Team Approach to Teaching Participatory Group Process Involving Natural Resources and Agriculture

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ABSTRACT: Contemporary issues are defined by people who share diverse and often strongly defended views about the topic. In Oregon, citizens are increasingly being asked or expected to participate in complex decisions that require a consensus. Rather than teach one professor's synthesis of a contemporary natural resource issue, faculty from six disciplines coach group process, interactive learning skills, and systems thinking as a way to address complex issues from multiple perspectives. Students learn by grappling with a natural resource issue of their choice within groups based on a diversity among majors, degree status, and gender. Students define situation (S), brainstorm new or different targets (T), and analyze two or more pathways (P), using an STP learning and action process. Exploring potential pathways involves defining possible consequences, stakeholder views, feasibility (ecological, social, economic, and political), and planning that includes expected behavior of the improved system over time. Students present their topics and improvements showing systemic relationships, systematic analysis, and integration of scientific facts and secondary data at midterm and during finals. Reflective learning is fostered throughout the course with prompted questions in a journal notebook. Grading criteria promote meaningful inquiry and participation in group process combined with integration of scientific facts and reflective learning.

Key Words: Learning, Conflict, Research, Learning Theory

Introduction

Natural resources function as dynamic systems, yet citizens are trained to study components and fix problems as if issues are simple and everyone agrees on the goal or purpose. Faculty teach content without process; systemic relationship and unintended consequences often are disregarded; similarly, people share diverse views and knowledge about natural resources, but fail to listen and learn. Then, people wonder why complex systems fail over time or why others oppose a decision or management practice!

Faculty from agriculture and liberal arts colleges representing six disciplines are exploring ways to model systemic learning and action within the context of complex natural resource systems. We want a compelling learning experience that develops the capacity to assess the issue; to select appropriate inquiry methodologies, including both causal research and systemic group approaches; and to consider expected consequences of choosing various methods or techniques to sequence within a methodology. Skills that students practice as part of the course include self-directed learning, group process techniques, and system thinking and practice. "Learning tension" is created as students grapple with diverse classmates, data, participatory or interactive learning, and the sciences associated with each faculty discipline. "Learning moments" are created as students integrate scientific facts and secondary sources of information, consensus methods, numerous methodologies or approaches, and stakeholder perceptions associated with improving a natural resource issue. Learning occurs when students begin to practice purposeful inquiry shaped by multiple viewpoints rather than practicing what they already know.

This paper describes our approach to purposeful inquiry and action associated with contemporary issues in agriculture and natural resources. As faculty, we "Stop, breathe deeply, and ask: what are we really

trying to do?—followed by, what method or methodology might best achieve our purpose?" Course design, results, and limitations encountered over 5 yr of inquiry and action involving an interdisciplinary approach to student-owned learning are described. Our intent is to provide a brief overview while inviting you to fill in the details and create personal ownership of a version that integrates your personality and meets the needs of learners at your institutions, company, or agency.

Course Design

At the beginning of the quarter, students settle into chairs and await the carillon bells that signal "time to learn." Suddenly, the sociologist asks everyone to reenter the classroom in single file to complete a participatory DOTS assessment (Lev et al., 1995) and an ActionGram (R. William, 1998, unpublished data). Students place a dot on each of four wall posters designed to assess levels of skill and experience with group process (Table 1). Groups of six to eight students are then asked to complete an ActionGram by drawing a river, identifying resources, considering relationships, and looking for leverage within the system. Someone asks, "What is leverage?" The horticulturist explains, "It's the point(s) where greatest impact, either positive or negative, may occur within the system" (Senge et al., 1994). Discussion of leverage points within a systemic diagram demonstrates numerous aspects of our course, all within the first 30 min. Students wonder what is going on; the faculty have not even introduced themselves or the class syllabus! Our purpose signals that each student is responsible for his or her personal engagement and learning in the science and practice of active and integral learning, synthesis thinking, and contemporary natural resource issues.

Course objectives are explained along with faculty expectations regarding attendance, grading, journals, class participation, midterm and final presentations, and demonstrable skills or theoretical understandings of the science and practice of group process and complex natural resource issues. Course objectives include the following.

1. Students will improve and practice methods and approaches to enhance their ability to function/work productively in interdisciplinary groups.
2. Students will examine and learn interdisciplinary approaches to consensus building and conflict resolution.
3. Students will research and critically evaluate alternatives concerning specific natural resource issues.
4. Students will understand group dynamics and the differences in how people view issues.
5. Students will view issues in a whole-systems perspective.
6. Students will develop generative as well as critical thinking skills.

Students choose a topic to maximize personal interest, knowing that groups will be formed to ensure a diversity of majors, gender, and degree status. Instruction begins with faculty modeling a standard inquiry and action methodology known as STP (situation, target, pathway) described by Schmuck and Runkel (1985). We role-play on a contemporary issue, such as forming a watershed council. The facilitator (faculty) explains both the methodology and methods or techniques associated with interactive learning and consensus while other faculty play the roles of diverse citizens. Introductions, expectations, and developing group guidelines (ground rules) encourage consensus before the situation is described with its emotion and usual defensive routines. Faculty demonstrate techniques that encourage diverse views while postponing judgment, all within 30 to 40 min, leaving time for students to practice during the third class period. Students facilitate, record, and participate as members several times during the quarter to gain an appreciation for each role and its responsibilities.

Student groups begin to define their issue while faculty wait for tension and "learning moments."

Table 1. Student response to pre- and postassessment of experience, skills, and expectations expressed as percentage increase in positive responses involving complex natural resource issues

Questions asked using a DOTS[a] poster technique	% Increase in positive responses	
	1997	1998
Q1. After your experience, how do you feel about working in groups?	62	74
Q2. Rate your skills in working in groups.	65	31
Q3. People with diverse views can reach consensus on complicated natural resource issues.	63	50

[a]DOTS involves a participatory assessment technique designed on wall posters for visual ownership by everyone (Lev et al., 1996). Participants place dots on a scale with words such as "great" to "hated it" to represent the extremes. Differently colored dots are used in the postassessment to measure change. Value of 1 to 5 are assigned to increments on the scale to calculate percentages.

Almost immediately, someone will suggest a vote or a motion using Robert's Rules of Order while someone else records ideas and statements as separate items in a list and another member wants to reduce the complex issue to something manageable. At these "learning moments," faculty ask students about probable consequences of choosing one of the above approaches. As faculty coach interactive learning, systems thinking, and consensus techniques that blend ideas and thinking into common themes, students begin to consider purposeful inquiry and action as an integral learning process with predictable consequences.

As faculty coach each group, we elaborate various inquiry and decision approaches (Flood and Jackson, 1991) within the STP framework of inquiry. Students are encouraged to explore historical perspectives involving how this topic became an issue and how decisions were made over time. We explore word meanings (Lev et al., 1996) such as what might be meant by *synthesis* or a *synthesis thinking* course. When should synthesis thinking be done within STP process? Students think critically about process and about their natural resource topic. They synthesize ideas and relationships first, followed by analysis and integration of scientific facts to validate alternatives and possible improvements. Students assess consequences from multiple perspectives, including diverse stakeholders, systemic relationships, and feasibility based on economics, social, and environmental impacts.

Systems thinking also is modeled, explained throughout the course, and exemplified in course design. Relational diagramming techniques, such as mind maps (Buzan, 1983), are recorded by students on wall charts along with comments noted in outline form. Students learn to postpone judgment by brainstorming new alternatives, new ways of synthesizing, and new ways of dealing with whole-systems inquiry. Students discover hierarchy and the art of thinking within both vertical and horizontal relationships and boundaries. Faculty coach a systematic process with systemic connections, feedback loops, levels of complex thinking patterns, and behavior of the learning system over time. Whole-systems inquiry seems to foster consensus because it is inclusive of participants' interest and the natural resource system. People feel good when they know their ideas or concerns are acknowledged as part of a system.

For the midterm project, participatory posters representing progress and systemic inquiry are presented by all groups during a "Going-to-the-Fair" or "galleries" (Kagan, 1993). During the "fair," students alternate between explaining their poster and visiting other posters to comment and learn. Comments to encourage imagination, innovation, and systems thinking are received either verbally or on notes placed on the posters by other students. Faculty encourage students to experiment with their presentation, to try a relational diagram or to integrate images, sensory, or hands-on learning. Most students are tentative at this stage; they begin to realize that this is a process course that integrates facts within the context of a complex issue. The midterm poster also forces students to clarify their issue among themselves and their audiences (other student groups and faculty), often within a consensus framework. A few moments are reserved at the end of the class period for students to consider feedback from peers and faculty.

Following the midterm, our coaching strategy shifts from a fairly structured learning process to student participation with faculty coaching. By this time, students have been exposed to strategies and techniques to proceed with fundamental improvement of their natural resource issue. Facts from primary and secondary sources (books, journals, Internet, personal interviews with participants or experts, attending meetings, or visiting the site) require integration and analysis from stakeholders' perspectives; systemic consequences; and impact on social, economic, and environmental criteria. Students begin to recognize the complexity and dynamic nature of natural resource issues while gaining confidence and insight into ways of dealing with diverse perspectives and people.

For the final presentation (20 min), each group is encouraged to diagram or represent most of their project in relational drawings while focusing the attention of faculty and other students on the group's inventions (improvements) and systems analysis, and integrating listeners into the learning process. Many groups become quite creative and actually have fun during their final presentation.

Graduate students enrolled in the course are expected to complete four additional seminars that explore the science and theory of inquiry. Papers or book chapters are assigned and discussed by a lead student with at least two faculty from diverse disciplines present to explore perspectives. Graduate students fuss with the science and language of inquiry and the premise of integration that fosters fundamental improvements in complex issues such as natural resources. Many students comment that this is the first time they have confronted integrative thinking across the disciplines.

Grading criteria measure learning against the course objective with assessment focused on whether students demonstrate and practice a basic knowledge (grade C), a basic knowledge and application (grade B), or a basic knowledge, application, and synthesis (grade A) of both group process and topic or issue. Faculty meet during finals week to reach consensus on grades for each student. We begin with discussion of student projects and groups in meeting our overarching goals of the course followed by student contributions to group process and performance to achieve grading criteria.

Results

As a university synthesis course,[1] students practice synthesis thinking across disciplines and within the context of a realistic natural resource issue. They describe an issue, synthesize alternatives, integrate facts, consider multiple perspectives, and analyze consequences within an experiential learning framework coached by interdisciplinary faculty (Caine and Caine, 1991). Rather than a professor's synthesis, students grapple and learn a fundamental learning process while developing their own improvements of a natural resource issue for scrutiny by peers and by faculty.

Students express initial confidence working in groups (preassessment with percentage of improvement reported in Table 1) but soon discover conflicting views shared by students from different disciplines. Students begin to comment that the course is very different than what they had imagined. It becomes evident that most of their experience is within their discipline. Students learn about learning processes for the first time; some discover personal learning preferences or patterns and how different learning styles can contribute to group process; others gain respect for different approaches toward inquiry and how both disciplinary and integral inquiry contribute to improving complex topics or issues. Students learn to listen, to trust, to explore, to postpone judgment, to analyze, and to respect diverse views and values (Table 1) while moving toward consensus action.

Students learn about a complex natural resource issue while reviewing the topics of five other groups during the midterm and final presentations. Reality is introduced by selecting current issues and purposefully grouping students across majors. Relevancy is coached as students grapple both with process and with their issue. Relational or systemic thinking is encouraged as a consensus technique while complementing systematic analytical approaches. Students learn to consider when to choose synthesis vs analysis, systemic vs systematic, and participatory vs individual inquiry. Although learning and action patterns are well established, most students begin to select methods based on a purposeful inquiry by the midterm.

Students discover either a genuine interest in serving as the group facilitator or they realize that others are better suited for this role. One former student continues to organize workshops, short courses, and an interdisciplinary curriculum for watershed councils. Several students have combined two or more inquiry approaches with an emphasis on integrating farmers into the learning process for their thesis research. Student teachers mention exposure to techniques for student-centered learning. Others have discovered listening as a fundamental skill; most students begin to realize how judgmental and often negative our ways of thinking and analyzing are in the United States. Some grumble about journals, never discovering the value of reflective learning and evaluation as being integral to personal inquiry. During the course, a sense of confidence emerges about improving complex and dynamic systems issues. Our expectation and hope is that students will revisit the fundamentals of our course as they encounter lifelong learning and participation as citizens.

Limitations

Many faculty remain skeptical of team-taught courses or simply prefer a singular approach to teaching. We are a self-selected faculty from six departments and two colleges who share interests in delivering relevant and integrated learning opportunities with students. We exhibit a wide tolerance for diverse ideas and ways of learning. In fact, during course design and continuous improvement, we practice postponing judgment until options are explored, consequences imagined, and purposes defined. Faculty express eagerness, enthusiasm, a sense of scholarship, and success as measured by student learning and discovery.

[1]University baccalaureate core requirements include at least one course designated as synthesis. Many faculty define synthesis as a "summary or final linking of information" and include historical perspectives and integration of ideas, concepts, and course work. To encourage enrollment by students from diverse colleges, prerequisites are discouraged.

Scholarship at Oregon State University is defined within the realms of discovery, integration, application, and(or) artistry that must be communicated to and validated by peers. Invention of a collaboratively coached course by integrating the sciences of natural resources, agriculture, liberal arts, and learning met ample and critical review by skeptical faculty and peers in each department and across campus. Initially, faculty involved in this course counted time spent as "overload." Following 5 yr of inquiry and active coaching, peer faculty within three departments (sociology, political science, and education[2]) have recognized this course as an integral part of a professor's teaching load; faculty in the college of agriculture are measured by contributions to statewide learning.

Perhaps our greatest obstacles involve faculty curriculum and baccalaureate core committees appointed by the faculty senate to review course requests against published criteria. Although we believe that the course exceeds the intended learning objectives described in policy statements, faculty reviewers focus on content rather than blends of process and content that ensure a synthesis and integration of facts. Although this tension and search for meaning by reviewing faculty creates "speed bumps," we view them as "learning moments" and opportunities to share our approach and learning with diverse faculty across campus. Perhaps their eventual approval represents another validation of scholarship by peers.

An annoyance and limitation is classroom design. Locating a single large classroom with nearby discussion rooms for team meetings has challenged the university scheduling staff. Rooms with improved facilities, such as carpeting to hush the consequences of interactive learning also have computer projection equipment and Internet capabilities with high demand among other teaching faculty. Learning centers with moveable chairs, flat wall space, and an atmosphere for creative learning and analysis are sought. Each year, we rediscover the overwhelming values faculty and administration place on traditional forms of learning.

Discussion of Theory and Practice

Discovery of learning and action style preferences (Kolb, 1984; Meyers and McCaully, 1985; Herrmann, 1990; Bridges, 1992) provides a framework for structuring interactive learning events and explaining citizens' diverse views and values associated with natural resource issues. Kolb (1984) described learning patterns beginning with big-picture, relational thinkers; adding intuitive, reductionist, fact-based researchers; blending theory into practice by the compulsive doers; and accommodating views or values to implement action plans. Purposefully integrating and acknowledging peoples' diversity adds perspective while dissolving conflict associated with complex issues (Bawden, 1991).

Discovery that STP (Schmuck and Runkel, 1985) and other inquiry processes exhibit a cycle of learning similar to Kolb's learning and action style preferences created a framework for integrating approaches into functional systems of inquiry. Systems inquiry considers purpose and expected results from choosing one process from many, and systemic processes consider relationships, feedback, hierarchy, and behavior over time. The integration of basic or applied research approaches designed to generate scientific facts with systemic inquiry (Checkland, 1981; Flood, 1990; Flood and Jackson, 1991; Flood and Romm, 1996) has contributed to learning and action associated with complex, adaptive systems such as natural resource dilemmas.

Discovery of symptomatic vs fundamental thinking loops (Senge et al., 1994) creates a framework for considering relational or diagramming tools (Hyerle, 1996). It encourages students and faculty to integrate relational thinking, systemic practice, and synthesis into projects along with analysis. Faculty witness success when individuals or groups consider the merits of relational thinking practiced within the context of integral or whole-systems inquiry!

Discovery of inquiry techniques that foster open-minded learning (postpone judgment), respect for different views, and promote some form of consensus decisions prompts inquirers to search for overarching goals and new ways of deciding. Techniques that foster relational thinking *and* consensus are emphasized as leverage points for integration with familiar analytical problem-solving approaches. Participatory or cooperative learning (Johnson et al., 1991; Costa and Liebmann, 1997) and constructivist learning theory (Novak and Gowin, 1984) are integrated with behavioral learning theory. Rather than achieve "group think" similar to many corporations and organizations (Bridges, 1992), our diverse faculty representing key disciplines and multiple colleges purposefully exemplifies an integrated practice we believe promises fundamental improvements in learning and action associated with complex issues such as natural resources.

[2]Faculty member K. Stephens is moving to Education, where she will receive credit for teaching this course.

Implications

Contemporary issues in agriculture offer wonderful opportunities for students to engage in critical thinking and life-long learning. Integrating the sciences of inquiry and agriculture provide a grounded framework for learner-owned learning that considers purposeful approaches to improve decisions in a complex world over time. Our interdisciplinary coaching approach represents a dilemma similar to that faced by citizens confronted with improving a watershed, a business, a community, or any other system requiring an integration of diverse views, values, and data.

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