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Emotions in Teaching Environmental Education

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Abstract	This op-ed article examines the emotional impact of teaching environmental science and considers how certain emotions can broaden viewpoints and other emotions narrow them. Specifically, it investigates how the topic of climate change became an emotional debate in a science classroom because of religious beliefs. Through reflective practice and examination of positionality, the author explored how certain teaching practices of pre-service science teachers created a productive space and other practices closed down the conversations	
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1 Op-Ed

2 **Emotions in Teaching Environmental Science**

3 Cassie Quigley

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8 **Abstract** This op-ed article examines the emotional impact of teaching
9 environmental science and considers how certain emotions can broaden viewpoints and
10 other emotions narrow them. Specifically, it investigates how the topic of climate change
11 became an emotional debate in a science classroom because of religious beliefs. Through
12 reflective practice and examination of positionality, the author explored how certain
13 teaching practices of pre-service science teachers created a productive space and other
14 practices closed down the conversations. This article is framed with theories that explore
15 both divergent and shared viewpoints.

16

17 **Keywords** Emotions- Environmental Science - Positionality - Schisms - Religious
18 Beliefs

19

20 *'What church do you go to?'* Sarah, a student in my environmental science
21 class asked me when we were discussing the impacts of climate change.
22 *'Well, we are new here. I am not sure,'* I responded nervously, *'I was raised*
23 *Catholic but....'* *'So you don't go to church?'* Sarah probed. *'She's a*
24 *Yankee. Catholics are different up there,'* Zach interjected. *'Oh! Well you*
25 *can come to my church.'* Sarah offered. *"I am not sure that is appropriate. I*
26 *don't feel comfortable talking about my religious beliefs with my students.'* I
27 responded with an emotional tone of both surprise at the question and
28 indignation that I would need to respond. In that instance, I silenced my
29 students and created divide that felt insurmountable.

30

31 This exchange occurred my first year of teaching environmental science at a
32 Southeastern public university and still haunts me today. I chose the word, *haunt*, because it

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33 frequents my thoughts. Even though several years passed since this encounter, I often reflect
34 on the way I positioned myself with this emotional response. Positionality is a critical factor
35 for teaching relationships; it sets the tone for learning, affecting its course and outcomes. It is
36 absolutely essential for researchers working in environmental education to be aware the
37 complex ways in which the teacher's position shapes the power relationships between
38 teachers and students.

39 As environmental educational researcher, I understand that climate change science is
40 complex and requires knowledge in multiple domains. Complicating this matter is that most
41 environmental topics involve examining one's own actions, positions, and choices, and
42 therefore can make people uncomfortable about their role in environmental degradation.
43 Importantly, solving environmental issues requires shared human concern and responsibility,
44 as communities in all nations and geographic regions grapple with ecological degradation and
45 its associated consequences. *But what happens when people do not share concern or*
46 *responsibility for the impacts of human consumption of the earth's resources?* For the past
47 few years, I experienced this difference of concern and responsibility in my environmental
48 science classes. I teach environmental sciences, and so, I am familiar with the debates
49 surrounding climate change. My students often talk about variability in climate projections.
50 They cite the flawed data and unreliable models. They mention that we could be heading into
51 an ice age and thus the earth temperatures will cool soon. They discuss how the amount of
52 solar radiance could be causing the changes in climate. With these responses, my students
53 remove themselves from responsibility of reducing their impact on the earth, as one student
54 put it, *'it is going to happen any way, it is God's will.'*

55 Reflecting on the emotional way that I initially responded to my students' reactions to
56 impacts of climate change; I attempted to remove all emotion from my teaching of this topic.
57 I approached the course with the notion they would be teaching science (they are all middle
58 school preservice science teachers), and the human impact on the environment is a part of the
59 state curriculum, and thus would be a part of my instruction. I decided after this initial
60 emotional response, to stick to the facts, and only the facts regarding human consumption of
61 earth's resources. We looked at the Ice Core data. I showed pictures of the Arapaho Glaciers
62 taken at 1898 and 2003. We analyzed NASA satellite images of North polar ice and time
63 temperature graphs over the past two centuries. We looked for trends in the Keeling curves.
64 We even discussed weather patterns from the family farms where many of the students work.

65 At the end of the discussion, I raised the question, *'So, given all the data what do you*
66 *think about climate change and its impacts?'* Their responses were unequivocally, *'I don't*
67 *believe it.'* They would talk about variability; they would talk about how the data I presented
68 were only part of the story. They would point to the recent cold snap. I was frustrated but
69 even more—I was baffled. How could these students, who had little issue talking about a
70 common ancestor or evolution, have such trouble with climate change? What I discovered,
71 was we had completely opposite worldviews. These conflicting worldviews in combination
72 with emotionless teaching, I created more distance between my students and me.

73 According to Barbara Fredrickson(2001), certain discrete positive emotions such as
74 joy, pride, contentment, interest, and love all share the ability to broaden people's
75 perspectives and thoughts, while negative emotions narrow them. When I was responding
76 negatively to the students' reactions about human impacts on the earth, I was, in affect,
77 causing them to shut down to new thought. Moreover, because of my worldview on the
78 environment and my assumptions of the belief systems of future science teachers, I presumed
79 we would have similar worldviews. This misperception on my part made the opposition

80 tougher for me. To me, it seemed personal. And it was, because they were attacking my
81 worldview, just as they felt I was attacking theirs—we were at an impasse and one that could
82 not be dealt without addressing the emotions of teaching environmental issues.

83 Undoubtedly, I understand there are reasons for opposing worldviews and that
84 differing worldviews can be emotional for both parties. Findings indicate, and are supported
85 by my experiences, that presenting scientific observations, such as CO₂ trends, Ice Core data,
86 glacial area change, and Keeling curve trends, is often not enough to persuade a person to
87 reject their previous beliefs and become convinced of the scientific theory. Reasons for the
88 persistence of worldviews even in the light of scientific evidence refuting those notions
89 involve the emotions and self-interest people project onto their deeply held beliefs (E. U.
90 Weber & Stern, 2011). Making progress in convincing people of the validity of scientific
91 theories like climate change must include an understanding of the emotions and interests
92 strongly tied to the perpetuation of the prevalent belief-systems. For me, that included
93 examining my own positionality with environmental issues with scrutiny towards where I
94 was creating more dissent.

95 As I examined the ways in which I was preventing a shared space from occurring, an
96 obvious way was I did not outwardly talk about religion. One reason was I taught at a public
97 university and therefore felt a responsibility to maintaining the separation between religion
98 and education. However, as I reflect on the past few years of teaching, I realize it was more
99 than that. In fact, I was raised Catholic. I was baptized, received first communion, attended
100 Catholic school for 8 years, and was confirmed. I was comfortable talking about religion and
101 being in a church. In fact, I enjoy the ritual of a Catholic mass even though now I only attend
102 them for family events.

103 When I moved to the conservative South, I quickly realized that being Catholic was
104 not viewed in the same light as being a Southern Christian. *It was as if I wasn't Christian*
105 *enough.* It is with this realization that I understand, although I hid behind the responsibilities
106 of teaching at a public university, the reality is I did not talk about my religious beliefs with
107 my students because I felt like an outsider to the group. When I considered discussing my
108 religious beliefs, the questions began: *How much should I reveal? Should I mask my specific*
109 *religious beliefs (Catholic) in favor of common ground? We were all Christians, right?*
110 *Should disclose that I no longer attended church?* Ultimately, something else scared me. If I
111 revealed too much, I wondered—*would they try to convert me?* I worried that if I revealed I
112 did not belong to a church, and the students tried to convert me to their religion, and I
113 declined— it would destroy the learning environment— just as it had done in my first year of
114 teaching. I felt vulnerable. Since that original encounter, I made a conscious decision that I
115 should not reveal anything about my religious beliefs. Because our views about religion were
116 different and these understandings were influencing the way we individually regarded the
117 environment and our responsibility to it, incommensurability was established.

118 These incommensurable views often result from a ratcheting-up of opposition,
119 referred to by anthropologists as schismogenesis. During this ratcheting-up, one side of the
120 argument makes a statement to the opposition and the opposition responds with an argument
121 that builds upwards and is more divergent from the original argument. Gregory Bateson
122 (1935) developed this notion of schismogenesis, and described it as mirroring interactions,
123 where every move by each side makes the other respond more negatively. For example, if
124 two people are in a disagreement about the causes of changes in climate, one side might
125 make a statement that current climate changes are human-induced. The other side might say
126 the causes are historical changes in climate and that these changes have always and will

127 always occur. Then, the opposition might state the changes are coming closer together and
128 are more erratic. The other side could respond that the Ice Age was erratic. And so the debate
129 continues, with neither side willing to find an area of agreement or shared understanding.
130 Speaking from experience, this type of opposition occurred over and over again in my
131 classroom.

132 However, Bateson argues there has to be a moment that prevents the schismogenic
133 unit (a person or a group) from destroying itself through excessive disagreement. A kind of
134 discomfort might develop that would make normal social functioning increasingly difficult.
135 Something must exist to stop the progression before it reaches this state. This is what was
136 missing from my classroom debates—and perhaps from the national conversation. This
137 notion of schismogenesis is valuable to understanding environmental perspectives because as
138 we look for ways to solve environmental issues that plague our communities, understanding
139 the relationships that prevent opposing viewpoints from finding common ground is vital.

140 Because of the challenges in my classroom, I decided to research divergent
141 worldviews. In this work, I found there were times when the people acted as a part of the
142 group and other times when they functioned as an individual in a group context. For example,
143 when people act as a group, there is an ethos that binds the group and actions that are in
144 response to that ethos. In my classroom, I noticed the ethos that bound my students was their
145 interoperation of Christian values and their actions, such as not recycling because of their
146 belief that God would take care of those who were saved, were related to these values. Raimo
147 Tuomela (2007), who studies how people share viewpoints, notes there are times when
148 people do not act or think using *collective intentionality*, or acting as a group; instead they
149 operate individually, even if they are sitting with members of a group to which they belong.
150 In my classroom, I noticed if the ethos that bound them was Christianity but felt it was their
151 responsibility to take care of God's creation and therefore did recycle; they were not acting
152 with collective intentionality of the classroom that felt recycling was unnecessary.

153 Although Tuomela's work explores the shared point of view, he also discussed
154 dissent within groups. Typically, he asserted, there are intentions or actions that are not ethos-
155 compatible that cause the dissent. Accordingly, in my classroom, the topic of climate
156 change was not compatible with many students' ethos, and therefore there was dissent.

157 When students' schismed with me about environmental issues, there was the use of
158 language that positioned one group against another such as, 'us vs. you'. The question then
159 becomes how do I, as the teacher, shift the conversation away from schisms towards more
160 shared perspectives. I began drawing on Bateson's notions of shifting the schism to
161 encourage communication and create productive learning environment. For instance, by
162 encouraging groups to interrupt complementary schismogenesis by participating in an act of
163 symmetrical behavior, this eased the strain and promoted collaboration. For example,
164 although the students agreed that climate change was not human-induced, they disagreed on
165 the amount of governmental involvement in regards to environmental issues such as waste
166 management. But when they became involved in community-driven actions that were not
167 financially supported by the government, the groups could find an area to work towards
168 similar goals. Tuomela would call this joint action *collective action*, which eased the
169 schismogenic strain. In my class, we discussed how the local city currently was subsidizing
170 \$2 million annually in waste removal. The community was proposing a pay-per-bag
171 alternative to help alleviate the costs. One of the side effects of the pay-per-bag process is
172 that it often reduces waste, as families are required to pay per garbage bag to dispose.
173 Overwhelmingly, the students supported this notion because it was community-driven, and

174 when it also reduced the amount of waste, the students also noted that this was a benefit to
175 the community as well. Therefore, although the students originally felt based on their
176 religious grounds that recycling was not worth it, they felt that if there was a financial benefit
177 that was community-proposed, and then they did not oppose it.

178 Another way I found a shared space was to discover ways to change the purpose
179 behind the opposition. For example, when I introduced the notion that alternative fuels could
180 be used to help with deforestation, the students felt these were unrealistic because of
181 economic reasons. But if there were a program that subsidized the innovation, which would
182 make it more affordable, this made the idea more supportable. The same thing happened
183 when we talked about innovation in the car industry and talked about the history of the
184 government supporting advancements in SUV industry and tax breaks for business owners
185 who leased large vehicles but not for those who leased smaller ones. As we explored these
186 topics, they supported the subsidization of electric and hybrid vehicles. I came to realize that
187 my line of questioning could be harmful though. Once I was presenting the data in regards to
188 the car industry and a student became very upset describing how they felt '*cheated*' by the
189 car industry. She went on to describe how this privileged only certain people and in fact did
190 have negative consequences on the environment. As I continued to probe her, the other
191 students responded vigorously in opposition to her comment, citing that '*It was a person's*
192 *God-given right to buy a car and use as much gas as that car required. You believe, that*
193 *right?*' The student left the conversation by retreating back on her original statement and
194 said, '*Yes, of course I agree.*' Here, when I attempted to shift the purpose behind the
195 opposition, I probed too much, and found I put my student at risk from being pushed out of
196 the group. Since such investigative questions could put the students in a tricky situation, I
197 often struggle with the amount I need to inquire to understand their thinking and when to
198 withdraw. Although I still struggle with this today, I found I needed to be cautious of this
199 teaching approach in order to respect the vulnerability of my students.

200 I also noted schisms often occurred when I utilized polarizing 'us vs. you' language
201 and definite words such as *must* or *no choice* or *no other way*. The students shut down or
202 ratcheted-up their opposition. But when the conversation included notions of *we* and less
203 divisive words such as *perhaps* or *one idea* or *might* a shift in the emotional tone in the
204 classroom occurred and the room felt more comfortable. As I used this less discordant
205 language, students were more willing to listen to the evidence behind the reasoning.

206 Through reflection, I noticed students would join together to oppose an
207 uncomfortable notion, and that I could join them if there was not a clear victor but there was
208 a clear adversary. One example of this was in the schism surrounding the use of solar energy
209 versus other fuels. I often disagree with my students around the issue of energy—as I am in
210 favor of renewable sources such as wind and solar and they are often more in favor of nuclear
211 energy (there are many nuclear energy sites in the area). However, I found that could find
212 common ground with the students as we all agreed coal burning was less desirable (most of
213 the coal industry is located in the neighboring state which made for an easy enemy), thus
214 creating an schismogenesis between lower-carbon emission energy and coal industry instead
215 of between the students and me. In this way, there was still an original schism between my
216 students and me surrounding energy but it was lessened it in order to ratchet against a side we
217 both opposed.

218 These possibilities provided pathways for schisms to soften but also maintained the
219 balance in the classroom so as not to destroy the classroom. The challenge for me is to
220 continue to find that right balance. How do I maintain the balance of the classroom to create a

221 safe learning environment for my students but when do I push their thinking to encourage
222 new ideas?

223 As researchers of environmental issues, such as Elke Weber and Paul Stern (2011)
224 insist, solving these problems is really solving the problem with emotional interactions. I
225 found that understanding these emotional interactions included reflecting on both my
226 teaching and the ways in which my emotions influenced the classroom. As I recognize the
227 importance of examining the teacher's positionality, I understand because of the advocacy
228 role that environmental education necessitates, there is an obligation for a deep and abiding
229 dialogue. This means my attention to positionality must remain grounded in the examination
230 of self with others. I also believe this positionality also should occur with students. If we seek
231 to create a world that promotes human dignity, the development of sustainable communities,
232 and just distribution of the earth's resources, is it enough to teach ecological concepts or
233 should the goal also include influencing students' relationship with the earth? If it is the
234 latter, I posit, that influencing students' relationship requires a look inward at my position.

235 The resources necessary to tackle climate change are scattered across different groups
236 and as long as there is no shared perception of the content of the problem, it is difficult to be
237 define the solution. From this perspective, in order to deal with environmental issues we must
238 come to a shared view on the problems facing communities. In the case of climate change, it
239 affects us all. If we recognize the environment is something we share, and if we can keep the
240 conversation going about the environment, we will, however slowly, move towards common
241 ground and ultimately solutions.
242

243 References

244 Bateson, G. (1935). Culture contact and schismogenesis. *Man*, 35, 178-183.
245 <http://dx.doi.org/10.2307/2789408>

246 Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The
247 broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218.
248 <http://dx.doi.org/10.1037/0003-066X.56.3.218>

249 Tuomela, R. (2007). *The philosophy of sociality: The shared point of view*. Oxford University
250 Press.

251 Weber, E. U., & Stern, P. C. (2011). Public understanding of climate change in the United
252 States. *American Psychologist*, 66(4), 315. <http://dx.doi.org/10.1037/a0023253>

253

254 Author Biography

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