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Developing Critical Thinking in Distance Natural Resource Courses

**Developing Critical Thinking
in Distance Natural Resource Courses
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- Introduction to Distance Learning (and OSU Extended Campus)
 - Distance education no longer novelty once was, but still little understood by those who haven't been involved in it; I've been involved since fall 1999
 - Analogy of "no longer in basement, but up first staircase without electricity"
 - Comment on OSU distance NR program (have material if interested)
 - Distance education *does* offer some unique challenges—but fundamental challenge is the same: not only to teach students specific knowledge, but also to help them develop the ability to apply that knowledge to new situations
 - Challenges:
 - Not face-to-face (and, implied, without lectures from professors, material can't be transmitted—the height of academic arrogance)
 - first part true, but
 - Sense of isolation
 - Yes to isolation sense, especially initially, but can be overcome by instructor and students. . . .
 - Lack of interaction
 - definitely *not* true
 - Bottom Line: most of the perceived limits to distance education lie in realm of instructor creativity, not in space, student capabilities or technological limitations
- What do we mean by *critical thinking*?
 - (1) ability to go beyond "the facts"; (2) ability to think logically and to express thoughts clearly; (3) ability to make connections and take insights from one situation and apply to another
 - Ability to go beyond "the facts" (who, what, where, when) to the deeper questions:
 - Why? How? So What?
 - *How* does this process work and why do we *care*? *Why* is this the situation? What does this *mean*? What is the *significance*?
 - What is the likely consequence of this happening? Why do we care about this situation/development/outcome? Where does this process fit into the big picture?
 - Another way to put it: Cause, Effect, Significance
 - For example, I want students to know what the potential impacts of dams are on riparian ecosystems, but more importantly I want to them understand *why* these

consequences are likely to occur and under what circumstances and what the likely long-term consequences will be

- How can we encourage critical thinking given “challenges” noted above?

- Key point here is we need to help develop thinking processes, not simply transmit “knowledge”

- Range of approaches because I teach five distance courses:

- Subject matter partly determines which approaches use; but time also plays role
- Analysis/synthesis papers, interactive discussions, field exercise, (tests)

- Class Discussions

- Students respond weekly to questions based on videos or readings
- Online, but asynchronous

- Powerful learning tool for several reasons

- (1) Range of experiences—including age, work experience, personal observations, prior coursework—and, thus, perspectives, much broader; (2) Asynchronous, so time to think about others’ comments and formulate own observations; (3) Anonymity can be a definite plus, especially for the wall flowers, but for everyone because allows them to be more open both in offering observations and in commenting on others’ statements; (4) Everyone has to participate, good for the “woodworkers,” but nobody has to endure the “blow-hard”

- Student backgrounds (NR 455): individual who owns/operates ranch in NM; retired oilman now getting NR degree; woman who travels around country volunteering (paid and unpaid) for TNC, FWS, etc.; CFO for HMO in Trenton NJ; self-employed arborist in Texas; woman with 25 years experience with NRCS (now working in Washington DC HQ); Civil Engineer for Gaithersburg MD; woman who works for Oregon Coast Museum; “traditional” students majoring in NR, ES, Gen Ag;

- I guarantee you would be surprised by comments from each

- Aside: Can use Discussion boards to develop camaraderie: Introductions at course beginning – my students probably know more about their classmates than yours do, at least in the latter’s first courses

- Camaraderie also develops because students take many of the same courses, just as on campus—in fact, probably more so because fewer options

- Likely to think before commenting because what one says will be out there for all to consider over time, not just a “throw away” comment; *know* people will be commenting

- Students provide feedback to each other; I listen in, but don’t say much

- My tendency to ask, “What are the potential difficulties?” but also “How might resource professionals overcome these difficulties?”

- Sample discussion questions NR 455

(1) Bias in D-Making: What biases do you bring to decision making and what can you do to reduce their influence?

(2) Public Involvement in Resource Decision Making: How are the agencies to determine the 'dominant social values,' and what happens when the dominant social values conflict with scientific assessments?

(3) Wrap-up: Since instructors usually ask what students liked best about a course, we decided to reverse that: With which idea addressed in this course did you most disagree and why?

- Can even encourage critical thinking in course valuations: "What material would you delete to allow more time to cover topics you have identified as inadequately addressed?"

- Sample question from RNG 490

(1) How do you see the Holistic Management approach applying to natural resource management beyond a ranch operation? How might it apply to your personal as well as professional life?

- Example of making connections:

- NR 455 first "cross-cultural" reading and discussion, students addressed just what article addressed: communications problems between Euro-Americans and Native Americans in Alaska; after I commented about how this phenomenon is not restricted to these two groups got much broader perspectives/comments in synopses for second cross-cultural reading later in course

- Field exercises:

- One criticism of distance is students can't get "hands-on" experience

- Field experience is important: the protocols and parameters that seem so clear and easy in classroom become immediately hazy in the field

- Certainly criticism true in some cases, but again, lack of ingenuity looms large

- What are we really after in field labs?

- Want them to see, touch, smell the "real world" as opposed to just knowing it from books, lectures, slides, etc.

- Want them to apply the "book learning" on the ground

- Want them to be able to interpret what they see and explain why

- RNG 455 field exercise:

- 30 questions after I have gone over two different riparian areas; w/ photos

- Objective/purpose clearly stated: make students extend themselves and think about what they are looking at; What are you seeing? Why is it that way? What does it mean?

- Sample questions:

- What evidence is there that the stream regularly gets out of its banks?

- Is there bare ground in the riparian zone? What do you think are the causes of this bare ground? Is it contributing to sedimentation in the channel?

- Responses must be accompanied by photographs

- Aside: RNG 355 homework assignments send them to find and evaluate data on the web

- Analysis/Thought Papers – “analysis”/“thought” papers rather than “research”
- More emphasis on analysis than “reporting”

- Synopses of articles: What is the thesis? How well does author support it? What do *you* think about this subject? Why?

- Use paper on *Beyond the Rangeland Conflict* to illustrate taking from one situation and applying to another

a. What themes or common threads run through all or most of the situations addressed in *BRC*? How do these themes tie in with material we have addressed in Rangeland Management Planning?

b. What is the most important insight you gained from reading this book? (Include specific instances from the book that helped you gain this insight.) Why do you say so? How will this insight contribute to making you a better natural resource manager?

- Tests

- Are important learning tools both in the questions asked and in the feedback given

- Not just *what*, but *why* and *how*

- Focus is on *why* and *so what* questions increasingly as course progresses

- Ask “scenario” and “what if” questions: how might you explain this?

- “Given this situation, . . .”: How would you explain how it got that way?

What is the likely outcome and why? What is likely to happen if . . .?

- Examples:

- RNG 455: “The authors of the article on riparian buffer strip design list four criteria for determining adequate size. Identify two of the criteria *and* explain the logic behind their selection.”

- RNG 455: Recreation impacts – could ask as multiple choice (Which of the following are/are not reasons why recreation managers emphasize grouping camp sites together?) or as T/F (Recreation managers prefer to group camp sites together rather than dispersing them across the landscape. T/F). I preferred to ask in form of *why* to elicit explanation that demonstrates understanding (Why do recreation managers now emphasize grouping camp sites together rather than dispersing them across the landscape?)

- RNG 455: Choose three of the following four attributes of riparian ecosystems and explain why they have been included in the Proper Functioning Condition assessment methodology; that is, how does each relate to riparian functions and processes?

- RNG 341 final (Putting things into context): Discuss the three most important concepts, facts or insights you have gained from this course. Include in your discussion an explanation of why you selected these.

- Feedback

- An essential component of learning

- This *is* a problem with DE, especially timeliness

- Most frequent complaint is “I never hear from my instructor”

- Students provide each other feedback in discussions

- I send back detailed comments with all tests as well as with papers

- Papers: I mark up submissions liberally, then type up a general comments page(s) that covers common problems

- Tests: Identify the answer and explain why that is the answer and not the others, including—*may, especially*—T/F, multiple-guess; also try to provide reasons I asked the question—what I was driving at, trying to reinforce

Conclusion

- Basic objectives and fundamental principles are the same for distance as for classroom courses: to encourage students to go beyond memorization to understanding and then application, to have them question rather than merely accept.

- Techniques for implementing principles may differ, but the key to developing critical thinking remain the same:

- Should always be asking *Why? How? and So what?*

- Make these questions part of everything you and the students do