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An ecology of mind: teaching – learning complex systems

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Abstract

Purpose – The purpose of this paper is to show how to enact a Batesonian system to teaching an ecology of mind course.

Design/methodology/approach – The approach develops a practical framework for teaching with examples of teaching approaches and student work.

Findings – The overarching approach involves a depth-abstraction-abduction model. This model was used to engage students in examining a variety of transdisciplinary phenomena with emphasis on contexts, meaning, multiple perspectives, stories, relationships and systems, patterns, and epistemology. Epistemological shocks and shifts were a common occurrence.

Originality/value – This work is unique in that it focuses on a course based upon the film: "An ecology of mind: a daughter's portrait of Gregory Bateson".

Keywords Complexity, Curricula, Learning, Relationship, Complex systems, Teaching, Epistemology, Ecology of mind, Gregory Bateson, Epistemological shock

Paper type Conceptual paper

Introduction

After the release of the film, "An ecology of mind: a daughter's portrait of Gregory Bateson" (2010), I created a freshman seminar course focused on the concepts presented in this film. This course attracts students from a variety of subject matter disciplines. The course not only investigates the concepts presented in the film, but also attempts to enact these concepts within the classroom (Bloom, 2012). The primary concepts in this film include: cognition as an ecology, relationship, cybernetics, Batesonian epistemology, difference, double binds, pattern, changeability, beauty, context, multiple perspectives, among others (*An Ecology of Mind*, 2010).

A number of Batesonian approaches and ideas along with concepts from the complexity sciences have informed the design and implementation of this course. All of these ideas intertwine in the approach described in this paper. These Batesonian and complexity ideas have been used to construct a three-part model of teaching and learning involving:

(1) depth (complicated);

(2) abstraction (explanatory models); and

(3) extent or abduction (Bloom and Volk, 2007, 2012).

This research received Institutional Review Board approval from Northern Arizona University for 2011-2013.

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This three-part model served as a recursive approach for examining the key ideas. This approach provided the foundation for:

(1) classroom discussions;

(2) very short "lecturettes"; and

(3) the selection of videos, readings, classroom activities, and assignments.

Some of the major features of this course are listed in Table I.

Although teaching and learning are inherently social, they also are very personal. The course described here is my personal construction, which was influenced by many

Topics	Example activities	Assignments
How do we think?	Activity: sensory awareness Beau Lotto (TED talk) perception	Critical reflection
Relationships	5 min lecture: symmetrical, complementary, reciprocal Group activity: analysis of relations within and among a variety of natural objects (earthworms, shells, leafs, pine cones, rocks, bones)	Project and presentation
Cybernetics-systems	5 min lecture: minimizing, maximizing, optimizing Group activity: generating links between two disparate objects (photos) Whole class activity: systems of a selected phenomenon	Critical reflection
Ecology of mind	Millennium: ecology of mind video	Critical reflection
Epistemology	Activity: student descriptions of parts of photos (42 timed slides), followed by sharing of descriptions, then viewing whole photos Discussion: what assumptions affect your thinking? Discussion: what epistemological shocks have you experienced	Critical reflection
Difference	Discussion: contrast, multiple perspectives	Critical reflection
Double bind	Student YouTube video: double binds Brief enactment of double bind with students about "homework" Discussion: what double binds have you/we experienced across scales from person to social to global	Project and presentation
Patterns	Tyler Volk metapatterns videos Bob Full (TED talk) foot patterns Skype visit: Tyler Volk Field study: on campus patterns and functions Field study: museum with student impromptu patterns presentations	Project and presentations
Changeability	Discussion: flexibility-rigidity, balance, acclimatizing-adapting	Critical reflection
Beauty	Discussion: emotions-aesthetics	Critical reflection
General	Skype visit: Nora Bateson	Final public poster display

Note: Italicised topics received major emphasis

Table I.
Major topics, activities, and assignments

different people including a variety of scholars of teaching, learning, and cognition, as well as by my own students past and present. The enactment of this course emerged from the interactions between my students and me, which are not predictable or replicable. However, I do hope that readers will come away with the underlying ideas that can lead to developing your own versions of course enactment in a Batesonian spirit of emergent curriculum.

Curricular enactment

The following subsections describe the presentation or enactment and examples of the effects of selected areas of emphasis, including stories, contexts, meaning, relationships, systems, patterns, epistemology, and epistemological shock. The overall model of depth-abstraction-abduction manifested an overarching pattern of engagement some of which was planned and some of which arose out of the particular circumstances in the classroom. In assignments, especially the larger projects, students were encouraged to delve into the depth of interrelationships within their topic, develop explanatory models, and compare to phenomena across contextual and disciplinary boundaries.

The sharing of personal stories through various classroom discussions and assignments provided a means to explore the depth of understandings. Such depth involved their explorations of interrelationships, contexts, and the meanings associated with whatever they were exploring. A number of students examined various psychological problems, such as anxiety, depression, and bipolar disorder. In each case, they looked at the basic statistics of their occurrences, along with detailed examinations of the personal and social dynamics and double binds they or people they have know have experienced.

Their discussions and presentations also provided opportunities for students to see how the basic concepts from the film and other materials cross-disciplines and contexts (abduction). Such abductive processes were at the heart of students' projects and reflections, where they took the major themes from the film and readings and used them to make sense of areas of personal interest and meaning.

The students also began to formulate representations, explanations, and models (abstraction) from these discussions and within their projects. An example of an artistic, emotional representation of addiction appears in Figure 1. In her preface to her project, another student suggested how the rap music of drake connects people and connects people to the environment:

> I realized that his music and his past relationships are a very accurate portrayal of what people think of when they think of connections and emotions relating to the people and world around us [. . .] [and, his music is] a good depiction of how words connect people to their environment and the people surrounding them (7 October 2011).

In another example, after reading Catherine Bateson's (2004b) "Lessons of 9/11", one student elaborated upon problems of being judgmental, where emotions rather than rationality control one's thinking. In other students' writing about personal traumas, they not only used the ideas of patterns, relationships, double binds, epistemology, and so forth to analyze their situations, but also used these same concepts to create frameworks for understanding their own and others' particular situations.

Figure 1.
A student's representation of addiction

Stories, context, and meaning

Stories were used in several ways:

- to elaborate on contexts and meaning;
- to engage students in explorations of concepts and in discussions; and
- to help establish personal relationships within the classroom.

For example, students shared stories of relationships and double binds in their personal experiences of addiction, schooling, religion and friends, and death. Such stories emerged from open-ended questions, such as, "what experiences have you had with double binds?" or "how have you experienced complementary or symmetrical relationships?" In the beginning of the course, most students were hesitant to share personal stories. Many students discussed how teachers have placed them in double binds by "encouraging" participation, then humiliating them when they did participate. However, by sharing my own personal stories, while manifesting a sense of "confident vulnerability", more students began to feel a sense of safety. In fact, my doctoral student observed that the class often seemed like a group therapy session (12 January 2013). In addition, I emphasized the showing of genuine interest in their stories and on elaborating upon how their stories fit with the content of the course:

> [the instructor] has a very relaxed attitude with the students and they have picked up on his "essence", it seems. They all call him [by his first name], and I get the idea that they really like

> doing so. It levels things. He never gives any student the impression that he dislikes things they share. He is constantly excited when his students share things with him. He doesn't even really seem to mind if things discussed are on topic – he genuinely likes to see inside the minds of his students. He shows them a level of respect many students don't get [. . .] (doctoral student observation, 14 September 12).

Once they began to feel more comfortable participating, the major projects on relationships, double binds, and patterns provided further opportunities to explore and share their own experiences and interests. In many instances, students demonstrated incredible courage and openness. Stories of sexuality, family sexual abuse, addiction, divorce, self-image, family dysfunction, rape, death, and interpersonal conflicts were among some of the more powerful stories shared in reflections and project presentations.

Relationships and systems

As mentioned previously, a key focus of teaching was on developing relationships with students. At the beginning of the course, students introduced themselves, while describing their academic majors, hometowns, and passions and interests. Large nametags were used to for the first several weeks. Seating arrangements varied between sitting in a circle to sitting in small groups. In addition, individual teacher – student meetings helped develop a sense of reciprocity. After the first four weeks or so, such efforts resulted in a dramatic increase in classroom participation, the sharing of very personal "stories" in assignments and classroom discussions, and a change in student-to-student interactions including the development of new friendships. Students commented that in most of their classes they did not get to know other students. They sat and listened to the instructor and then left. In the ecology of mind class, a significant portion of time was spent in small group activities and whole class discussions that were not controlled by the instructor. Such activities and discussions fostered relationships and friendships.

However, Bateson's suggestion that we "live in a world of relationships" goes well beyond the relationships among people. In fact, as the course progressed, many students discussed their own preconceptions about relationships being limited to those of the romantic kind, such as in one student's commentary (7 February 2013):

> My whole life I have seen relationships as between a boyfriend and girlfriend or that of a friendship. These readings though, opened my eyes to the fact that everything around me is in relationship [. . .].

In addition to the readings on our course wiki, book chapters by Gregory and Mary Catherine Bateson, and to the ecology of mind film, students also engaged in activities that explored various types of relationships, such as those between various living (earthworm, pine cone, shell, etc.), nonliving (rocks, ponds, etc.), and human-made objects. They also explored how these relationships are systems in and of themselves as well as parts of even larger systems. An emphasis on interacting systems was maintained throughout the course through the posing of questions about the effects of interacting systems on particular phenomena and by elaborating on how such interacting systems affect particular issues and events.

Patterns

The patterns theme focused on pattern thinking and on Volk's (1995) elaboration upon Bateson's (1979/2002) metapatterns. The functions and meanings of patterns and their

interactions in systems at different scales were investigated through examinations of various objects in the classroom, during short campus outings, and during a trip to a local museum. During the museum visit, individuals or groups chose one particular object or set of objects and gave impromptu presentations on the interactions, functions, and meanings of metapatterns in their objects: a modern mural of a timeline of native American history; a variety of native American jewelry, basketry, pottery; and dinosaur skeletons and bones.

Students' reactions to metapatterns were frequently quite dramatic. In one case, after we had been talking about and investigating metapatterns, we were waiting for a guest expert to connect through Skype, when one student blurted out, "so [. . .]. Metapatterns [. . .] Wow, right? I'm blown away [. . .] binaries, [. . .] sheets, spheres [. . .]. I can't seem to see anything the same way". Another student realized how patterns and double binds were just subsets of relationships. As a chemistry major, he saw titration as a step-by-step process. After immersing himself in the ecology of mind course, he began to see how everything was connected, such as an earthworm and a seashell, and how there was a beauty to the patterns of swirling liquids during titrations. Another student commented on how this course affected her:

> This course has impacted my thinking in ways that are hard for me to verbalize. It has made me think more, it twists my brain around things that I am slowly starting to understand, yet some of it is still hard to conceptualize. I am seeing how everything is related, everything is a pattern in one form or another.

Epistemology and epistemological shock

As Bateson (2004a) described, epistemological shock occurs when we encounter a situation where our personal explanatory frameworks (epistemologies) do not function in a way that support our established assumptions. As an educator, I feel obligated to present opportunities for epistemological shock as a way to create possibilities for personal and professional transformation.

As various topics were introduced in this class, a number of students expressed confidence that their own ideas and interpretations were true. As time progressed, students appeared to have various epistemological shocks as they confronted ideas and situations that challenged their assumptions. In many ways, the Ecology of mind film provided an array of epistemological shock possibilities. One activity introduced during the epistemology topic sessions seemed to have a significant effect. This activity had students look at a set of 42 photographs, which, unknown to them, were smaller sections of larger photographs. For each of these photographs, they wrote down what they thought the photograph was depicting. After they finished looking at and describing each of these photographs, we returned and discussed what students thought about each photo. Then, we viewed the larger photographs from which the smaller photos were taken. Audible gasps and nervous laughter accompanied the introduction of each large photo. A photography major, who had expressed "absolute" confidence in the accuracy of her perceptions and interpretations of the world just few days prior to this activity, described the effect of this activity in her journal:

> The exercise [. . .] made me really think that things aren't what they seem to be. When I saw the clips I thought or saw something completely different. I created a different picture in my mind with the small clue in the clip. This excersize [sic] made me ponder the idea that I do things like this in my everyday life. I assume different things from what they really are.

Another student reacted to this activity as "eye-opening. I've learned that not everything is what it seems to be. I am a judger and I think this class taught me to look at the big picture".

In general, students began to question their assumptions about various aspects of their lives. Some of this questioning of assumptions may have started as epistemological shocks from class activities or readings, while others occurred as insights into the nature of their own perceptions and interpretations.

The problems with trying to assess epistemological shocks and shifts are that they may not be "visible" at a particular point of time and that they may take time before they fully manifest. However, the impact of this course, as indicated in students' journals, final questionnaires, and final interviews, suggests that the topics of relationships, double binds, patterns, epistemology, and beauty have led to their seeing their worlds differently. These particular areas seemed to resonate with their personal experiences and interests.

Implications and discussion

The biggest challenge of teaching this course has been in addressing the established sets of expectations and "game plans" that have arisen from previous relationships to schooling. Some students resisted engagement. Others who did engage, at least cognitively, went through some degree of transformation. They "saw the world differently" or felt like their brain had been "twisted". For quite a few students, the course was cathartic. They tapped into uncomfortable experiences, and were able to see how these experiences fit into larger frameworks of understanding. For others, the course was an opportunity to explore areas of interest from different angles. They saw how their musical talents were complex knots of relationships within themselves, as well as between themselves, the instrument, the sounds, and other people. One pair of students did an in-depth examination of evolution from the perspectives of patterns and relationships. They chose the topic, because they "didn't know anything about it" and wanted to delve into the topic out of curiosity.

The conceptual themes themselves provided conceptual tools to analyze a variety of experiences. Relationships, double binds, context, metapatterns, difference, and beauty have had impacts on students' epistemologies. One student described how she had suffered from post-traumatic stress disorder (PTSD) for years after she was subjected to an extreme act of violence. She felt that the material in this course had helped her put these traumatic experiences in a broader context of understanding.

My recollections of Gregory Bateson's teaching are ones of a sharp intellect balanced by human vulnerability and heart. When he talked, everyone listened, as if he was gently seducing you into a new world, while pulling the carpet out from underneath you. He manifested the importance of relationship, while teaching about relationship. Such a binary focus appears to be key. In order for students to engage, an environment must be created that provides a sense of safety. At the same time, the environment needs to suggest a level of curiosity, rigor, and uncertainty. In many instances, Gregory asked questions as if he had no potential answers and then waited for responses. In the ecology of mind course, such an approach has been formalized as a shift in towards students as producers of knowledge.

During and after each course offering, a sense of "transformation in progress" was evident. However, such qualities of "in progress" do not fit well within the contexts of schooling. Current structures of schooling do not support learning that is always

"in progress". We divide up school learning into five, six, or even seven "courses" that all occur within a 15-week period. During such short periods of time, we may only sew the seeds of change in attitudes, assumptions, expectations, and epistemologies. Certainly, my early experiences with Gregory are still affecting my thinking 47.5 years later.

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