem</td>
<td>59% to 77%</td>
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<tr>
<td>Improvement in leadership skills</td>
<td>53% to 78%</td>
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<td>Feeling safe in uncomfortable settings</td>
<td>6% to 39%</td>
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<td>Enhanced communication skills</td>
<td>53% to 71%</td>
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<th>MEN Participants Responses</th>
<th>1996 to 1999 Year 1 to Year 4</th>
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<tr>
<td>Increase in personal closeness</td>
<td>24% to 84%</td>
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<tr>
<td>Increase in trust</td>
<td>71% to 100%</td>
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<tr>
<td>Improved working with women</td>
<td>28% to 81%</td>
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<tr>
<td>Enhanced communication skills</td>
<td>58% to 86%</td>
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<th>BOTH Participants Responses</th>
<th>1996 to 1999 Year 1 to Year 4</th>
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</thead>
<tbody>
<tr>
<td>Increase in verbal skills</td>
<td>54% to 84%</td>
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Both male and female engineering students agreed that their most important experience, as it related to the engineering classroom and to the workplace, was teamwork. In each assessment survey, teamwork has been unanimously voted the most important engineering skill learned by all the student participants. One female participant wrote: "I learned about teamwork. That's what industry is founded on -- group projects."

Reported another female student: "Now, I will put more trust in people, more trust in myself, and more trust in my decision-making abilities. I will take more risks, and feel more confident about them. I will also ... support others."

A September 1996 article in *The New York Times* noted that programs like the one Cooper Union has forged with Outward Bound increase the likelihood students will stay in school. A professor at the University of New Hampshire has also found that students who participated in such courses had higher grades. Noted one engineering student: "I will be more focused and better able to concentrate in school."

At Cooper Union, all of the students who have "graduated" from the engineering school's new leadership initiative have participated in the Outward Bound course, and all of the Outward Bound student co-facilitators have achieved the two highest levels in the leadership program.

In a controversial culminating activity in the second year course, two teams were given the goal of finding a student and a faculty team member who were "hurt and lost" in the woods. Their only directions came from a third team member who acted the part of an incoherent, scared and slightly disoriented guide to the location.

After the groups formulated an emergency search and rescue plan and found the "victims," they had to build litters to carry them out of the woods, making sure that they were immobilized as much as possible to eliminate further trauma to their fake injuries.

This dramatic exercise required working out a plan under stressful conditions, where all the information was not always known or correct. Each team had to divide up to cover as much ground as possible, while still keeping in touch with the others. When the victims were discovered, first aid and emergency measures had to be carefully enacted to determine their medical states and the best way to evacuate them from the scene, using only limited resources.

This simulated scenario put effective teamwork to the test, and the students performed remarkably under extremely taxing circumstances and psychological stress.

The effectiveness of this particular exercise for engineering students was made tangible when, at a Cooper Union lecture series, Eugene Fassullo, former chief engineer of the New York-New Jersey Port Authority at the time of the terrorist bombing of New York's World Trade Center, spoke at the engineering school. He recounted the dramatic story of
his own rescue, where he and his engineering colleagues, breathing smoke and fumes, dug through elevator walls and shafts with their car keys and credit cards, lit only by the glow of their beepers, to achieve final safety.

Fassullo credited teamwork, trust, innovation, coolheadedness in a crisis, and his engineering problem-solving experience with not only his own rescue but with the rescue and subsequent rebuilding of the World Trade Center itself.

While Cooper Union ardently hopes none of its engineering students will ever experience the very real and harrowing rescue Eugene Fassullo recounted, the College is confident that its collaboration with Outward Bound is one of its more innovative means to prepare students for the professional crises they may encounter in the workplace.

Involving engineering students in the leadership role of co-facilitator, along with professional Outward Bound staff, is an unique aspect of Cooper Union’s program and one that is not replicated in any other Outward Bound course in the country. Engineering students who have taken part once in this expeditionary course are selected to train -- for a total of four days -- for facilitator positions with student teams in a subsequent course.

These engineering student co-facilitators study group dynamics and team organization, framing and debriefing techniques, motivational strategies, and experiential training theories and practices. They also select exercises and plan a day of team-building and problem-solving initiatives.

During the course, the engineering student co-facilitators take an active leadership role in guiding their peers toward personal discoveries and empowering them to move into the risk zone. One 1997 student participant remarked about her student co-facilitators: “They were very supportive of the group but, at the same time, they allowed enough space for us to learn from our mistakes.”

In addition to Outward Bound professional staff and engineering student co-facilitators, each team of engineering students is accompanied by an Outward Bound-trained member of Cooper Union’s engineering faculty who has participated previously, as well as by an engineering faculty member new to the experience.

Engineering faculty acknowledge that the group experience breaks down traditional barriers, allowing them to learn more about their students in ways the classroom does not usually permit. Students, on the other hand, begin to see faculty in a new light, as real people who, together with them on the level playing ground of an Outward Bound team, try to take on the same personal challenges. Several Cooper Union faculty have introduced Outward Bound’s experiential learning techniques into traditional engineering courses on Fluid Dynamics, Electromagnetics, and Introductory Chemistry.

Cooper Union has also invited female engineering faculty and students from other engineering schools participating in the National Science Foundation’s Gateway

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Coalition to experience its program with Outward Bound, as well as its new initiatives in communication and entrepreneurship. The first Gateway Women’s Leadership Seminar received an overall rating of 4.75 out of 5, with one participant summarizing what has come to symbolize both Cooper Union’s initial hopes and its ultimate success: “Having a full knowledge of one’s self allows one to be a stronger person. Each part of the program allowed us to tap into another part of that self. …It [the seminar] has taught me to think outside the box and beyond the stereotypes and barriers that society places on us.”

Cooper Union now has a trained core of faculty and students who are able to coach other engineering faculty and students in the initiatives and group dynamics of its collaboration with Outward Bound. In addition, two one-hour video tapes, with an accompanying manual and set of initiatives, are available for engineering schools interested in replicating Cooper Union’s innovative leadership training.

Where is Cooper Union’s collaboration with Outward Bound going? Dr. Eleanor Baum, Dean of the Cooper Union School of Engineering, former President of ASEE and ABET, notes: “We weren’t really sure if we could achieve our engineering goals with such an unconventional program, but I am convinced that personal experience is one of life’s best teachers.”

“The experience of these engineering students -- both women and men -- will stay with them for a very long time and will, I hope, be a positive influence in their personal and professional lives. Along with the students, we too have learned that sometimes you just have to take a risk if you want to make a change -- and that’s a lesson worth learning at any age.”

Perhaps the best testimony is given by a female mechanical engineering student, who wrote in her course assessment: “Falling backwards off a rock or a 30-foot high log used to cause panic, but now it’s easy.”

For more information on the Cooper Union School of Engineering’s collaboration with Outward Bound, please visit its website: www.cooper.edu/engineering/projects/outwardbound/

For more information on the School of Engineering’s two one-hour videotapes and accompanying manual on Outward Bound initiatives and group dynamics, e-mail: guggums@cooper.edu or leap@cooper.edu