# Ain't gonna study war no more: Teaching and learning cooperation in a graduate course in resource and environmental management

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*Abstract: Humans are the primary causes of increases in biosphere-scale toxicity, climatic variation, and risk. Despite several generations of intensive and scientifically astute environmental advocacy, research, and training it is unclear whether these trends will provoke self-perpetuating and out-spiraling conflicts or unprecedented levels of effective cooperation. For educators, a pivotal question is whether our schools, classrooms and curricula will produce the problem solvers required to meet escalating challenges in resource and environmental management. One of our responses to this question is a course that uses groupwork to simulate aspects of 'real world' complexity in resource management. The course, taught to over 300 graduate students in Simon Fraser University's School of Resource and Environmental Management, effectively trains learners in the acquisition and application of conceptual and practical knowledge and skills centered on cooperation among individuals and groups with diverse values and interests.*

*Keywords: collaborative learning; collective problem solving; education for sustainable development; experiential education; graduate studies in environmental education; groupwork; theories of cooperation; group work*

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It is not the similarity or dissimilarity of individuals that constitutes a group, but interdependence of fate. (Kurt Z. Lewin, 1939)

It has been a half century since the publication of *Cooperation in Change*, Ward Goodenough's (1963) landmark review of social science applications in international development and regional planning. Goodenough's enduring principles for deriving public benefits from environmental alterations in diverse cultural settings boosted concerns about the consequences of global economic expansion and sparked innovations in environmental management and development policy and practice. Exponential growth in resource and environmental management research and training has followed. Graduate and undergraduate programs in environmental fields management have proliferated (Clark et al., 2011a; McGowan, 2004; Zurayk et al., 2010). Lamentably, however, growth and professionalization in these fields have yet to translate into solutions to persistent environmental challenges.

Humans are making our planet more toxic, more climatically variable, and generally riskier for humans and other life (UNEP, 2012a). Relentless changes at global and more micro scales commonly outstrip efforts to create resilient ecosystems. Population growth, migration, and technological, economic, and political dynamics tend to overwhelm or divert benefits flowing from even careful, creative, and concerted resource management initiatives. It is difficult to dispute Acheson's (2006, p.118) assertion that

> the world is facing a resource management crisis. Large numbers of marine fisheries have been seriously depleted. Forests are being harvested at unsustainable levels; acid rain and smog are problems in widespread parts of the industrialized world; soil erosion threatens vast areas; parts of Africa and the Middle East are returning to desert; industrial waste dumps make life hazardous for large numbers of humans and other animals; many rivers and estuaries are polluted; and virtually every large lake in the world is in a precarious state.'

The *Global Environmental Outlook 5* (United Nations Environmental Programme [UNEP] 2012b, p.6) underscores Acheson's dire observations:

several critical global, regional and local thresholds loom or have been exceeded. Once these have been passed, abrupt and possibly irreversible changes to the life-support functions of the planet are likely.

Lertzman (2009, p.344) observes that if 'avoiding population declines, species loss, erosion of ecosystem services, and degradation of environmental quality in general are the criteria for a successful management system, then modern resource management systems cannot be considered successful.

With this in mind, an essential question for teachers of environmental and resource management is whether our work is contributing to solutions or to 'institutional failure'? Our first response is that it depends less on what we (or others) think is true in the mid 2010s than on what our students <u>do</u> with their learning (or in spite of it) after exiting our classrooms. Our second response involves redirecting our lament that future generations will have to make up for today's ineffective institutions into constructive pedagogical and curricular critique and reform. The rest of this article makes the case for cooperation as the key to effective environmental management, particularly of common pool resources, and for groupwork as the key to teaching prospective resource managers cooperation in the 'Social Science of Resource Management' course we have offered since 1996.

## Cooperation as the key to environmental management

The causes of environmental problems are diverse and their consequences increasingly costly. The probability of finding ideologically or technologically driven or 'one size fits all' solutions to environmental problems is low and diminishing. Despite rapid growth, diversification, and professionalization in resource and environmental management since 1990, academic programs have yet to converge on curricular orientations. Various faculties have argued for emphasizing negotiation and dialogue (Ness and Williams 2008; Suskind, 2000), human dignity and environmental justice (Clark et al., 2011b; Washington and Strong, 1997), sustainability (White, 2002), ethics (Martin and Beatley,

1993), experiential learning (Wagner et al., 2012), applied knowledge and action research (White and Mayo 2005), and inter- and trans-disciplinarity (Focht and Henderson, 2009; Maniates and Whisse, 2000; Moslemi et al., 2009; Winner and Champion, 2012).

These are all compelling instructional orientations. Nonetheless, the scale and complexity of many management issues, coupled with widespread claims that environmental and resource management is a 'job eater' (Canada, 2011), are nudging many jurisdictions toward centralized, state- and market-based decision making. Concerned about these trends, Acheson (2006, p.126) observes that, by 'making it impossible for local governments to experiment in solving problems, top-down management policies stifle learning and curtail adaptive responses.' The failure to manage natural resources, writes Acheson (2006, p.128), 'is traceable to a lack of willingness or ability to solve collective-action dilemmas to produce effective rules.' The crux of the issue, in other words, is neither whether we understand environmental impacts and risks (we know a lot) nor whether we know what to do about them (i.e., avoid and reduce) but, rather, why we– scholars, citizens, decision-makers– are not cooperating effectively to limit these impacts and risks to acceptable levels. These lines of thinking, coupled with our own careers in resource management and management research, have led us to peg cooperation as the instructional linchpin.

## Cooperation in common pool resource management

Common pool resources– especially water, energy reserves, fisheries, and public range and timberlands– are the focus for the most and most contentious negotiations in resource and environmental management (Feeney et al., 1990). Common pool resources are by definition problematic to manage through centralized or top-down institutions due to issues of excludability (difficult to keep users out) and subtractability (easy for users to take more than their fair share). Social science research regarding institutional arrangements that do permit cooperation typically focus on relations among government agencies with resource management mandates and local communities adjacent to and dependent on the resource.

Knowledge continues to grow concerning the social, economic,

political, and ecological conditions that permit cooperation, collective action, and related altruistic behaviours and institutions to flourish. Dominant Western views of human nature as inevitably competitive and egotistical have been effectively challenged (Keltner, 2009). Counter examples and antidotes to the *tragedy of the commons* are now well documented (Netting, 1993; Ostrom, 1990; Poteete et al., 2010). Studies of self-regulation by rural communities (Acheson, 1975; Berkes, 1981; McCay and Acheson, 1987; Swezey and Heizer, 1977) have stimulated integrative research by anthropologists, political scientists, economists, ecologists, and planners on the benefits of power sharing between communities and government agencies (Agrawal, 2002; Armitage et al., 2007; Berkes, 1999; Feit, 2005; Pinkerton, 1989; Plummer, 2009; Schlager and Ostrom, 1993; Wilson et al., 1994; Wilson et al., 2003).

Identifying appropriate management strategies also requires understanding attributes of both the resource and the community. For example, to attract investments in cooperative institution-building, the resource must be abundant, culturally or economically important, and adjacent to the community. Similarly, to make cooperation likely within the community and with government agencies and other parties, the community must be dependent on the resource and have clear membership, sufficient trust, conflict resolution capacity, legitimacy, and shared norms and values about the need for sustainable resource management. A final condition favouring cooperation is leaders able to articulate visions regarding the inclusive benefits of sustainability and to galvanize wills in pursuit of such visions (Agrawal, 2002; Jentoft, 2000; Pinkerton, 2009; Pinkerton and John, 2008; Welch et al., 2011a).

If these resource and community conditions are met, cooperative institutional arrangements for resource management can be built. *De jure* and *de facto* rights asserted by the community play distinct roles in supporting cooperation. First, the community must have strong access rights, as well as local livelihoods sufficiently linked to these rights such that the community is unlikely to pollute or degrade the resources. Second, the community must have management rights sufficient to cooperate with government in collecting and interpreting data on resource status, in planning resource withdrawals, in monitoring and enforcing harvest plans and associated environmental safeguards, and in otherwise guiding agency decisions.

In addition to management studies of resource-dependent

communities, findings from the sociology of bureaucracies and the behaviour of organizations identify attributes of government agencies which favour effective and cooperative behaviour (Bolman and Deal, 1997; Clarke and McCool, 1996; Lane and Stephenson, 2000; Pinkerton, 2007; Wilson, 1989). The capacity of these agencies to act cooperatively is highly variable and often affected, again, by leaders and other individuals.

In sum, we now have hundreds of case studies of successful and less successful cooperation in resource management. The studies converge on the truth that cooperation tends to produce resource management outcomes superior to those resulting from competitive, market-driven and top-down institutional arrangements. Major questions remain, however, concerning how to prepare resource managers to create conditions that foster effective cooperation.

## Teaching cooperation

The need for training in adaptive learning (and managing) is pervasive. Acheson writes, 'To manage resources effectively, we…. will need to combine various elements of privatization, government control, local control, and managerial techniques . . . in ways we have not imagined' (Acheson, 2006, p.129). Similarly, UNEP (2012b, p.16) emphasizes that, because 'there is no universal solution to environmental degradation, a range of tailored responses is required to reflect the diversity of regional needs. In areas of common global concern, however, coordination, participation and cooperation are critical for jointly meeting internationally agreed goals and targets, while also addressing the capacity deficits.'

Such conclusions, coupled with our respective career experiences, lead us to recommend that universities should train resource management professionals to:

1. Engage and learn from resource users on multiple social and spatial scales;
2. Work with governments and resource-dependent communities to craft institutions that harmonize specific resource-user-situation configurations and management goals;

3.  Assess costs and benefits of interventions (and non-interventions) in local and regional resource and environmental management as the basis for strategic investments in capacity enhancements, research, etc.; and
4.  Identify and promote factors leading to successes defined by resource stakeholders.

We also see the need for a fifth element– one not considered by Acheson or UNEP– to integrate and drive these four critical skills and abilities:

5.   Harness personal commitments to the protection of environmental integrity.

We recognize that resource management is, strictly speaking, a value-neutral pursuit that includes managing resource extraction and consumption, as well as protection and conservation (Lertzman, 2009). We further acknowledge that universities exist to create and mobilize knowledge and skill, not to promote social movements. On the other hand, we agree with many other professionals on the need to 'combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future' (Union of Concerned Scientists, 2013). The reality that university programs in resource management tend to attract students with established interests in environmental health and sustainability also deserves consideration in instructional design (Arnocky and Stroink, 2011).

Many students in environmental management degree programs, especially at graduate levels, have already made a decision to intervene on behalf of sustainability and resilience– to manage and thus to lead. Given that the success of management intervention depends in part on the attitude or internal state of the intervener (Goodenough, 1963, p. 377; Scharmer, 2007), our teaching recognizes and advances the truth that leadership success in resource management is determined by constellations of personal commitments, collective visions, and capacities to pursue those visions (Pinkerton, 1998; Welch et al., 2011a). More fundamentally, the powers of personal conviction, as difficult to deny as they are to measure, provide a rationale for faculty initiatives to empower students' applications of this fifth element in their thinking,

doing, and learning. The next section examines the academic context in which we are implementing these five recommendations.

## SFU, REM, and 601

Simon Fraser University (SFU) offers more than 100 undergraduate, graduate and non-degree programs to about 32,000 students on three campuses in and near Vancouver, Canada. Founded by the province of British Columbia in 1965, SFU soon emerged as a hub for progressive training and research (Johnston, 2005). In a 2010 consolidation of this reputation, SFU adopted a motto of 'engaging the world' and a vision of becoming 'the institution to which the community looks for education, discussion and solutions,' including engagement with environmental concerns (Petter and Taylor, 2012).

The School of Resource and Environmental Management (REM) is one of Canada's oldest and strongest graduate schools in the field. REM's 12 full- and seven part-time faculty members share expertise ranging from environmental toxicology, ecology, and geosciences to economics, law, planning, community-based research, archaeology, and tourism. This diversity embodies REM's founding philosophy: effective approaches to environmental problems require close attention to complex interactions among socioeconomic and biophysical factors (see http://www.rem.sfu.ca/).

REM's three main credential programs– Ph.D., Masters of Resource Management (MRM) and MRM (Planning)– offer students opportunities to obtain and apply interdisciplinary training. All students complete coursework in environmental science, ecological economics, and environmental policy and social science. The two masters-level programs, MRM and MRM (Planning) are academic-professional hybrids that account for over ninety percent of REM's students. Most students arrive with undergraduate degrees in biology, geography, environmental studies, political science, economics, or anthropology. All arrive to boost research aptitudes in preparation for careers in consulting firms and in governmental and non-governmental organizations. Table 1 lists the six required courses and nine categories of electives. Unlike most other programs accredited by the Canadian Institute of Planners and the Association of Collegiate Schools of Planning, REM's MRM (Planning)

program is entirely focused on multi-scale environmental planning and policy concerns (see White and Mayo, 2005, p.31).

Table 1 Required and elective coursework for the SFU Masters of Resource Management degree.

| Six 'core,' classroom-based courses | Nine types of elective courses |
| --- | --- |
| 1. Social Science of Natural Resources Management | A. Community and regional planning |
| 2. Applied Population and Community Ecology | B. Co-management and institutional design |
| 3. Ecological Economics | C. Ecological risk assessment |
| 4. Earth Systems and Global Change in Environmental Management | D. Fisheries and water management |
| 5. Regional Planning I or Public Policy Analysis and Administration | E. Sustainable energy systems |
| | F. Population and conservation ecology |
| | G. Outdoor recreation and parks planning |
| 6. Principles of Research Methods and Design in Resource and Environmental Management | H. Tourism planning and development |
| | I. Environmental law, policy and regulation |

The MRM programs are cohort-based. A fieldtrip introduces incoming students to critical issues in resource management and one another. Classes commence the following week, and first-year students typically take two of the six required courses and one elective each term. Most students dedicate summer terms to fieldwork or other activities relating to their capstone research projects. Over 80% of MRM students participate in internships; more than 20% pursue short-term 'co-op' employment with a public, private or aboriginal organization. MRM students conclude their programs with a juried defense of a thesis-like report on their capstone project.

*Social Science of Natural Resources Management* (REM 601 in the SFU course calendar) is a required, 13-week course taught each fall. Subtitled 'Theories of Cooperation,' the course is designed to build MRM students' conceptual vocabularies and practical skills for understanding the social dimensions of resource management and the interpersonal factors that often determine management success, especially with regard to common pool resources. Because of its pivotal roles in sustaining cohort *esprit*

*de corps* built during the pre-term fieldtrip and in counterbalancing the 'siloing' that naturally occurs through students' research projects, REM 601 is the only course for which students are not granted waivers based on prior course work.

The course emphasizes theoretical and practical approaches to fostering cooperation and creativity in pursuit of futures that are just, sustainable, resilient, adaptive, and desired. Although both conflict and collaboration often entail cooperation and promote solidarity, conflict is defined by differences– of values, interests, opinions– while cooperation is defined by commonality. Conflict sows seeds for fractionating social and political capital, thus setting high or neutral discount rates on uncertain futures. In contrast, cooperation grounded in shared interests and pursued in good faith, even if focused on small goals, tends to expand commonalities, reward virtuous behavior, multiply social learning and social capital, and assign low discount rates to mutually desired futures (Wals, 2007). REM 601's main lesson, however naïve, is that proactive pursuits of consensus goals using constructive, context-sensitive inquiries are more likely to be satisfying and successful than reactive and divisive quests. It is easier to build coalitions in campaigns 'for' than 'against.' Even in computer simulations of decision making in contentious arenas, 'yes' is more potent and mutually beneficial than 'no' (Axelrod, 1984).

Contrary to prevailing beliefs in Western culture that selfishness and aggression are innate and harsh conflict inevitable, altruism is at least as instinctual as egotism (Keltner 2009). Human 'nature' and human values, behavior, culture and institutions are highly adaptable to exigent circumstances (Flores et al., 2012). There are viable alternatives to violence and for conflict resolution (Burton 1998). The realities that personality, culture, land, and technology shape how people perceive, evaluate and choose to deal with conflict are crucial when people come together from different ethnic, religious, racial, economic, disciplinary or organizational backgrounds. All or most supra-household cooperation involving resource and environmental management involves multiple values, norms, and preferences. Studying how and under what conditions people cooperate in interpersonal, cultural and institutional settings helps to relieve students of ego- and ethno-centric convictions, to expand their repertoires of responses to conflict, and to guide them to and through collective learning.

# Modelling cooperation through course process

The complement to the REM 601 keystone principle that cooperation is the indispensable ingredient in effective resource management is the dictum (attributed to Einstein) that 'Example isn't another way to teach, it is the only way.' We imbue course processes with this pedagogic precept. Students must master suites of social science concepts central to three main REM 601 course modules (Table 2 over leaf). We employ many course concepts in this paper to illustrate the trans-disciplinary importance of the concepts, the merits of teaching by example, and the integrating power of groupwork.

In lieu of examinations or research papers, students demonstrate learning through three creative written explorations of situations that unleash the concepts. Students work either individually or in their groups, using various literary forms (such as creative fiction and non-fiction, poetry, screenplays) and narrative contexts (for example, travelogues, dialogues, parodies of popular songs, transcripts) to bring course concepts to life. Most papers describe common pool resources (coffee on a camping trip, fuelwood at a cabin and so on) and dilemmas arising from resource (over)use and profit-driven management. We evaluate the papers in terms of both breadth in the number of concepts engaged and depth in concept interplay. Some successful papers use doggerel to describe real-world resource management solutions. Others devise emphatically fictional worlds in which previously unimagined resource conflicts give rise to novel solutions. Students prepare the first paper on their own, are given the choice to work with other members of their group on the second paper, and are obliged to co-author the final submittal.

Much as the three papers require students to breathe life into course concepts, their persistent work groups engage students in real-time, real-people collaborations (and conflicts). When coupled with peer feedback, intensive groupwork obliges members to develop and deploy diverse knowledge and temperaments to collective advantage. Groupwork design principles include access to all pertinent information, transparent rules, practical training in process skills, compositional balance, use of peer feedback, and instructor responsiveness to all requests. These principles show marked resemblance to 'keys to successful group processes' identified through empirical studies (Shimazoe and Aldrich, 2010 p.53).

Table 2. Central course concepts for the three REM 601modules.

| Module/ paper 1 | Paper 2 | Paper 3 |
|---|---|---|
| Common pool resources (CPRs) are subtractable | TEK/ LK vs. science | Characteristics of effective management leadership |
| CPRs are nonexcludable | Pattern thought | Communal vs. private tenure |
| Tragedy of Commons | Individual vs. group welfare | Elements of human–land connectivity |
| Game theory | Realism vs. constructivism | Harmonized resource and management scales |
| Prisoner's Dilemma | Process vs. outcomes | Cadastralization |
| Tit-for-tat strategy | Dialogue | Bureaucratic vs. ecosystem rationalities |
| Repeat/continued interaction (fosters cooperation) | How children learn | Science vs. 'non-science' emphasis in management culture |
| Egotists | Solidarity | Multi-disciplinary vs. interdisciplinary |
| Cultural factors influence economic behaviour | Ideologically driven rule making or enforcement | Organizational legitimacy |
| Limits of rational choice theory | Middle-range theory vs. grand theory vs. case studies | Top-down vs. bottom-up management |
| Institution vs. Organization | Property rights → more property rights → better CPR management | Countervailing and triadic power |
| Transaction costs | Tiered management rights | Captured agency |

| | | |
|---|---|---|
| Social capital | Individual *vs.* group rights | Characteristics of effective organizations |
| Human capital | Trust→social capital→civil society | Single- *vs.* double-loop learning |
| Physical capital | Nested enterprises | Structural, human resource, political, and symbolic management frames |
| Values driving market *vs.* state *vs.* community institutions | Ideology influences economy | Behavioural biases of bureaucracies |
| De jure *vs.* de facto rules | 80/20 Rule | Micro-level leadership |
| Free-riding | Neo-classical CPR management | Citizen science |
| Efficient *vs.* effective | Institutional CPR management | Community-based management |
| Discount rate | Cultural ecology CPR management | Adaptive management |
| Perverse incentive | Features of successful community management | Servant leadership |
| Constitutional, operational, and collective choice rules | Features of sustainably managed, community-based fisheries | Managing in, up, out, through |
| Path dependence | Accountability mechanisms | Reframing: structural, political, human resources, symbolic |
| Scale-appropriate adaptive governance | | |

Implementation of these principles begins in the first class and continues all term (Table 3 overleaf). To illustrate how communication can play decisive roles in groupwork and resource management, week two features a 'blind construction game' in which two students are given identical sets of wooden blocks and asked to take turns as dictator-architect and listener-builder. Screened from one another, with the listener unable to ask questions or receive nonverbal clues, the first round of the game tends to teach the importance of precise and empathetic communication. With the roles reversed in the second round, participants typically display improved performance through rapid adaptation. This exercise shows students how the prisoner's dilemma and tragedy of the commons (in which actors do not communicate and act only in self-interest) can be overcome by an individual's commitment to effective speaking or listening.

Week three includes another exercise intended to help students connect personal and group values to resource management institutions. The cannibal-cave dilemma empanels 601 students as the jury deciding the capital crime fate of a group of spelunkers who, cut off from the outside world, agreed to throw dice to determine which one of them would surrender his flesh so the others could eat and live. In addition to obvious questions about individual and collective welfare, jury deliberations tend to differentiate students depending on whether they judge the surviving cannibals primarily based on (a) formal, de jure law; (b) the contract agreement they made to throw the dice, or (c) de facto prioritization of collective welfare, including the above ground community. The exercise highlights how values-based preferences operate as origins and drivers, respectively, for *state*, *market*, and *communal* institutional formations. The exercise obliges students to situate themselves as actors in the inherently social process of making and enforcing rules, including environmental regulations on various scales.

Two additional exercises illustrate and affirm course commitments to building collective capacities for cooperative learning and acting. We ask the work groups to use active listening principles (paraphrasing, reflecting, clarifying, encouraging) to deepen their knowledge of variations in communication styles in a formal exercise in which group members take turns sharing, listening, observing, and offering suggestions to enhance communications. By the course midpoint, we

expect that the various exercises, together with group responses to questions on the readings prepared and offered in every class meeting, will have inspired group capacities for self-regulation. In week seven we ask each group to describe de facto and de jure rules emerging to govern group discussions, to assure all members' views are considered, and to make decisions. This assignment is delivered via an invitation to create a name, flag, credo, and system of rules– constitutional, collective choice, and operational– for a new 'nation' consisting of group members as citizens. The results typically feature creative, personality-driven arrangements that reveal insight into self-directed team-building. As the groups accumulate experience in collaborations and knowledge of the course concepts, they emerge as analogues or microcosms for 'real world' resource and environmental management institutions.

The challenges and benefits of groupwork often remain abstract and elusive to students prior to their major term assignment, the Group Report. The collaboration required to plan and implement a research-based analysis of a topic in common pool resource management often entails a blend of exhilaration and vexation. Latent conflicts– even minor differences in preferences concerning the timing, location, and formality of meetings and task assignments– often surface in the creative crucible of report preparation and in-class presentation. These conflicts, which may seem trivial even as they impact group effectiveness, are ideal contexts for individual and group engagement with peer feedback.

The Group Process Reports, presented the week after the Group Reports, require members to reflect on how their group formed, functioned, identified and addressed conflict, and performed. The purpose of the Group Process Reports is not to evaluate the 'hand' that each group was dealt in the REM 601 game, but how the group played its hand by deploying its membership and applying the course concepts. The Group Process Reports are evaluated in terms of the quality and candidness of the group's self-analyses. The provision for each member of each group to anonymously offer constructive written feedback as well as quantitative assessments of their peers helps to ensure students' careful attention to course process in general and groupwork in particular. The cohort structure of the MRM program means students will share future responsibilities for coursework or task groups, so REM 601 students tend to assign low discount rates to future peer interactions.

Table 3. Small group assignments, suggested steps to completion, and task-level learning objectives.

| Group Tasks | Recommended Process Elements | Intended Learning |
|---|---|---|
| Questions on assigned readings (18 sets of questions) | • Pre-class reading by all students <br> • In-class group deliberating <br> • In-class responding <br> • After-class posting of written response to course Dropbox ™ | • Reading focused on specific questions and group interests <br> • Listening to group peers <br> • Speaking to class peers <br> • Negotiating workloads |
| Cooperative learning exercises (4–6 training opportunities in the initial two-thirds of course) | • Direct experience of selected course concepts <br> • Visual-auditory-kinesthetic involvement in teaching and learning <br> • Participation in and observation of group process <br> • Discussion and feedback on exercise design and implementation | • Knowing personal temperaments and preferences for dealing with conflicts <br> • Communicating across social boundaries <br> • Listening actively <br> • Discovering and harnessing group preferences, identity |
| Group Report (35 minute presentation in week 10) | • Identifying and analyzing operation of course concepts in real world <br> • Producing and delivering multi-media presentation | Peer and instructor feedback criteria: <br> • Course concept presentation <br> • Concept linking, integrating, assimilating, extending <br> • Deployment of member attributes <br> • Presentation originality, creativity, effectiveness <br> • Audience engagement |

| | | |
|---|---|---|
| Group Process Report (20-minute presentation in week 12) | • Considering individual temperaments and conflict management styles<br>• Reviewing passive and active management of group process<br>• Analyzing effects of key modes and episodes in group process | • Identify group challenges and opportunities<br>• Portray dynamics affecting collective and individual learning and team building |
| Peer Feedback (ongoing, then formalized in week 11 for inclusion in course mark) | • Assessing role(s) played by each team member in relation to others<br>• Specifying links among role(s) played and group effectiveness<br>• Assuring justice and parity in provision of quantitative and qualitative feedback<br>• Balancing compassionate thoughtfulness and critical rigor | Peer feedback criteria:<br>• Logistics– attendance, punctuality, participation<br>• Substance– preparedness, contributions to course material synthesis, analysis, and group report form, content, and presentation<br>• Process– enthusiasm, facilitation, feedback, promotion of learning |

Students enter our course with knowledge of one another based only on the fieldtrip. When they exit 601, students are generally embedded in associations with their 601 groups as well as their respective, faculty-led research groups. The relationships fostered and professional capacities cultivated in 601 cut across and, importantly, precede barriers that naturally form as students' MRM programs and post-REM careers unfold. A 2012 student commented on the value of 'forced interdisciplinarity' inherent in the small groupwork, noting that their group– consisting of representatives from tourism, toxicology, and community planning– continues to meet to exchange perspectives seldom available within their respective disciplines. A 2009 team persists as a Facebook group. A 2008 student said, '601 catalyzed our awareness of how lucky we were to be working together.' Cross-disciplinary integration is one of 601's most important, yet difficult-to-specify learning outcomes. The overall average course evaluation of 3.6 on a 4.0-scale for years 2004-13 suggests students generally appreciate the course format and content.

## Discussion and conclusions

We design and deliver REM 601 to help dismantle outmoded divisions between teaching and research, and classroom and experiential education (Hutchings et al., 2011). REM 601 is, in part, an experiment in on-campus emulation of experiential education and student-centered learning (Rogers et al., 2013). If experiential education is the co-creation, with students, of opportunities to learn through engagement with and reflection on activities designed to require applications of theories to practicalities, REM 601 qualifies. 601 students are obliged to master and integrate course content into their lives though role playing, groupwork, the three creative papers, the Group Process Report, and the peer and course feedback. 601 often resonates long after term's end in many students' careers, providing all participants– that is, all MRM graduates– with a shared conceptual vocabulary for deployment in discussions and activities that flourish where there is common ground despite diverse interests, temperaments, and professional goals. Students' enhanced capacities to recognize key differences in market, state, and community institutional frameworks for resource management and to identify circumstances favoring specific or hybrid

institutional frameworks provide insight across the broad spectrum of REM careers. Students' understanding of the limits of rational choice theory and ability to see and describe how cultural factors influence behavior, including economic behavior, also add value. Our students can apply elements of effective organizational leadership and model the characteristics of organizations capable of learning and changing in response to knowledge. Finally, REM 601 students are able to apply institutional design and decision-making principles that take social, cultural, economic, and political factors into account, and promote sustainable outcomes. They understand, based on first-hand experience in a 13-week course and thereafter, how cooperation can develop, thrive and be harnessed in creative and satisfying initiatives that improve the conservation of common pool resources– including time in groupwork.

In conclusion, environmental problems, including the institutional failure of resource management, are not likely to be solved by the replication of disciplinary focus and independent individual learning and acting (Moslemi et al., 2009; Wagner et al., 2012; Zurayk et al., 2010). The escalating values of 'stakes' in environmental decision making are boosting potentials for both conflict and its generally more constructive flip side, cooperation. Research into factors and theories of cooperation and into managing relations between human communities and ecosystems has blossomed in recent decades, yet few published works have examined how these research advances may be conveyed to students and resource management practitioners. Graduate students need and deserve guided participation in resource management crucibles involving multiple participants and technical issues, pressure from short time frames, and heat from divergent interests. We prepare participants to enter such crucibles familiar with factors that enable cooperation and in possession of conscious, first-hand experience in groupwork and conflict management to pursue and achieve collectively desired futures.

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