

The Global Discussion Thread:  
Civics Education in the Age of Digital Communication Media

by

Isabel Fay

(Under the Direction of Celeste M. Condit)

ABSTRACT

The author analyzes the arrangement patterns of the discussion forums from three massive open online courses (MOOCs) for their potential in facilitating global civic discussion and learner communities. Based on Michael Warner's theorizing of the textual public, the author observes that different learner communities and educational opportunities emerge across three overlapping types of discussion patterns. The linear responsive patterns produce more exclusive, scientific learner communities and advance epistemic understanding in competitive and cooperative modes of discussion. Additive patterns produce more inclusive democratic publics that bring learners together through the engagement of brainstorming different aspects of public problems and solutions to these problems. The repetitive discussion pattern has the potential to produce activist publics based on shared perceptions and experiences of problems that take on formation through the repetition of statements from different participants. With regard to the repetitive thread, the author observes that repetition unfolds a mimetic style that is fueled by textuality itself. Despite the redundancy of repetition, repetition is productive in escalating affective energy with the potential to motivate different forms of public

activism. The author concludes that repetitive addition and additive repetition are chronological processes that build a public presence iteratively through time. The timely presence that is maintained through additive and repetitive patterns on digital discussion forums allows participants from across global distances to affiliate as a people around the urgency of global concerns.

INDEX WORDS: Massive open online course, Civic education, Digital discussion forums, Global publics, Digital activism, Mimesis, Presence, Scientific communities

THE GLOBAL DISCUSSION THREAD:  
CIVICS EDUCATION IN THE AGE OF DIGITAL COMMUNICATION MEDIA

by

ISABEL FAY

BA, Concord University, 2008

MA, Virginia Polytechnic Institute and State University, 2011

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial  
Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2016

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MEDIA

by

ISABEL FAY

Major Professor:	Celeste M. Condit
Committee:	Roger Stahl
	Edward M. Panetta
	Kelly E. Happe
	Amy J. Ross

Electronic Version Approved:

Suzanne Barbour  
Dean of the Graduate School  
The University of Georgia  
May 2016

## DEDICATION

To humanity, whose future demands a quest for becoming.

## ACKNOWLEDGEMENTS

Foremost, I thank my advisor, Celeste M. Condit, for her commitment to my professional future, her trust in my intellectual endeavors, her guidance in the fulfillment of this project, and her independent mind, which has challenged and inspired me. I thank my committee for their valuable suggestions, and especially Roger, for his faith in me. Thanks to Kev and Val for their loving encouragements. Danke, Mama und Papa, for your unwavering support and sponsorship.

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# CHAPTER 1

## A CIVIC CALL FOR GLOBAL ONLINE COURSES

### Introduction

Online education might change college as we know it. And Massive Open Online Courses (MOOCs) have given us some idea of the tracks that higher education could be on. The first MOOC was launched in 2011 at Stanford University, which attracted over 160,000 participants from all over the world. Soon, more and more institutions followed to offer open online courses, such that in late 2015, 4,000 MOOCs have been counted.<sup>1</sup> MOOCs have been viewed as a threat that disrupts the walls of higher education.<sup>2</sup> However, since mid 2013, the hype around MOOCs has been flagging. Reasons are often attributed to inefficient income generation and ineffective cost reduction for universities due to their high production cost. As a consequence, MOOCs have come to be seen as unsustainable and the belief in their disruptive effect on higher education has tailed off.<sup>3</sup> Although the hype has slowed down, MOOCs have proliferated exponentially. While 100 MOOCs existed at the end of 2012, and 800 MOOCs were counted one year later, this number was to grow five-fold only within the following two years.<sup>4</sup> Richard A. DeMillo,

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<sup>1</sup> Ellen Wexler, "MOOCs Are Still Rising, at Least in Numbers," *Chronicle of Higher Education* (2015), accessed February 12, 2016, <http://chronicle.com/blogs/wiredcampus/moocs-are-still-rising-at-least-in-numbers/57527>.

<sup>2</sup> Steve Kolowich, "The MOOC Hype Fades, in 3 Charts," *Chronicle of Higher Education* (2015), accessed February 12, 2016, [http://chronicle.com/blogs/wiredcampus/the-mooc-fades-in-3-charts/55701?cid=at&utm\\_source=at&utm\\_medium=en](http://chronicle.com/blogs/wiredcampus/the-mooc-fades-in-3-charts/55701?cid=at&utm_source=at&utm_medium=en).

<sup>3</sup> Ibid.

<sup>4</sup> Wexler, "MOOCs Are Still Rising."

at the Georgia Institute of Technology, has commented: “That growth curve tells you volumes about the number of people that are seeing value.”<sup>5</sup>

The *Chronicle of Higher Education* article attributes the interest in MOOCs to the potential for obtaining credentials.<sup>6</sup> However, while many MOOCs are made for professional development, wherefore the certificate comes in handy, the recreational value of MOOCs should not be ignored. Many participants take MOOCs due to the sheer pleasure of learning, which is evident in the large number of participants who enroll in the course without gaining the certificate. For example, a study by Katy Jordan finds that the completion rate in MOOCs is barely 6.5 percent.<sup>7</sup> This is echoed in an analysis by Koutropoulos et al., who find that 86.7 percent of participants were lurkers or dropped out early.<sup>8</sup> According to the authors, lurkers “follow the course, look at the recordings, and browse the available course resources.”<sup>9</sup> This description suggests that the majority of participants had a genuine interest in the subject of the MOOC, rather than seeing the course as a means to a professional end. Only “active participants,” who completed all the assignments, indicated that they were going to use what they learned professionally.<sup>10</sup>

The great number of participants who do not work toward the certificate may be a sign that participants frequently enroll in courses for more recreational purposes. This observation justifies studying MOOCs as educational resources that have value beyond

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<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

<sup>7</sup> Katy Jordan, “Initial Trends in Enrollment and Completion of Massive Open Online Courses,” *International Review of Research in Open and Distributed Learning* 15, no. 1 (2014), <http://www.irrodl.org/index.php/irrodl/article/view/1651>.

<sup>8</sup> Apostolos Koutropoulos, Michael Sean Gallagher, Sean C. Abajian, Inge de Waard, Rebecca Joann Hogue, Nilgun Ozdamar Keskin, and C. Osvaldo Rodriguez, “Emotive Vocabulary in MOOCs: Context & Participant Retention,” *European Journal of Open, Distance and E-Learning*, no. 1 (2012): 3, <http://eric.ed.gov/?id=EJ979609>.

<sup>9</sup> Ibid, 2.

<sup>10</sup> Ibid, 3.

purposes of professionalization with the potential to educate well-rounded, free-thinking citizens in the tradition of the liberal arts. Besides their recreational use, MOOCs merit scholarly attention due to their potential in bringing together a student body from different parts of the world. Their scope makes MOOCs a particularly interesting study of civic education because it can train students from different parts of the world to deliberate about global exigences across distances. Hence, MOOCs provide an example of online education that should not immediately be regarded as another platform for vocational schooling. While professional development is important, it should not be the only standard by which online courses are designed and evaluated. This project sets out to respond to two pressing pedagogical concerns of our time: one, the question of a liberal arts education in an age of digital media, and, two, the question of offering an education that is relevant to increasingly interconnected, culturally diverse global communities.

This chapter begins with a review of connectivism as the pedagogical model through which MOOCs have been studied in online education journals. This review shall establish connectivism's insufficiencies in designing a more civic model of education for open online courses because it looks at discussion forums as information networks. In order to make my case for studying discussion forums as public communities, I will review the constituents of Isocratean liberal arts education. Thereafter, I provide a comparison of the different forms of affiliation that have been facilitated in oral and literate cultures, which set up my questions of studying digital technologies for how they promote the formation of communities. The central argument is that the study of digital discussion forums as public communities is enhanced by a consideration of presence, which is an affective perception that fosters affiliations.

## Connectivism – Studying MOOCs as Information Economies

As the name implies, massive open online courses are open to anybody who is registered with a MOOC provider, such as Udacity, edX, or Coursera. The largest provider is Coursera with an estimated bank of 16 million participants. A study conducted by Katy Jordan measured an average of 43,000 students to enroll per course,<sup>11</sup> three quarters of whom connect from places outside the United States.<sup>12</sup> MOOCs usually have a five-to-eight-week duration, and consist of weekly modules with online videos and reading material, online quizzes and essay submissions, peer evaluations, and a discussion forum. Course topics range widely, and despite the common attention to business administration and computer science subjects, the number of courses offered in the humanities was the largest in 2014 with 17 percent.<sup>13</sup> However, in 2015, the humanities came third (9.41%), and were surpassed by courses in business administration (16.8%) and computer science (9.74%).<sup>14</sup> Courses are offered by reputable research institutions, most of which are universities.

Most MOOC courses are highly specialized and serve personal and professional needs and interests in a wide variety of areas, such as health & nutrition, data mining, terrorism & counterterrorism, gardening, and computer science. Judging by the subjects, many courses seem to appeal to individual needs of self-enhancement. While personal development is an important component of an education, proponents of the liberal arts

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<sup>11</sup> Jordan, “Initial Trends in Enrollment Completion.”

<sup>12</sup> Harry Pence, “When will college truly leave the building: If MOOCs are the answer, what is the question?” *Journal of Educational Technology Systems* 41, no. 1 (2012-2013): 30.

<sup>13</sup> Dhawal Shah, “Online Courses Raise Their Game: A Review of MOOC Stats and Trends in 2014,” Class Central, last modified December 27, 2014, <https://www.class-central.com/report/moocs-stats-and-trends-2014/>.

<sup>14</sup> Dhawal Shah, “By the Numbers: MOOCs in 2015,” Class Central, last modified December 21, 2015, <https://www.class-central.com/report/moocs-2015-stats/>.

approach to education tend to foreground socialization as a central component of personal development. For example, at the center of Isocratean education was the improvement of culture (doxa) through mimetic practices of rhetoric.<sup>15</sup> Similarly, John Dewey believed that a strong civic education empowered autonomous and sovereign communities.<sup>16</sup> By contrast, by only looking at personal growth as a matter of acquiring information, we are missing the chance to advance the civic goals of a liberal arts education. It is necessary to study MOOCs for whether they yield potential for the kind of communal exchange that enables shared experiences and new forms of awareness.

Connectivism is the dominant pedagogical model that has been used to explain the collective learning potential of MOOCs. MOOC scholars have insisted that connectivism is the most suitable pedagogy for open networked learning because it best capitalizes on the network's information potentialities. However, connectivism does not account for the democratic and emancipatory goals of a liberal arts education because its model produces individual consumers and producers of information within a network. Connectivism is an attempt to capitalize on the opportunities of connections between participants and their information arsenals. It emphasizes the possibility of information exchange in a large grid of messages that are sent among innumerable participants. The learner's information literacy, defined as the learner's ability to filter through extraneous information in order to find, use, and reproduce content that is most relevant to the

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<sup>15</sup> Takis Poulakos, "Isocrates' civic education and the question of doxa," in *Isocrates and Civic Education*, ed. Takis Poulakos and David Depew (Austin: University of Texas Press, 2004), 52.

<sup>16</sup> John Dewey, "My Pedagogic Creed," *School Journal* 54 (January 1897):10.

Dewey believed that a strong education could replace laws to reach communal autonomy and sovereignty: "By law and punishment, by social agitation and discussion, society can regulate and form itself in a more or less haphazard and chance way. But through education society can formulate its own purposes, can organize its own means and resources, and thus shape itself with definiteness and economy in the direction in which to move."



learner's needs,<sup>17</sup> consists of aggregation, remixing, repurposing, and feeding forward.<sup>18</sup> For example, Kop, Fournier, and Mak write that the connectivist model of learning entails managing a "vast network of resources," which "requires learners to be autonomous in their learning and to have advanced analytic and synthesis skills to distill relevant information from the 'noisy' network."<sup>19</sup>

Connectivist scholars treat the discussion board as an information economy, through which users consume information, and which they feed information back into. According to MOOC founders Stephen Downes and George Siemens, "In connectivism, the starting point for learning occurs when knowledge is actuated through the process of a learner connecting to and feeding information into a learning community."<sup>20</sup> The simultaneous consuming and producing of information is captured in the term "produsage,"<sup>21</sup> which Anderson & Dron use to explain the process of information exchange. By studying the discussion board as an information market, its educational potential remains focused on information as something to be bargained and consumed based on the individual's personal and professional needs.

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<sup>17</sup> This is also called *Chaos Theory* in Inge deWaard, Sean Abajian, Michael Sean Gallagher, Rebecca Hogue, Nilgun Keskin, Apostolos Koutropoulos, and Osvaldo C. Rodriguez, "Using mLearning and MOOCs to understand chaos, emergence, and complexity in education," *The International Review of Research in Open and Distance Learning* 12, no. 7 (November 2011): 94-115.

C. Osvaldo Rodriguez, "MOOCs and the AI Stanford like Courses: Two Successful and Distinct Course Formats for Massive Open Online Courses." *European Journal of Open, Distance and E-Learning* (2012): 12.

Rita Kop, Helene Fournier, and John Sui Fai Mak, "A Pedagogy of Abundance or a Pedagogy to Support Human Beings? Participant Support on Massive Open Online Courses," *The International Review of Research in Open and Distance Learning* 12, no. 7 (November 2011): 75.

<sup>18</sup> Kop et al., "A Pedagogy of Abundance," 79.

<sup>19</sup> Ibid, 75.

<sup>20</sup> Rita Kop, and Adrian Hill, "Connectivism: Learning Theory of the Future or Vestige of the Past," *The International Review of Research in Open and Distributed Learning* 9, no. 3 (2008): 2.

<sup>21</sup> Terry Anderson and Jon Dron, "Three Generations of Distance Education Pedagogy," *International Review of Distance Education Pedagogy* 12, no. 3 (2011):88.

Hence, connectivism is a model that studies the network for its vocational purpose of retraining employees in a competitive and constantly changing labor market.<sup>22</sup> The process of filtering relevant information through an overflowing net of information and then reproducing novel content in return likens education to “information shopping” to meet private and professional needs and interests. A survey by deWaard et al. demonstrates that most mobiMOOC participants were following an autonomous program of study, thus “building their own mLearning project.”<sup>23</sup> In another survey, the authors found that 82 percent of mobiMOOC participants were using the information they acquired from the mobiMOOC at work.<sup>24</sup> Harry Pence reaffirms this trend in claiming that 75 percent of Udacity students “were looking to improve their skills relevant for either current or future employment.”<sup>25</sup>

This type of vocational training poses a departure from the liberal arts tradition of educating an empowered democratic people. Despite focusing on information acquisition, connectivist scholars are curiously convinced that MOOCs foster communities by pointing to social presence and affective language as important byproducts of network communication.<sup>26</sup> Kop, Fournier, and Mak acknowledge the importance of social presence in MOOCs, as “characterized by affective engagement, open communication, and a high level of personal address between participants.”<sup>27</sup> Koutropoulos, Gallagher,

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<sup>22</sup> For example, see Ignacio Aguaded-Gomez, “The MOOC Revolution: A new form of education from the technological paradigm,” *Comunicar* 41, no. 21 (2013): 8.

<sup>23</sup> deWaard et al, 101.

<sup>24</sup> Koutropoulos, Apostolos, Michael S. Gallagher, Sean C. Abajian, Inge de Waard, Rebecca J. Hogue, Nilgun O. Keskin, C. Osvaldo Rodriguez. “Emotive Vocabulary in MOOCs: Context & Participant Retention.” *European Journal of Open, Distance and E-Learning* (2012): 3.

<sup>25</sup> Pence, 30.

<sup>26</sup> Koutropoulos et al., “Emotive Vocabulary in MOOCs,” 2.

Kop et al., “A Pedagogy of Abundance,” 76.

Anderson and Dron, “Three Generations of Distance Education Pedagogy,” 88.

<sup>27</sup> Kop et al., “A Pedagogy of Abundance,” 77.

Abajian, deWaard, Hogue, Keskin, and Rodriguez have studied emotive vocabulary as a predictor for long-term commitment to the MOOC. Similar to Kop et al., they refer to social presence as “affective responses, interactive responses, and cohesive responses.”<sup>28</sup> However, these scholars remain silent on the pedagogical justification for affect and presence, treating affect as an “additional benefit” to learning rather than explaining its importance in the connectivist process of information acquisition. Kop et al., for example, make a clear distinction between social presence and cognitive presence, arguing that social presence is helpful in building trust and facilitating engagement with other participants, whereas cognitive presence fosters “exploration of ideas and points of view.”<sup>29</sup> Similarly, Koutropoulos et al. underscore the importance of emotive language and “social presence” for participation and commitment to a learner community, but the authors don’t explain the pedagogical value of these benefits. For Kop et al. and Koutropoulos et al., “social presence” seems to be a condition for “cognitive presence.” Connectivist scholars thus leave us with pure information “produsage” on the one hand, and affective communication as community-building on the other, without clarifying the relation between communities and their knowledge.

Despite the common praise of sharing knowledge, connectivist approaches actually produce very individualistic, self-serving learners. Although connectivism emphasizes interpersonal connections, these connections are but economies of information exchange, markets in which each participant consumes information to suit their own needs. By contrast, an education that centers on the cultivation of collective doxa would offer a model that effectively ties education to the needs of a community

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<sup>28</sup> Koutropoulos et al., “Emotive Vocabulary in MOOCs,” 5.

<sup>29</sup> Kop et al., “A Pedagogy of Abundance,” 78.

instead of individual needs of information. These communities would come together based on common interests that are have urgency.

### **Isocratean Liberal Arts Education**

Isocrates saw practical wisdom as a kind of knowledge that is acquired through mimetic styles of learning, and which is to improve the community through a sharing of valuable doxa. Isocrates' equation of practical wisdom with eloquence positions him philosophically between Plato and the Sophists. Whereas Plato had intended education to transcend doxa as mere opinion toward more theoretical knowledge, the Sophists saw doxa as a linguistic phenomenon that is relative to persuasive powers.<sup>30</sup> Isocrates wanted to enhance doxa by teaching his students resourcefulness and practical wisdom (phronesis) through the stochastic skill of aiming.<sup>31</sup> For Isocrates, not all proposed solutions and judgments were equal, but subject to an education that fostered the improvement of resourcefulness and practical wisdom. Unlike Plato's focus on universal truth, Isocratean doxa did not always turn out correct, as the best solutions do not always lead to the best outcome. The practical skill of observing timely constraints and opportunities, as well as past exemplars of eloquence still does not make possible the effective prediction of the future. Hence, Isocrates understood practical wisdom as a stochastic skill of aiming, rather than hitting.

Isocrates' insistence on phronesis and resourcefulness as necessary for the cultivation of valuable doxa kept him from associating with the Sophistic understanding of doxa as a purely linguistic phenomenon. Isocrates included phronesis in his definition

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<sup>30</sup> Takis Poulakos, "Isocrates' Civic Education and The Question of Doxa," 45.

<sup>31</sup> Ibid, 52.

of eloquence, which also distances him from Aristotle's classification of political wisdom as superior to eloquence. For Isocrates, eloquent speech entails practical wisdom because it observes the interests of the city. According to Takis Poulakos's description of Isocratean eloquence, "Wise people make the right decisions because they know how to align their judgments with the benefit of the city."<sup>32</sup> Hence, eloquence is defined as *logos* that uses practical wisdom by observing present *doxa*, which is the totality of collective experience and is itself the product of shared *logos*.<sup>33</sup> Speakers thereby engage in a constant mimetic cycle of transforming communal culture from within by proposing judgments and solutions based on current culture. Poulakos writes, "Through *logos*, the very conventions that propped up communal *doxai* as collective truths would eventually come under pressure, lose their stability, and become subject to refinement, redefinition, and change."<sup>34</sup>

Hence, *doxa* are unstable and subject to cyclical stages of reconstitution. Understanding *doxa* as undergoing constant transformation and contestation, Isocrates saw the purpose of civic education in making students wise so they can guide the polis through change from within. According to Poulakos, "His pedagogy in the constitutive power of *logos* thus created the possibility for guiding the community rhetorically by reconstituting its conventional *doxai* and by redefining its traditional truths."<sup>35</sup> Different from the Sophists, who saw the power of persuasion as a question of individual skill, Isocrates' attention to communal *doxa* renders *logos* an expression of the community

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<sup>32</sup> Ibid, 59.

<sup>33</sup> Ibid, 61.

<sup>34</sup> Ibid.

<sup>35</sup> Ibid.

through which it transforms itself. Through an Isocratean lens, civic speech takes on simultaneously deliberative and epideictic genres.<sup>36</sup>

A similar divergence between Sophistic and Isocratean models of civic education occurred in the 1920s with the turn from competitive debate to more collaborative discussion. Whether debate served a greater civic function beyond training students in the skills of clever argumentation regardless of the endorsement was a heated controversy in the years that followed the establishment of the communication discipline in 1914 and its struggles. With John Dewey's introduction of discussion as a more solution-oriented method, the discipline was able to restore its civic and democratic purpose without suffering the charges of teaching mere verbal skillfulness that would encourage in students a disengaged disposition for manipulation in order to win at all cost. As William M. Keith describes, "discussion (as it evolved) was a cooperative, problem-solving activity, as opposed to the conflictive, resolution-passing activity of debate."<sup>37</sup> Hence, Dewey's merging of communication with solution-oriented action revivifies Isocratean *phronesis*. Moreover, Dewey's discussion version of deliberation rested on a progressivist conception of knowledge as grounded in human experience rather than eternity.<sup>38</sup> This is pedagogically significant because a discussion-based education will take as its subject the concerns of the discussants. In explaining Dewey's method of discussion, he notes that learning in discussion groups is guided by the interests of the group: "The group is formed in response to a problem [...], and they must, logically, first discuss the problem,

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<sup>36</sup> Ibid, 65.

<sup>37</sup> William M. Keith, *Democracy as Discussion: Civic Education and the American Forum Movement* (Lanham: Lexington Books, 2007), 92.

<sup>38</sup> James T. Kloppenberg, *Uncertain Victory: Social Democracy and Progressivism in European and American Thought 1870-1920* (Oxford: Oxford University Press: 1986), 4.

explore it, discuss possible solutions, and seek a best solution, all things considered.”<sup>39</sup>

Further, Randolph Bourne, an early advocate of discussion in replacement of debate,

wrote, “A discussion will have been adequate if it has done no more than set the problem

in its significant terms, or even defined the purpose that makes such a setting

significant.”<sup>40</sup>

Similarly, Isocrates’ pedagogy challenged its students to study communal doxa, or, popular knowledge. In particular, students were to study popular speeches as exemplars of doxa, and imitate them as models of eloquence. By teaching rhetoric through this process of mimesis, speeches were guaranteed to likewise remain expressions of the community. According to Takis Poulakos, “Teaching philosophy entailed for [Isocrates] the task of cultivating phronesis on the basis of concrete cases of excellence in political deliberation, an excellence that students were expected to witness, marvel in, study, and learn from.”<sup>41</sup> Robert Hariman refers to mimesis as “creative modification,”<sup>42</sup> a practical approach that works from example rather than theory. Mimesis takes the study of rhetoric into the city and “its culture as the means and end of imitation.”<sup>43</sup>

Due to its reliance on mimesis, the Isocratean liberal arts model facilitates more collective modes of learning. By creating speech from speech, *logos politikos* becomes the voice of the polis and functions as collaborative invention. Hariman explains, “*No one speaker can speak the logos politikos*. It is the voice of the city: polyglot,

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<sup>39</sup> Keith, *Democracy as Discussion*, 106-107.

<sup>40</sup> Quoted in M. Ely, *Why Forums?* (New York: AAAP Press, 1937): 198.

<sup>41</sup> Takis Poulakos, 60.

<sup>42</sup> Robert Hariman, “Civic education, Classical imitation, and Democratic Polity,” in *Isocrates and Civic Education*, ed. Takis Poulakos and David Depew (Austin: University of Texas Press, 2004), 219.

<sup>43</sup> *Ibid*, 224.

multifaceted, and openly adaptive to a myriad of new circumstances.”<sup>44</sup> This collective style not only advances understanding but also reconstitutes communities. John Poulakos describes the effect of Isocratean education as a centripetal force, which shapes social realities and holds communities together. This centripetal effect comes as no surprise considering that Isocrates’ goal was to refurbish a panhellenic unification across local city states. This “unification meant to reverse the results of excessive pluralization.”<sup>45</sup> Whereas the Sophists had taught rhetoric as the skill of complete adaptation to local communities for enhanced persuasiveness, Isocrates wanted his students to be able to speak to larger audiences, and put different communities in conversation with one another for a greater panhellenic consciousness. John Poulakos describes Isocratean rhetoric as having the “fundamental mission [...] to unify divided political communities by articulating desirable visions and specifying common goals.”<sup>46</sup>

Similarly, today we are facing global political demands that seem to overwhelm national political capacities. At the same time, our digital technologies are organizing and morphing peoplehood in ways that transcend national boundaries. The Isocratean model is especially timely for educators who seek to cultivate intercultural exchange that allows students to leave their ethnocentric views behind and mindfully, wisely, and resourcefully learn to respond to the daunting global exigencies of today. Hariman writes that panhellenism required “a new class of political problems, and to create political harmony by expanding the horizon of politics, and to ensure cultural sustainability amidst large-

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<sup>44</sup> Ibid, 225.

<sup>45</sup> John Poulakos, “Rhetoric and Civic Education: From the Sophists,” in *Isocrates and Civic Education*, ed. Takis Poulakos and David Depew (Austin: University of Texas Press, 2004), 73.

<sup>46</sup> Ibid, 78.



scale forces of change.”<sup>47</sup> He portrays the Isocratean philosophy of political wisdom as a form of eloquence that could be cultivated through the practice of mimesis, which could build “global political concord to address those problems that individual states are incapable of solving on their own. These problems include ozone depletion, resource exhaustion, the distribution of wealth and scarcity, population growth and movement, and bio-extinction.”<sup>48</sup> He argues that “Isocratean education would be directed to developing citizens capable of acting together to solve these problems in a manner that would allow for mutually sustainable ecological, cultural, and political practices.”<sup>49</sup> Hence, Hariman calls for the extension of democratic practices across the society of states, “and it so happens that such extensions could be achievable objects of civic education.”<sup>50</sup>

Hariman does not offer a specific vision of how a global Isocratean education could be practiced. Nevertheless, in light of the transcultural scope of the digital media, present online education platforms should be analyzed for their potential to offer a kind of collective learning that fosters the formation of global democratic publics. In order to study the formation of affiliations in the digital media, it is important to understand how different communication technologies have produced different types of cultures and publics.

### **Oral, Literate, and Digital Cultures**

The invention of the phonetic alphabet expanded communities by loosening their ties to their immediate surroundings. Writing enabled a detachment from proximate

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<sup>47</sup> Hariman, “Civic Education, Classical Imitation, and Democratic Polity,” 228.

<sup>48</sup> Ibid.

<sup>49</sup> Ibid.

<sup>50</sup> Ibid.

referents and allowed language to travel over longer distances, thereby producing more homogenous and expansive cultures. Isocrates' school of rhetoric relied on speech writing, which was more suitable for his transcultural logos because writing could transcend the demands of the local audience and appeal to a panhellenic people.<sup>51</sup> According to John Poulakos, "Writing invited readers to follow arguments, not cadences; it solicited their thoughtful responses, not their participation in ritualized public performances. In so doing, it asked them to put aside their localistic pride, read [the rhetor's] texts, and ponder the possibility of a unified Hellas."<sup>52</sup> John Poulakos distinguishes the Sophists' dynastic goals of rhetoric as better accommodated by speaking, whereas Isocrates' hegemonic goals were better suited to writing.<sup>53</sup>

Harold A. Innis, Marshall McLuhan, and Walter Ong have written extensively about literacy as a technology that has served the growth of empires by prolonging and extending speech and increasing the scope of its audience. Indeed, Innis observes that "man's activities and powers were roughly extended in proportion to the increased use and perfection of written records."<sup>54</sup> He argues that the rise of empires was conditioned by the efficiency of written language: "The written word signed, sealed, and transmitted, was essential to military power and the extension of government. Small communities were written into large states and states were consolidated into empire. The monarchies of Egypt and Persia, the Roman empire, and the city-states were essentially products of

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<sup>51</sup> John Poulakos, 79.

<sup>52</sup> Ibid, 80.

<sup>53</sup> Ibid, 78. John Poulakos explains that the Sophists used a concept of rhetoric that suits personal ambitions whereas Isocrates used logos at a more institutional level to bring different communities together: "Isocrates rhetorical education was hegemonic in the sense that it attempted to harness the perilous powers of logos institutionally. His school became a place in which rhetoric could be housed and put in the service of his campaign for a panhellenic consciousness... that rhetoric's fundamental mission is to unify divided political communities by articulating desirable visions and specifying common goals."

<sup>54</sup> Harold A. Innis, *Empire and Communications* (Toronto: Dundurn Press Limited, 2007), 30.

writing.”<sup>55</sup> Similarly, McLuhan writes about the phonetic alphabet as replacing a priestly authority with a military power. He writes:

The alphabet meant power and authority and control of military structures at a distance. When combined with papyrus, the alphabet spelled the end of the stationary temple bureaucracies and the priestly monopolies of knowledge and power. [...] All this is implied in the myth of about Cadmus and the dragon’s teeth, including the fall of the city states, the rise of empires and military bureaucracies.<sup>56</sup>

McLuhan further explains that the phonetic alphabet had universal application value regardless of culture because it broke down knowledge into miniscule, meaningless parts. This “breaking-up of every kind of experience into uniform units in order to produce faster action and change of form (applied knowledge) has been the secret of Western power over man and nature alike.”<sup>57</sup> The phonetic alphabet was applicable in different languages and could travel over distances because it transcribed sound into visual signs by which it became separated geographically from the signifier. However, this separation of sign from signified also detached language from its immediate lifeworld, making it more abstract and homogenous. In McLuhan’s words, “The phonetic alphabet, by a few letters only, was able to encompass all languages. Such an achievement, however, involved the separation of both signs and sounds from their semantic and dramatic meanings.”<sup>58</sup>

While the phonetic alphabet has enabled the transmission of messages across distances, it has also detached information from the body and should therefore be considered a technology that has fundamentally undermined traditional processes of affiliations based on physical presence. By contrast with the phonetic alphabet’s effects

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<sup>55</sup> Ibid.

<sup>56</sup> Marshall McLuhan, *Understanding Media* (Cambridge: MIT Press, 1994), 82-83.

<sup>57</sup> Ibid, 85.

<sup>58</sup> Ibid, 87.

of abstraction, oral speech is tied to concrete, local affairs because it is sound-based, which makes it ephemeral and immediate or timely. Hence, oral speech addresses audiences that are directly involved in and affected by specific situations. Innis describes sound as having an indispensably affective dimension: “The spoken word was in its origins a half-way house between singing and speech, an outlet for intense feelings rather than intelligible expression.”<sup>59</sup> Hence, sound reaches its audience physically and stirs up feelings. Literally, sound reaches the body through sound waves, whose resonance can stir up bodily reactions in the audience. Sound is therefore a form of touch that explains oral speech as an undeniably sensual and affective phenomenon. Oral speech has presence, which is the rhetorical art of producing affective energy by communicating via sensual perception and making the abstract become concrete.

Due to its sensual, affective impact, presence generates perception and awareness, which is central to a civic education. Besides representing primordial stages that precede the learning stages of knowing and understanding, perception and awareness are essential to a democratic, civic education because they allow students to become more affectively involved in the learning process and empower students to attend to matters that affect their lives. If objects of study were to obtain a greater degree of presence, we would be able to devise more civic, liberal arts models of education that effectively combined affective forms of attention and curiosity with the more scholastic emphasis on analytical, detached forms of studying. By considering matters that have presence in the lives of the students, an education does not only become more civically and politically relevant, but

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<sup>59</sup> Innis, *Empire and Communication*, 28.

promotes models of education that cultivate affiliations, communities, and publics based on shared affect.

Chaim Perelman and Lucie Olbrechts-Tyteca have defined rhetoric as “the art of creating presence.”<sup>60</sup> They write that presence is that which is “foremost in our minds,” whereas “that which loses in importance becomes abstract, almost nonexistent.”<sup>61</sup> In oral cultures, the immanent contact between communicators and their surroundings has a major influence on what has presence by way of physical location. However, the detachment of literate cultures from the lifeworld and from other people requires communicators to employ stylistic choices that enhance the presence of particular doxa or phenomena. Perelman and Olbrechts-Tyteca rely on Richard Weaver’s definition of rhetoric as “an art of emphasis,”<sup>62</sup> to theorize presence as evoking the attention of an audience which can be manipulated by the speaker’s stylistic choices. Although recognizing presence as a matter of emphasis, Perelman & Olbrechts-Tyteca do not explicitly develop presence as an embodied, affective form of knowing. Nevertheless, they acknowledge the affective powers of presence as building sympathies and affiliations by pointing to a Chinese parable: “A king sees an ox on its way to sacrifice. He is moved to pity for it and orders that a sheep be used in its place. He confesses, he could see the ox but not the sheep.”<sup>63</sup> The parable illustrates the potential of presence for building affiliations based on taking on a shared position, or, a shared presence. As evident in this parable, sympathy is an emotion that flourishes through approximation and perspective-taking.

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<sup>60</sup> Chaim Perelman, *The Realm of Rhetoric* (Notre Dame: University of Notre Dame Press, 1982), 37.

<sup>61</sup> Ibid, 36.

<sup>62</sup> Ibid, 37.

<sup>63</sup> Chaim Perelman and Lucie Olbrechts-Tyteca, *The New Rhetoric: A Treatise in Argumentation* (Notre Dame: University of Notre Dame Press, 1969), 17.

Presence is indispensable to the development of communities because it allows communicators to develop affiliations based on a sharing of affect. While oral cultures have presence by nature of the physical proximity among communicators, literate cultures have to employ sophisticated styles of repetition and amplification to build emphasis, attention, and emotion in ways that promote affiliation. That which is present to all communicators invites them to share a particular position, point of view, or perspective, which promotes affiliation based on proximity. As in Perelman and Olbrechts-Tyteca's Chinese parable, the king's attention to ("seeing") the ox allowed him to sympathize with the animal as a way of taking on the animal's position based on sheer attention. A shared attending brings a community into existence based on a shared position and presence. Specifically, a collective attending to the same problems or issues brings together a political community, or, public.

The presence of public problems implies a sharing of attention attributed to these problems. The collective attention to shared problems is a rhetorical process that happens in more or less democratic styles. The more distributed the problem, the more democratic is the public that comes into existence. John Dewey defines a public by a sharing of indirect consequences, proposing that problems need to affect a larger group of people, who are not all directly and immediately impacted, but who yet have a stake in the way the problem is managed. He writes, "The line between private and public is to be drawn on the basis of the extent and scope of the consequences of acts which are so important as to need control, whether by inhibition or by promotion."<sup>64</sup> Dewey's distinction between public and private groups based on the popular extent of consequences demands a sharp

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<sup>64</sup> John Dewey, *The Public and its Problems* (Athens: Swallow Press, 1927), 15.

attention to the different communication technologies as extending the scope of the rhetorical styles by which certain problems are made present.

Besides oral and literate styles of communication, digital communication should be examined for how it builds real communities based on presence, rather than mere information networks. While connectivist scholars Kop et al. and Koutropoulos et al. have attended to social presence on digital discussion boards, they have yet to draw a relation between emotive vocabulary, social engagement, and learning. Hence, my dissertation seeks to answer whether and how presence is built on digital discussion forums. Understanding presence as a rhetorical art of emphasis and a technique of creating awareness, a pedagogical consideration of presence allows us to devise civic models of education that understand learning as a political process of creating knowledge from that which is affectively perceivable. A consideration of presence allows us to see knowledge as more than information processing in a network, but as *doxa*, with affective and political significance. Presence is a necessary component of a liberal arts education because it allows students to consider *present* (timely and specific) circumstances in order to lead the community toward valuable *doxa* and wise solutions. Moreover, presence is especially important to online learning because it helps overcome the physical distance of communicators by inviting a shared attention to the same matters and questions.

Research Focus: Observing that digital **discussion**<sup>65</sup> relies on silent, literate media on the one hand, and instantaneous and massive

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<sup>65</sup> This dissertation treats discussion as a general term that encompasses different types of deliberation, such as debate and cooperative problem-solving, as well as additive and repetitive styles of discourse. In other literature on civics education, the term “discussion” has been used to specifically denote a Deweyan

participation on the other, this project seeks to answer whether and how presence can be created on digital discussion forums.

Based on an understanding of the ways of building presence in digital discussion forums, it may be possible to understand what kind of digital affiliations are produced and how they stand in relation to knowledge. It is important to understand the relation between knowing and being in order to develop a civic model of education. For example, literacy has produced analytic forms of learning due to its detachment of the visual sign from the lifeworld, which facilitated a separation of knowledge from the learner. The world as a visual object made possible its organizing into abstract categories that are subject to quiet analysis and reflection. Walter Ong posits that writing is the most drastic technology in human history that “initiated what print and computers only continue, the reduction of sound into quiescent space, the separation of the word from the living present where alone spoken words can exist.”<sup>66</sup> Further, Innis points out the binary distance between the visual object and the idea as the product of analysis: “The idea of things became differentiated from things and the dualism demanded thought and reconciliation.”<sup>67</sup> As an analytical undertaking, learning became privatized and individualized, which is what we today know as “studying.”<sup>68</sup> Analysis establishes a distance between the learner and knowledge, and produces theoretical ideas which are able to be stored over time as text. McLuhan emphasizes that the timelessness of literate knowledge is the result of the visual distance between knowledge and the learner, such as the distance between the text and its reader is a shield from the affective enticement of

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solution-oriented discourse marked by collaboration and reflectiveness, i.e. in William M. Keith, *Democracy as Discussion*.

<sup>66</sup> Walter Ong, *Orality & Literacy: The Technologizing of the World* (London: Methuen Press, 1982), 82.

<sup>67</sup> Innis, *Empire and Communication*, 31.

<sup>68</sup> Ong, *Orality & Literacy*, 9.



speech: “Only the phonetic alphabet makes such a sharp division in experience, giving to its user an eye for an ear, and freeing him of the tribal trance of resonating word magic and the web of kinship.”<sup>69</sup> Due to the analytic distance between reader and knowledge, written cultures are more likely to produce communities that pivot around expertise, hence, scientific communities.

By contrast with the distancing between reader and literate knowledge as the text, oral cultures facilitate a more participatory learning that is marked by the invitational character of sound. Ong describes speech through the Hebrew word “dabar,” which means both event and word.<sup>70</sup> It is the eventfulness of speech-as-sound that invites participation and produces place and community. It is impossible to not hear a sound, unless you are physically absent. Since speech-as-sound is tied to location, it produces a kind of knowledge that becomes meaningful through its immediate connection to a concrete situation. Hence, Ong explains that learning in oral cultures occurs by “achieving close, empathetic, communal identification with the known.”<sup>71</sup> He elaborates that “oral folk assess intelligence not as extrapolated from contrived textbook quizzes but as situated in operational contexts.”<sup>72</sup> Whereas literate cultures redefined learning by the more solitary activities of reasoning and analytics, oral cultures practiced a type of learning that was not just tied to problem-solving in particular situations, but communal by way of its invitational style. Both modes produce different publics: Literacy is more likely to produce a community of intellectuals and orality is more likely to produce a participatory lay public. Since the literate age has driven us into more and more

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<sup>69</sup> McLuhan, *Understanding Media*, 84.

<sup>70</sup> Ong, *Orality & Literacy*, 31.

<sup>71</sup> Ibid, 45.

<sup>72</sup> Ibid, 55.

specialized fields of experts, the educational and communicative challenge in the digital age is to create a conversation among experts and lay people to address the concrete exigencies of our time.

Research Question: Understanding oral speech as bringing a community together through eventfulness (dabar) or sound, and literacy as creating separate groups of experts, what kind of affiliations do digital discussion forums create?

Further, whereas literacy separates the text from the communicators, orality brings speaker, speech, and audience together in time and location.

Research Question: Observing that digital discussion forums rely on visual symbols that are used instantly and simultaneously, what kind of author-text-audience relation do digital discussion forums create?

The participatory, eventful relation to speech in oral cultures contrasts with the more distanced relation to the text in literate cultures by producing different styles of composition. Through the separation of the visual sign from the lifeworld in a logic of representation, learning has become a more analytic activity that makes possible more linear patterns. The detachment from the text gives authors time to carefully plan the text's unfolding before the writing, and follow a story or argument to its end. Ong notes that especially print media are self-contained and linear: "Print encourages a sense of closure, a sense of what has been found in a text has been finalized, has reached a sense of completion."<sup>73</sup> Completion is the product of a single author,<sup>74</sup> whose solitude shields

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<sup>73</sup> Ibid, 132.

her from any affiliative distractions that may disrupt the careful meditation over logical sequences. McLuhan writes, “Only alphabetic cultures have ever mastered connected linear sequences as persuasive forms of psychic and social organization.”<sup>75</sup> However, McLuhan cautions that our “linear structuring of rational life”<sup>76</sup> has led us to falsely accept all linear sequencing as implying logic or reason. However, human reasoning is not a linear, but an additive process: “In Western literate society, it is still plausible and acceptable to say something ‘follows’ from something, as if there were some cause at work that makes such a sequence. [...] The sequential is merely additive, not causative.”<sup>77</sup> Similarly, Perelman and Olbrechts-Tyteca have challenged the possibility of logical sequencing as reaching a universal audience. In literate societies, such as nation states, which extend over culturally diverse regions, the rational sequencing of ideas has often been assumed to reach a more timeless audience that can follow the text to its conclusion regardless of its local affairs and interests. While Perelman and Olbrechts-Tyteca have questioned the possibility of a universal audience by treating it as the speaker’s construction, they refer to its philosophical ideal of “absolute and timeless validity, independent of local or historical contingencies.”<sup>78</sup> Although linear textual patterns are not formally logical, they can offer a more coherent correspondence that builds scientific knowledge. Chapter Two, for example, illustrates how scientific communities produce more linear discussion threads by way of responding directly to preceding contributions through answers, elaborations, challenges, and confirmations.

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<sup>74</sup> Ibid, 101.

<sup>75</sup> McLuhan, *Understanding Media*, 85.

<sup>76</sup> Ibid.

<sup>77</sup> Ibid.

<sup>78</sup> Perelman and Olbrechts-Tyteca, *The New Rhetoric*, 32.

Additive and repetitive patterns are usually attributed to oral cultures due to their instantaneous and participatory styles of speech composition. Ong observes that oral speech often flows in additive, aggregative, and repetitive patterns.<sup>79</sup> Unlike writing, oral communication is unplanned and instant, which leads communicators to add to previous speech without careful meditation of its logical connection, or without the memory to prevent communicators from reiterating what has already been said. While Ong suggests that the physical presence of communicators may lead them to engage in more dialogue and become more additive and repetitive as a consequence, Perelman and Olbrechts-Tyteca argue that repetition and amplification are stylistic choices that build presence: “Repetition is important in argumentation, whereas it is of no use [superfluous] in demonstration or scientific reasoning in general. Repetition can act directly; it may also accentuate the breaking up of a complex event into separate episodes which, as we know, promotes the impression of presence.”<sup>80</sup> Further, they highlight amplification as a style that builds presence through the “oratorical development of a theme,”<sup>81</sup> or through the “enumeration of parts.”<sup>82</sup> Interestingly, Perelman & Olbrechts-Tyteca suggest that repetitive patterns can promote the “impression” of presence regardless of whether the speakers are in close or distant relation from each other, and they seem to imply that repetition and amplification are the stylistic choices of an individual speaker. Hence, presence can be established even in more literate forms of composition by choosing repetition and amplification to add emphasis. This suggests important considerations when studying presence and affiliations on digital discussion forms:

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<sup>79</sup> Ong, *Orality & Literacy*, 36-41.

<sup>80</sup> Perelman & Olbrechts-Tyteca, *The New Rhetoric*, 174-175.

<sup>81</sup> Ibid, 175.

<sup>82</sup> Ibid, 176.

Research Question: Observing that digital, networked communication uses visual symbols in combination with a participatory style, what kind of patterns do digital discussion forums create? Can presence be shared and produced collaboratively through the patterns of repetition and amplification?

### **The Study**

In light of the project's interest in presence, community formation, and authorship, a rhetorical analysis is appropriate for the study of digital discussion forum. Specifically, I use a close-textual rhetorical analysis to study the circulation of linguistic symbols for their constitutive and materialist functions in shaping collective experiences and bringing a people into existence.

The discussion forums from three different MOOCs in the areas of evolutionary biology, public health, and global warming were analyzed for the patterns through which massive textual contributions produced different kinds of communities. Since this study is interested in the patterns that draw participants to produce collaborative compositions, the analysis has been limited to discussion threads with a minimum of ten posts in the evolutionary biology and the public health MOOCs, and a minimum of 20 posts in the MOOC on global warming.<sup>83</sup> This amounted to 86 discussion threads with 13 threads from the MOOC in the evolutionary biology, 38 threads from the MOOC public health, and 35 threads from the MOOC on the global warming. Around 500 pages of text were

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<sup>83</sup> The MOOC on global warming had a more active rate of participation in the discussion forum than the other two MOOCs, with 35 threads having a minimum of 20 posts. Due to the enormous scope of this text, analysis has been limited to those 35 threads, as well as a few single-post threads for contrast and comparison.

examined using a close textual analysis that was focused on how the posts cohered, and how these connections were able to constitute different types of learner communities.

Close-textual analysis is a methodological approach to rhetorical messages that is grounded in the empirical study of a specific text. In neo-Aristotelian studies, this approach has been used to study rhetorical messages as strategic, deliberate uses of Aristotle's three persuasive appeals, ethos, pathos, and logos. In what they describe the "neo-classical" methodological approach, Leff and Mohrmann make an important distinction from close-textual literary studies by taking into consideration elements from the rhetorical situation and genre. They explain, "As opposed to the nominalism implicit in neo-Aristoteliansim, genre theory permits an abstract conception of audience and rhetorical situations."<sup>84</sup> The authors analyzed Abraham Lincoln's Cooper Union Address and evaluated his persuasive strategies, as well as style and arrangement, in terms of the genre (deliberative campaign speech), the goal (present himself politically moderate), and the audience (Northerners) of the speech.<sup>85</sup> The consideration of these situational elements lets the authors draw critical judgments of the speech's effectiveness at the end of their analysis. Edwin Black has offered a critique of neo-Aristotelian mode of criticism, arguing that it falsely assumes that critics can derive a persuasive purpose from the text itself,<sup>86</sup> that rhetoricians can make rational choices when composing the text,<sup>87</sup> and he disputes that critics need to understand the text's intention within a larger social context.<sup>88</sup>

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<sup>84</sup> G. P. Mohrmann and Michael C. Leff, "Lincoln at Cooper Union: A Rationale for Neo-Classical Criticism," *Quarterly Journal of Speech* 60, no. 4 (1974): 459.

<sup>85</sup> Ibid, 459-467.

<sup>86</sup> Edwin Black, *Rhetorical Criticism: A Study in Method* (New York: Macmillan, 1965), 16.

<sup>87</sup> Ibid, 33-34.

<sup>88</sup> Ibid, 33.

My dissertation does not account for the genre, purpose, or listeners, because the text of analysis is not the work of a single orator or author, but the collaborative composition of a community-in-progress. With a massive number of authors, the text cannot be studied in terms of its intentional production, but rather as a product that is always in process. This project uses close-textual analysis to study the formal elements of the discussion thread, such as its arrangement patterns, with the intention to identify the types of affiliations and knowledge that are produced through collaborative modes of composition. The study was conducted based on the assumption of that a collaborative patterns of composition have constitutive effects. As part of my analysis, I first read all of the threads that had the minimum number of 10 posts (20 posts in the MOOC on global warming). By studying the different types of interactions within the different MOOCs, I was able to discern the compositional trends that overlapped across different types of fields, and those that were distinctive. I originally grouped the posts into the most obvious categories of linear, additive, and repetitive patterns. Upon re-reading the threads, I broke up each category and re-organized it. The final categories reported here represent groupings into over-arching functions, such as increased understanding, generation ideas, and building affiliations. In addition, each category is broken down into subtypes, such as cooperative and competitive discussions styles in linear-responsive threads, problem amplification, problem resolutions, scientific speculations, and additive argumentation in additive threads, and affiliation based on shared problems, based on shared accusations, and based on shared activism in Chapter Three on mimetic repetition. Appendices are provided in each of the chapters to illustrate these trends.

The MOOC titled Emergence of Life on evolutionary biology was offered by the University of Illinois Urbana-Champaign from October to December of 2014. Professor Bruce W. Fouke and his team of assistants provided informative videos that chronologically presented the unfolding of the tree of life from the first cell to the modern era in eight weeks. The English-language course entailed additional readings, regular quizzes, papers, and specific discussion topics for each week.

The six-week long MOOC titled “An Introduction to Global Health,” was offered by the University of Copenhagen and covered different topics related to public health, ranging from infectious diseases, noncommunicable diseases, reproductive health, environmental health, and mental health. The English-language MOOC ran between November and December of 2014. Professor Flemming Conradsen and his team used video lectures and interviews, additional reading material, quizzes, and the discussion forum.

The MOOC titled “Turn down the Heat – Why a 4-Degree Warmer World Must Be Avoided” ran for five weeks in June of 2015 and attracted over 6,000 participants from all Spanish-speaking countries in Latin America. As the first Spanish-language MOOC on climate change, it reached lively participation in the discussion forum, with over 100 threads and around 5,000 posts in the first four weeks of the course.<sup>89</sup> The MOOC was designed during the December 2014 Latin American and Caribbean Chapter of the Global Report on Climate Change in Washington, D.C., which took place in response to a 2012 report by the World Bank in which it was concluded that the Earth will reach a 4-degree-Celsius temperature increase by the end of this century if no

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<sup>89</sup> Pablo Benitez, Incae Business School (Costa Rica), *Bajemos la temperatura: enfrentar la nueva normalidad climatic*, Youtube (live stream event) 3:39 min, July 3, 2015, <https://www.youtube.com/watch?v=Mj4I6GA8MxY>.



reduction in greenhouse gas emission is reached.<sup>90</sup> One of the main consequences of this 4-degree increase is the developmental hardship that affects developing regions in response to an exponential increase in natural catastrophes. Latin America is projected to struggle with extreme heat events in 90 percent of the continent, extreme droughts in the Amazonian basin, a complete disappearance of the Andean glaciers, frequent hurricanes of the categories 4 and 5 in Central America, and rising sea levels with damaging effects on the large bay cities of Rio de Janeiro, Brazil, and Barranquilla, Colombia.<sup>91</sup> The goal of the MOOC was to enhance scientific understanding of the phenomenon of climate change and facilitate political activity.<sup>92</sup>

### **Preview of Chapters**

The first chapter draws from the scientific MOOC on evolutionary biology and the political MOOC on public health in order to show how specific hypotheses and research questions tend to produce what I am calling linear responsiveness among participants. The chapter shows how linear patterns tend to filter participation based on expertise and therefore produce scientific communities. Linear discussion facilitates a mutual learning among participants.

The second chapter draws from the MOOC on evolutionary biology, the one on public health, and the one on global warming. It shows how what I am calling additive discussion patterns generally respond to more open questions and tend to function as an

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<sup>90</sup> Mauro Azeredo, “‘New climate normal’ poses severe risks to development in Latin America and the Caribbean,” *The World Bank*, last modified December 2, 2014, <http://www.worldbank.org/en/news/press-release/2014/12/02/new-climate-normal-poses-severe-risks-to-development-in-latin-america-and-the-caribbean>.

<sup>91</sup> Ibid.

<sup>92</sup> Benitez, *Bajemos la temperatura: enfrentar la nueva normalidad climatic*.

inductive process of generating ideas based on open participation. Specifically, this chapter highlights the educational benefits of collective brainstorming as a way of solving common problems or gaining a more multifaceted understanding of particular problems or situations. Additive discussions can foster a kind of collective phronesis or resourcefulness, which is central to Isocratean education.

The third chapter draws exclusively from the MOOC on global warming to argue that mimetic repetition produces public affiliations. The chapter looks at mimesis as an affective resonance that allows participants to come together as global publics with common needs and problems. The chapter also looks at the repetition of common accusations as ways for global publics to position themselves against a common agent.

## CHAPTER 2

### EMERGENCE OF SCIENTIFIC COMMUNITIES IN LINEAR DISCUSSION PATTERNS

#### **Introduction**

The quality of online discussions is often judged based on how well participants respond to each other's comments. This chapter provides an analysis of the level of responsiveness in discussion threads that occurred in a MOOC on evolutionary biology, titled *Emergence of Life*, and a MOOC on public health titled *Introduction to Global Health*. The chapter explicates the finding that responsiveness is more prevalent in scientific discussions<sup>93</sup> that seek to expound on a specific field of knowledge.

In these two MOOCs, scientific hypotheses and arguments are often followed by comments that carefully observe the statements made in the previous posts by either challenging or elaborating on them. Hence, proposing specific hypotheses or arguments prompts more linear coherences of posts that consist of cooperative and competitive modes of collectively producing knowledge among participants. By linear coherence, I do not mean to imply that the threads are logically deductive, but that they contain comments that respond to posts that closely precede them. Moreover, linear sequences

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<sup>93</sup> I am using the term "discussion" as more general term that includes cooperative deliberation and competitive debate. The first part of this chapter includes two sections on cooperative and competitive responsiveness, respectively. For the purposes of this chapter, "debates," or, competitive patterns, fall under the more general term of "discussion." So, I am not using "debate" and "discussion" as exclusive terms to describe competitive debate as distinct from solution-oriented, reflective deliberation, which is how the term "discussion" has been used in other civics education context, such as in Keith's book *Democracy as Discussion*, 89-93.

are maintained and managed by participants who take on discussion leadership over the thread. Participation in discussions about specific hypotheses or arguments is often exclusive to participants with a higher level of expertise in order to offer comments that coherently respond to the subject matter introduced in previous post(s). Due to the knowledge constraints, linear discussion patterns involve a limited number of participants who each have more control over the direction of the thread. Compared to the massive participation in the additive and repetitive patterns discussed in Chapters Three and Four, the limited number of participants share a greater portion of authorship over the thread, which may facilitate its linear unfolding.

Linear sequences are rare occurrences on open online discussion forums. Nevertheless, they are valuable because they connect participants through a sharing of knowledge that integrates them into scientific communities. Cooperation and competition are both collective modes of knowledge production that respond to questions of uncertainty (confirming or challenging hypotheses/arguments) and are fueled by curiosity, love for speculation, provocation, and power. Since linear patterns do not often develop, this chapter focuses on the six exemplars of discussion threads that consistently maintained responsiveness throughout the discussion threads. Linear responsive patterns usually follow the presentation of specific hypotheses, and unfold in the cooperative styles of agreement, paraphrases, deductions, elaborations, and answers, as well as the competitive style of debate. Moreover, linear patterns are often maintained by the active responsiveness of distinct participants, who take on negotiative or authoritative leadership styles. I provide a discussion at the end of the chapter that includes the pedagogical relevance of this analysis.

## Responsiveness Follows Specific Hypotheses

Linear discussion patterns are rare, but occur in response to a specific hypothesis, question, or argument. All six discussion threads displayed in the appendices are set off by research questions and hypotheses that trigger a more linear style of correspondence. In order to confirm or reject a hypothesis or argument, expert knowledge is required. For example, in Appendix 2.b, a participant argues that bacteria and eukaryotes live in symbiotic relationships, illustrating how humans, for example, derive health benefits from presenting a habitat for certain bacteria. Knowledge about insect reproduction and genetics is required for participation in this discussion, as exemplified in this response:

As an additional comment, I'd like to express you my interest on one of the examples you displayed: today's role of the bacterium *Wolbachia* on insects' life. This bacterium is able to induce a curious mechanism for reproduction on the insects they infect: after being infected, female insects only give origin to other female insects. Moreover, some studies have showed that the symbiotic relationship they develop -in most of cases- gives to the infected insects a better "fitness". This would represent, maybe, an evolutive advantage. This mechanism of reproduction is related to the parthenogenesis (a way of reproduction trough the one a female organism originates offspring from not-fertilized eggs) and it occurs not only on procaryote organisms, but in eucaryote such us reptilian and some specific birds. This topic is really exciting and you showed us some important references and opportune information!

The respondent here develops the example of the symbiosis between the *Wolbachia* bacteria and the insect by observing the curious effects that the bacteria have on the insect's offspring. Another example of a linear discussion pattern from the Emergence of Life MOOC (Appendix 2.c) starts with the observation that there is no physical mechanism that we know of today that drives inflation, which is the expansion of the universe. This observation is followed by the question, what drives inflation, and the

hypothesis that energy causes space to expand. The respondents who question this hypothesis and respond to the question require an understanding of particle physics and metaphysics, as evident in this sample response:

Thanks for such a thought provoking post.

Inflation seems to be the accepted theory for the present. I can't say I understand the physics about it. . Popular Physicist Sean Kelly argues that the rate of expansion during inflation needs to be very precisely within a perfect rate. It is commonly called a fine-tuning problem. When all cosmological histories are counted, inflation only occurs in  $10^{-\exp(6.6 \times 10^7)}$  (1). An extremely infrequent event in simulations.

Also, is this big bang inflation related to the current expansion of the universe due to dark energy? Where does the universe get the energy to drive expansion today?

What energy could account for the expansion? Is the first law of Thermodynamics still true when all galaxies are traveling away from each other at an accelerated rate.

(1) Unitary Evolution and Cosmological Fine-tuning. Sean Carroll,  
<http://arxiv.org/abs/1007.1417>

Specific hypotheses are more likely to trigger linear discussion patterns also in the MOOC on public health (Appendix 2.e). Here, the initial poster argues that Nigeria is not making satisfying progress toward improving reproductive health, stating: “Although in recent time, there has been an increase in awareness on sexual and reproductive health issues, however there is still much to be done.” The defense or refutation of this argument requires knowledge of the current reproductive health situation in Nigeria. Hence, the second poster writes:

Amongst other points you mentioned above below are also some barriers or problems;

Getting access to good and proper health care especially those in the hard to reach areas

Conversion of provided items or materials to personal use or sale of such items  
Reluctance of Health Staff giving injectibles to expectant and or nursing mothers and sick children

Out break of violence, Crises and or Conflict making reaching the hard to reach areas difficult or impossible etc.

A similar argumentation evolved about India's progress in the area of reproductive health in the Appendix 2.f.

The expertise required for responding to a specific argument or hypothesis guarantees a more linear unfolding of discussion patterns with posts that directly respond to the preceding comments. The responsiveness that emerged through the presentation of specific hypotheses or arguments did not necessarily take on the competitive style of debate. Generally, cooperative and competitive styles of linearity both occurred on digital discussion forms.

### **Cooperative Learning Patterns**

Cooperative learning occurred when participants accepted a proposed hypothesis or argument. Hence, cooperative discussion represented more or less direct statements of confirmation, and reflected various degrees of engagement with and evaluation of the preceding statements. Cooperative patterns were marked by responsiveness that can take on different forms on a scale between repetitiveness and additiveness. Expressions of agreement, paraphrasing, and deductions were more repetitive forms of confirmatory statements, and elaboration and answering represented more additive forms of confirmation. It is important to note that cooperative linear responsiveness was characterized by a mix of repetitive and additive statements that actively engaged closely preceding posts. This is why linear discussion patterns are more likely to occur in response to scientific questions and hypotheses.

### *Repetitive Responsiveness: Agreements, Paraphrases, and Deductions*

Agreements are explicit statements of confirmation that constitute a form of repetition because they restate previous claims without adding new information. However, they enhance understanding by confirming the validity of previous statements, and they also have a strong potential for building affiliations among participants. For example, Jacob Leach relies on Lynn Margulis's Gaia Hypothesis in order to make the claim that "Gaia is an emergent property of the interaction among organisms." In response, Tom reconfirms him, writing, "Though I have read a number of Lovelock's books and liked what he says I have never felt that self-regulating was what was happening; emergent is a much better term." Later in the thread, participant Tanya Galdo restates, "It does sound to me as Jacob said above. Organisms living together (symbiosis) new organisms 'emerge' from this cooperative relationship (syntrophogenesis)." These examples of agreement illustrate the potential for affiliations between Leach and Galdo, and Leach and Tom, based on the reinforcement of Leach's claim.

Although agreements can increase certainty of a claim, they don't necessarily build understanding. For example, on the thread on reproductive health in Nigeria (Appendix 2.e), statements of agreement are made at the beginning of the majority of posts, as in "Of course Emmanuel the points you have raised are actually true," or "@Emmanuel and Tope! You are very right," or "Yes these seem to be the common problems of most countries." These types of agreements confirm a statement without paraphrasing it. Although they don't build additional understanding, agreements have the potential for affiliations to emerge among participants, even if participants differ in opinions. This thread on Nigerian healthcare is particularly interesting due to its



extraordinary amount of expressions of agreement compared to most other threads. The names of the participants and their detailed knowledge of Nigeria's health status may be a sign that the participants are from Africa, where expressions of affiliation may be more normative.

Paraphrasing expressions also have potential for affiliation among participants, because they likewise provide confirmations. Paraphrases are forms of repetition that allow participants to strengthen their understanding of a statement by putting it in new terms. Just like agreements, they build the credibility of preceding claims. A good example of paraphrasing comes up in the same thread on life-earth feedback. Peter Volkers posts that humans are the "first species to have a consciousness of the earth-life feedback mechanisms," which is followed by Leach's paraphrasing of, "We are certainly the first with language and symbolic logic (on earth, probably not in the universe)." Jacob Leach paraphrases Volkers's claim by using new terms about language and symbolism, while he also builds upon Volkers's claim with more specificity. In another example from the thread Big Guys and Small Guys, a participant paraphrases Vick's central argument that bacteria make up a large part of the human body and largely influence its performance by using an analogy: "The Human body is a collection of colonies, like a squadron of aircraft flying in VERY close formation!! Hit one and the rest are in Big trouble." The use of new terminology when paraphrasing builds knowledge not only through the confirmatory effect of repetition, but also by providing a modified version of the statement that enhances understanding. Hence, paraphrasing promotes understanding as a form of repetition and addition.

Deductions are inspired by previous posts in that they use information from two or more existing comments to create another statement or question. Different from elaborations through addition (explained in the next section), deductions are elaborations that don't yield additional information to make a new statement, but rely solely on the information provided by others. This type of response is a strong sign of collaborative learning. It comes closest to a kind of "merging of brains" of various participants for the purpose of producing knowledge in a specific field. Collaborative deduction is extremely rare on the discussion forums, and occurs among smaller groups of participants. For example, in the thread on life-earth feedback, Vick makes a contribution that defines symbiogenesis as collateral gene transfer. Based on that definition, Leach concludes that symbiogenesis is an example in support of his argument about cooperative evolution in the original post. Leach does not introduce anything new, but uses semi-formal reasoning to deduce and suggest that symbiogenesis is a type of cooperative evolution based on Vick's definition.

### *Elaborations and Answers*

Direct answers and elaborations on proposed hypotheses are types of linear, cooperative correspondence that are less repetitive than agreements, paraphrases, and deductions. Elaborations are a type of addition that allow participants to expand their understanding of a subject by undergoing review by their peers, who add to their statements with more information that confirms or corrects the previous statement. A lot of elaborative statements occur on the discussion thread Big Guys and Small Guys (Appendix 2.b). In the first post, Sonya Vick argues that the survival of all eukaryotes

depends on the living colonies of bacteria, but the survival of only some bacteria depends on the survival of eukaryotes. This statement is elaborated by Natalia Portillo, who first offers a statement of agreement with Vick's claim: "It seems to be very evident that the whole Eucaryotes would be into big trouble without these organisms. Unfortunately, we are often avoiding the esencial contact and interaction between them and us." Portillo then elaborates on one of Vick's examples of Wolbachia-infected insects, adding that the Wolbachia bacteria affects the reproductive advantages of insects through parthogenesis, a form of asexual reproduction from non-fertilized eggs. Vick follows up with Portillo's elaboration and the article that Portillo supplied by citing a scholar (Carl Zimmer) to claim that rotifers don't have sex because they don't have parasites, and that sex is an evolutionary strategy for organisms with parasites to stay genetically robust by co-creating a modified genetic code with each offspring.

The same thread also entails elaboration through correction. Jeff corrects Vick's claim that the occurrence of bacteria helicobacter pylori (h.pylori) in the gut averts the risks of esophageal cancer, explaining that h.pylori is responsible for lowering acid levels in the stomach, which can undermine healthy digestion and eventually lead to colorectal and stomach cancer. Vick reacts to Jeff's correction with appreciation and continues to ask for clarification on why a bacterium that lowers acid levels would not have protective effects on the esophagus and prevent esophageal cancer.

Elaborations are also used in the public health thread on reproductive health in Nigeria (Appendix 2.e). For example, after Emmanuel argues that Nigeria's reproductive health situation is marked by stagnation, Tope elaborates on Emmanuel's claim by listing additional barriers to progress, but also by going into some evidence of progress achieved

through the introduction of new technologies to manage and evaluate health projects (“eHealth”). Some elaborations come up with solutions to problems identified in previous posts, as when one participant brings up audits and reports as a way to control corruption in governments, or when Nwanneka proposes the need for food banks to help poor farmers feed their families.

Elaborations provide a stronger mechanism of review and evaluation than confirmations by agreement or paraphrasing because elaborations engage preceding statements with somewhat more diligence. Elaborations provide more active forms of confirmations because participants are doing something with the information provided by another peer: they add and correct. Hence, elaborations are a valuable form of cooperative learning that draws from the repertoire of all participants to produce enhanced knowledge and comprehension. In some cases, elaborations can be understood as the product of inspiration, such as when a previous post reminds another participant of a related idea with the potential to take the thread in a new direction. This occurred in the thread on earth-life feedback (Appendix 2.a), when participant Peter Farrell brings up climate change. In response to Leach’s life-earth feedback hypothesis, Farrell writes:

What about the current life-earth feedback mechanisms? One is the ozone depletion, and its effects on climate as well as plant and animal life (see <http://www.epa.gov/ozone/science/effects/>), for example. There is also current climate change, and its interaction with life forms (see [http://en.wikipedia.org/wiki/Climate\\_change#Life](http://en.wikipedia.org/wiki/Climate_change#Life)).

This post takes the hypothesis that life influences the planet, and the planet influences life, and applies it the current problem of climate change. Not only does this example add support for the hypothesis, but it has the potential to take the discussion in a new

direction of policy. Given that most participants are more interested in scientific questions, this discussion is not picked up.

Oftentimes, participants came up with questions that were inspired as an elaboration on preceding statements. For example, in the thread on the expansion of the universe (Appendix 2.c), Leach was inspired by Volkers's initial question about where the big bang derived its energy from and asks whether that question is related to "the current expansion of the universe do [sic] to dark energy," and whether the first law of thermodynamics still applies to inflation theory. However, for the same reason that inspired elaborations created a very strong cohesiveness among a small number of participants, these types of linear elaborations came more easily to a single participant in the form of monologue. This was the case in the thread on whether the laws of physics (Appendix 2.d) are subject to evolution. In response to his own argument that the laws of physics are constant, Volkers was inspired to continue to ask what determines the constants of values that we have, such as the speed of light.

Inspired questions were especially valuable forms of additive responsiveness because they promote the continuation of the linear pattern of discussion. Questions demand responses that stay on topic and supply pertinent, new information. Answers constituted another form of linear additive responsiveness. *Answers* are informed responses to specific questions that help participants advance their learning. Questions and answers were valuable forms of collaborative learning that took advantage of the large knowledge pool among all participants. The thread on the expansion of the universe (Appendix 2.c) started off with the metaphysical question where the expansion of the universe derives its energy from. The immediate post by Christine attempted to provide a

response by pointing to dark matter. Moreover, Kenneth elaborated on the initial question by coming up with another question: “Peter, An interesting thread, thanks for posting this. What are your thoughts about the possible effect of quantum fluctuation to ‘power’ inflation?” This question was then answered by Volkers, although it expressed dissatisfaction in terms of providing answers for his initial question about how the universe expands:

Thanks Kenneth. You mean the possibility that primordial quantum fluctuations were expanded to macroscopic scales by inflation in the very early universe? That is, as far as I know, the working assumption of some cosmological models. For me it offers a possible understanding of why there is a universe at all (as we know it, i.e. with matter and everything) and not just "nothing" (in the sense of a completely empty space-time or not even that). However, I still would like an explanation of what inflation really is, i.e. what drives the super-rapid expansion? Is there another force-field? Or a completely different mechanism? And how does it fit into the overall picture of the physical forces?

Moreover, in post 13.g. Volkers provides an answer to Michael’s question in 13.f.:

*13.g.) Michael:* Well, if you think about it, if one galaxy is moving away from another there must be work done overcoming gravitational potential energy.

Where is that energy coming from? Maybe space is just expanding with no work done but it seems odd to me.

*13.f) Peter Volkers:* Michael, the energy for overcoming the gravitational field is coming from the kinetic energy of the galaxies which are slowed down by gravity. That's the classical picture anyway. Because now we think the expansion is actually accelerated we postulate an additional force which overcomes gravity and as a net effect has the expansion accelerated. That's dark energy.

These examples of answers to specific questions reflect a remarkable degree of linearity by adding information that is directly relevant to the specific hypothesis or question of discussion. Answers to questions advance the learning in the direction that is most relevant to the field of knowledge that is of interest to the participants. Since answers rely heavily on the expertise of participants, they occurred in more scientific contexts.

However, public policy subjects also often require information in order to make

decisions, and therefore answers to questions of fact also came up in the public health MOOC. In the thread on reproductive health in India (Appendix 2.f), Christina asks whether there are differences in reproductive progress across the country and what international programs have been most effective in improving the situation. Matt, the initial poster, immediately responds without a concrete answer, writing “I would guess there are going to be differences among the states. Maybe others with direct knowledge can respond?” The next post puts forth answers to Christina’s questions, although being directed at Matt:

Hey Matt, I am currently working in India on a health intervention targeting the poorest of the poor (PoP) in rural parts of my state. We are focusing on the 1000 day interventions, from pregnancy through to two years of age, and use free meals as an entry point activity.

First we survey all eligible women in the village (the village organisation does at least) and then all pregnant women, lactating mothers and children up to the age of 2 years old are offered free meals (or heavily subsidised depending on the area). Once they start coming for the meals they are given health education, regular ANC and PNC care and all the immunisations necessary. We also perform growth monitoring for children up to the age of 5. These interventions are linked to an mHealth system and also to the government systems - when a woman is recognised as high risk she is referred to the government facilities to receive additional care.

In organising this intervention we went on many exposure visits to other projects in neighbouring states. As you mentioned there is a huge variation in the achievements of these areas, and I wonder if anyone has a solid reason for this variation? Kerala, for example, has a phenomenal record with regards to public health (especially sanitation - although some doubts have been cast on the longevity of these interventions) , whereas Assam still languishes behind (SRS 2011 - found

here [http://censusindia.gov.in/vital\\_statistics/SRS\\_Bulletins/MMR\\_release\\_070711.pdf](http://censusindia.gov.in/vital_statistics/SRS_Bulletins/MMR_release_070711.pdf))

A few posts later, a participant responds to Christina’s and Matt’s questions more directly by listing four charts that demonstrate the stages of progress across different regions in India toward reaching the United Nations Millennium Goals of reducing maternal and infant mortality rates. The participant addresses her peers directly:

Hello, I always find graphics useful illustrating trends in countries as large and diverse as India. To that end, here are a few which may be interesting: (Christina and Matt, they might give you an overview of the differential rate of progress among the states in India) Overall, India will not achieve the MDG 4 and 5 targets by 2015, with the extent of potential for each of the sub-goals summarized below...

While answers to questions represent the most linear-responsive pattern of discussion, answers can also close off the conversation by making available the information that was desired and which fueled curiosity in the first place. Linear-responsive discussions unfolded in response to very specific questions that were fueled by curiosity and love for speculation. For example, the thread on earth-life feedback (Appendix 2.a) was fueled by the pleasure of speculating about the evolutionary relationship between earth and its relation life. The post by Tanya Galdo (2.b) expressed her curiosity by drawing on previous information about Margulis's emergence hypothesis and Lovelock's self-regulating hypothesis to advance her speculation. All questions or elaborations inspired by previous comments imply a heightened degree of pleasure in learning and speculating on part of the participants. Peter Farrell's question about global warming implies that he enjoys applying the knowledge made available by Leach to a specific case (global warming) that sparks his interest. Further, the exchange between Vick and Portillo in the thread Big Guys and Small Guys (Appendix 2.b) entails elaborations on specific questions of symbiotic relationships between bacteria and eukaryotes that display a heightened interest in the subject. Moreover, analogies and other types of paraphrases require active processing by participants that reflects their enthusiasm about the subject matter. Elaborations and answers, but also more repetitive forms of paraphrases and deductions, constitute linear patterns of discussion that unfold



due to the participants' curiosity and pleasure in learning and speculating about a specific question within a specific field of study. Different from the patterns discussed in Chapters Three and Four, cooperative linear-responsive patterns are largely fueled by a more pure interest in the field of study. It is therefore, perhaps, that linear-responsive patterns have mostly developed in the scientific context of the MOOC on evolutionary biology.

### **Competitive Learning Patterns**

Competitive learning occurred when participants disagree on a given hypothesis or argument. These debates were marked by more intense responsiveness that required a great degree of expertise in a specific domain and constituted a form of power struggle based on a display of competence that earned the debaters a considerable amount of respect and authority. Due to their competitive form and elevated degrees of expertise, debates often involved only two or three participants.

The thread on the expansion of the universe (Appendix 2.c) produced a debate among three participants who disagreed on whether energy is a sufficient factor for expanding the universe. The thread had developed in response to the question of what causes the universe to keep expanding, posted by Peter Volkers. In post 15, Michael downplayed the sophistication of the question by flatly offering a straightforward answer to Volkers's question. Michael argued that inflation is not that mysterious, and that it is fueled by dark energy. Volkers's response in post 16 defended the quality of his question, denying that energy is a sufficient factor to make space expand, and questioning that what we know about dark energy accounts for the continued expansion of the universe. He then added the question, Why did inflation stop after  $10^{-32}$  seconds, in order to

imply how dark matter is an unsatisfactory answer to his question. In the next post, Michael, flatly denied Volkers's comments, insisting that energy makes space expand and that dark energy has been found to explain how the universe expands. This form of denial did not build knowledge because it did not provide any explanation. Rather, denials are purely competitive expressions to win the argument. Michael continued to answer Volkers's added question: Inflation stopped because it froze, and that is the end of inflation because there is no new energy only old energy at this point. At this point, Jacob Leach chimed in to supply an explanation for why dark energy counteracts expansion in line with the first law of thermodynamics. Michael disagreed with Leach's claim, this time referring to humanity's lack of knowledge as a reason why it is impossible to rule out that dark energy was accountable for the current expansion of the universe. Volkers then challenged Michael's reliance on humanity's lack of knowledge by explaining that kinetic energy is accountable for how the universe overcomes its gravitational tendency to contract.

In this last post, Volkers overpowered Michael's challenges and won the debate through a variety of strategies. He referred to his explanation of kinetic energy as widely accepted by scientists by calling it the "classical picture." He aligned himself with the scientific community by using the pronoun "we", as in "Because now we think the expansion is actually accelerated we postulate an additional force which overcomes gravity as a net effect." He used affirmative, simple sentence structure, as in "That's dark energy." Then he turned to attack Michael's argument that dark energy explains the current expansion because that's the reason for its discovery, arguing "Just because we give a thing a name ("dark energy") doesn't mean we understand it's nature and it's

properties.” Finally, he cited the exchange between Michael and him to continue the original debate about whether energy causes the expansion of the universe by responding to Michael’s denial of his argument with a scientific explanation before finishing off with an expression of pride:

>>>> energy doesn't make space expand in and of itself.

>> Actually, yes it does.

No it doesn't. Energy is (in the  $E=mc^2$  sense) equivalent to mass and therefore gravity acts on it. Relativity theory tells us that masses influence ("bend") space-time which we can actually observe in some circumstances. However energy doesn't necessarily make space expand, that's simply not the case.

And yes, I'm happy that this thread got a lot of views and comments ;-)

This thread illustrates how competitive responsiveness advances knowledge because participants required expertise in order to cogently back up their arguments and win the debate. Through their explanations, information was made available for all participants who cared to read the discussion. However, although competition produced knowledge, it was clearly motivated by the participants’ tendency toward dominating and winning the debate based on competence, intelligence, and expertise. The insertion of quotations of each other constitutes a heightened level of linearity that reflects the participants’ ambition to outperform the competitor.

These tendencies toward dominance and victory were also evident in another thread on whether the laws of physics are subject to evolution (Appendix 2.d). Jacob Leach defended this hypothesis that non-biological realms (chemistry and physics) are subject to evolution in posts 4 and 6. Peter Volkers denied this, arguing that everything is set by universal laws of physics, and that the chemical reactions after the big bang are not instances of evolution. Leach replied with the example of hydrogen, arguing that its properties depend on its combination of electrons and protons. Volkers responded that the

properties of hydrogen are subject to the laws of physics (Quantum Electro Dynamics), not evolution. Here Leach gave up the argumentation without being willing to give up his position, arguing that we should not always understand biology in terms of physics, but also make use of biology to advance our knowledge of physics. At this point, other participants chimed into the debate, but Volkers stood firm on his position in post 13.

The thread is another illustration of the elevated level of expertise that is required to engage in a scientific debate. Although the thread did not put forth specific answers to whether or not the laws of physics are mutable, the thread encouraged speculation and reflection on metaphysical questions with the help of the expertise of a few participants. The thread also reflects how competition can be power-driven activity for some participants more than others, since Volkers was unwilling to credit the validity of Leach's position. Volkers relentlessly insisted on the more conservative point of view that the laws of physics are universal without any sign of openness toward Leach's position. On the contrary, Leach showed more signs of cooperation while maintaining his case, as in:

I agree, this is a nice discussion!!! I agree with 100% that the laws of physics have to be considered immutable and constant, not evolving. I'm certainly not qualified to debate particle physics, and yes, it is ambitious to extend the concept of emergence or evolution. I'm admittedly out on a limb, trying to learn. Still, to me, if you start with a universe protons and electrons (3 minutes after Big Bang), and then try to predict the properties of hydrogen and then chemistry is a big step. I prefer to call that "emergence" of atomic properties and chemistry. This emergence still operates under the same laws of physics, but changes the structures and properties in the universe. Hydrogen is so ubiquitous, it is hard to imagine a universe without it. But it took the universe a lot of steps to get there. Looking back after it happened, it seems easy to say, and of course that is reductively predictable "put 2 and 2 together..." To me, I see the holistic side, and looking at protons and electrons and predicting *the properties of (edited)* hydrogen is a little like looking at 50,000 termites and their DNA, and saying it is obvious that after one year they will create a 15 foot tall [termite mound](#).

Just one question, are the properties of hydrogen fundamental laws of physics, or are the fundamental laws of mass, electromagnetism, quantum mechanics acting to "organize" hydrogen?

Thanks for your comments, this is very interesting to me!

Jacob Leach

By agreeing with Volkers and admitting his lack of expertise in particle physics, Leach showed more humility. He acknowledged Volkers's competence by ending his post on a question directed at Volkers. Moreover, by thanking him in advance for his commentary and writing, "This is very interesting to me," Leach also showed that his primary interest was in the subject matter and revealed his intention to use cooperative discussion in order to feed that interest.

In the public policy MOOC, debates broke out more seldom than in the scientific MOOC, and they broke out mainly due to differences in evaluating a problem. The thread on reproductive health in Nigeria (Appendix 2.e) led to some disagreement about whether Nigeria is making satisfactory progress toward lowering reproductive health problems and whether farmers in Nigeria have enough food to stay nourished. The three debaters were informed of the Nigerian health infrastructure and engaged in a discussion marked by heightened responsiveness. Emmanuel, who started the thread, made the argument that Nigeria is making insufficient progress toward increasing the quality of reproductive healthcare. He mentioned the understaffed and ill-equipped health centers and their inaccessibility for many expectant women who live in rural areas. Although pointing out several additional obstacles for progress in reproductive healthcare, the first respondent (Tope) countered Emmanuel's evaluation by praising the use of technology in the area of reproductive healthcare in Nigeria. In post 6, Nwanneka raised issues with the evaluation by Tope, bringing in facts and statistics that showed that Nigeria has dramatic rates of

maternal and infant mortality, malnutrition, and inadequate healthcare infrastructure. On top of that, the country is battling with a corrupt government, an astonishing concentration of wealth in the hands of a few governing elites, as well as the social barriers of gender inequality, lack of contraceptive use, and illicit (unsafe) abortions. In response, Tope defended his more optimistic evaluation of the state of healthcare in Nigeria by attributing more responsibilities to the people themselves. He relied on his personal experience of working with rural communities in order to argue that farmers have what it takes to be nourished, but their lack of education prevents them from making healthy choices by consuming their own produce. Nwanneka expressed skepticism toward Tope's description, arguing that they cannot eat their own produce because their profits won't suffice to pay back the governmental loans they used to start up their farms.

The debate in the thread on reproductive health in Nigeria was looser and less competitive than the previous two examples from the science MOOC. Participants were more open to drift toward different topics, such as health infrastructure, government corruption, and malnourishment, rather than persist on resolving one specific disagreement. Moreover, throughout the thread, participants agreed with each other before they expressed objections. Compared to the other two debates in the science MOOC, the debate in the public health MOOC was less competitive because participants didn't seem to insist on being right to the same degree. In response to Tope, Nwanneka begins her last comment with "Yea, well said, although I would like to think that...." Similarly, Tope acknowledges that he agrees with Nwanneka's argument for better education after launching his defense against her critique. This shows that the disagreement between her and Tope is less about outsmarting one another, but an

endeavor to learn from one another. Nevertheless, some personal competition exists, such as when Tope gets defensive in light of Nwanneka's critique. His reference to the farmers neither offers an effective counterargument to the broad range of issues brought up by Nwanneka, nor does it defend his position. Rather, he seems to have aimed at defending his personal image by bringing up his personal experience. Similar to the debate in the scientific MOOC, participants in the public health MOOC vary in their degrees of dominance tendencies.

It is possible that the lower levels of competitiveness in the public health MOOC come from the fact that participants took a personal interest in the situation of their country, which may overshadow the participants' concerns of winning the argument. As mentioned above, it is also possible that the expressions of agreement are culturally mediated tendencies toward maintaining harmony. Participants in the debate on Nigeria share a common interest in achieving a greater quality of life for the Nigerian people. Being right or wrong may be secondary to sharing ideas that are relevant to this concern, even if they lead to disagreements.

Consistent across all three cases discussed here is that debate is fueled by provocation be it due to an insult to the participants' expertise or due to a disagreement about the severity of a situation. In the first example, Michael's simplistic answers to Volkers's metaphysical questions insulted Volkers's status because they undermined the sophistication of his question. In the second example, Leach carried on a courteous debate with Volkers in order to defend his right to propose non-traditional speculations that challenge physics with biology. In the last example, Tope's positive evaluation of the

healthcare situation in Nigeria was insulting to those participants who see the country's range of problems.

Debate is a competitive style of collaborative learning that allows participants to exchange ideas while also engaging in a contest of competence. Some participants are more inclined than others to insist on winning the debate and establishing their dominance. This competitive drive was moderated by other interests, such as curiosity in the science MOOC and public concern in the public policy MOOC. However, since scientific discussions are about knowledge, the display of knowledge as a form of competence among participants may be more present in the science MOOC than in the policy MOOC.

### **Leadership**

Linear coherence (responsiveness) was often steered by specific participants who take on discussion leadership over the thread. Most of the time, leadership was assumed by the original poster, who took responsibility over responding to comments and questions posted by others, especially if they were in response to the originally posted question or argument. The type of leadership influences whether the collective learning that occurs is cooperative or competitive.

Authoritative leadership is based on expertise and leads to competitive discussion patterns. In both debates discussed in this chapter, Volkers maintained the authority by evaluating the propositions by other participants as right or wrong. Although Volkers carefully responded to each comment, he was not open to developing the conversation in new directions by going along with the statements introduced by others. Instead, he



evaluated them in terms of their relevance to his original question. Volkers took on competitive leadership in the thread on the expansion of the universe (Appendix 2.c) by discarding all the possible answers to his initial question about what drives inflation (expansion of the universe) without showing any sign of openness toward any of them (see Appendix 2.c). For example, when Christine in post 2 proposed to respond to his question by pointing to dark energy, referencing some literature, and speculating that the new invention of the particle accelerator may yield some answers to this question, Volkers wrote that “the question of what drives inflation is not directly tied to [dark matter and dark energy].” When Kenneth in post 4 proposed quantum fluctuation as a possible explanation for the expansion of the universe, Volkers wrote that quantum fluctuation proves that there is a universe at all, but it doesn’t provide an explanation for what drives the expansion of the universe. When Paul in post 6 compared inflation to a big cement explosion, he was immediately corrected by Volkers:

The explosion on earth is unfortunately not a good analogy. For one, it's completely clear what drives it (the chemical reaction of the explosive, like, TNT, with the oxygen from the air) while for inflation that's exactly the question from my original post (what drives it?). Secondly, for the chemical explosion the debris get their initial velocity from the explosion and then fly outward, getting slowed down by friction etc. For the universe the picture is completely different. Space-time *itself* expands and it did so so in an *accelerating* manner during inflation (and even today as current measurements seem to indicate). So inflation remains somewhat of a mystery.

Volkers did not just evaluate the responses by other participants as right or wrong, he also backed up his judgments with detailed scientific explanations that revealed his expertise. None of the three respondents were introducing anything that seemed novel to Volkers. Instead, he unpacked in detail why the respondents’ hypotheses were inadequate for

answering his question. Hence, Volkers assumed the authority to evaluate other participants' comments based on assuming a superior level of expertise.

By displaying his expertise, his leadership was accepted among other participants. Thus, Paul admits in post 6.b: "You are right, it was an expansion and not an explosion." Nevertheless, the Community Teaching Assistant (CTA) Ramiro Diez chimed in to respond to both Volkers and Christine as a way of leveling the hierarchy that had developed in this discussion thread. Diez evaluated Volkers' topic as more appropriate for classes on metaphysics and physics, whereas this MOOC is on biology and the Earth. Diez posted a picture of planet Earth from the perspective of the moon in order to support his point that this class focuses on the Earth, not the universe. The intervention by the CTA may indicate that Volkers's authority had surpassed the levels deemed acceptable by the MOOC managers. At any rate, Volkers did only partially accept Diez's suggestion to stay on topic of planet Earth when he wrote: "Yes, as interesting (and humbling!) as cosmological questions are that blue dot of ours offer plenty of questions and challenges itself."

Besides evaluating the comments of other participants in terms of how well they responded to his question, Volkers also developed authority by arguing against any statement that challenged his hypothesis or research question. As discussed in the section on competitive linear responsiveness, Volkers hardly showed any signs of cooperation in the debates about whether energy alone makes space expand and whether the laws of physics are subject to evolution. In defending his hypotheses, he displayed a remarkable level of knowledge in particle physics that might have been difficult for many

participants to challenge. Anybody who dared to challenge the premises of his research question was immediately rebuked.

As the case of Peter Volkers shows, authoritative leadership promoted linear discussion because, as the leader, he evaluated and corrected each respondent's comments based on his assumed superior expertise. While authoritative leadership is similar to traditional authoritative teaching styles with the instructor's knowledge counting as the ultimate judgment of right and wrong (i.e. Atlas complex), it developed somewhat more democratically in the discussion thread because unlike Diez's authority, Volkers's authority unfolds throughout the MOOC not due to his title, but due to his display of expertise. Leadership based on expertise allows the participant to have more control over what counts as truthful and what doesn't, which leads to a greater degree of authority. Unlike authoritative leadership, negotiative leadership does not rely on the knowledge of the leader, but on their ability to mediate the contributions by multiple respondents into a more coherent stream of information. Negotiative leadership is based on mediation and leads to more cooperative learning.

Both Leach and Vick were discussion leaders who showed more openness to learn from other participants. In his thread on earth-life feedback (Appendix 2.a), Leach took on cooperative leadership by responding to the contributions of other participants with more openness. Leach confirmed a statement by Volkers (post 4.a), elaborated on the information provided by Vick (6.a and 7.a), and encouraged Galdo by reaffirming her proposition by elaborating on it and commenting "I like your thinking of merging Lovelock and Margulis' ideas" (2.c). Similarly, Sonya Vick took on negotiative leadership in her thread titled "Big guys and small guys" (Appendix 2.b). Vick was open

to being corrected by Jeff and asked him additional questions related to the gastrointestinal tract, the area in which he displayed knowledge (post 6), and she elaborated on Portillo's comment with additional information on asexual reproduction and its relation to bacterial symbiosis (3.a).

Public policy discussion threads generally exhibited less signs of leadership. Although Tope defended his positive evaluation of the Nigerian health situation in light of Nwanneka's counterstatement, he did not determine the topic of discussion, evaluate other comments, or even respond to other posts as a moderator. However, in the discussion thread on reproductive health in India, Matt, who was the initial poster, seemed to take on negotiative leadership by responding to Christina not as a supplier of information but by passing on the question to everyone else (post 3). While negotiative leadership was rare in the public health MOOC, authoritative leadership was nonexistent. Even when participants displayed a high level of knowledge in the field of discussion, they maintained styles more respectful and cooperative with others. Thus, in the thread on reproductive health in India, Jack Caresini responded to Debolina Goswami's suggestion to introduce eHealth projects to improve the situation in India. Caresini wrote that this has already been done, listed the regions in India where these types of initiatives have been launched, and explained that they were available in the local dialects as well as in English (post 7). As Goswami responded with modesty and appreciation (post 8), Caresini made an apologetic post to signal that Goswami's lack of awareness was not shameful by agreeing with her suggestion and explaining his awareness as a special coincidence due to work experience (post 9). Since Caresini contributed with information that was relevant to the questions posted by others (i.e. Matt, Christina, and

Debolina), rather than dominating the discussion in the area of his expertise, Caresini acted as a regular participant, rather than a leader.

Regardless of whether authoritative or negotiative style was used, leadership was important in order to maintain the linear coherence of the thread. As the analysis has shown, authoritative leadership was more likely to co-occur with competitive learning styles, and negotiative leadership emerged with more cooperative learning styles.

### **Emerging Scientific Communities**

Linear discussion patterns bring participants together through a sharing of expertise that clusters around specific research questions, hypotheses, or arguments. Hence, participation in linear threads requires a certain level of expertise in order to carefully respond to the specific arguments and hypotheses put forth by other participants. Due to this close collaboration among participants, the discussion thread can be characterized by shared authorship that connects all participants based on the collaborative development of content, or, the elaboration on a specific field of knowledge. The close responsiveness among participants based on the exchange of more or less directly related information connects participants into groups of expert, or, scientific communities.

A high level of linear responsiveness is only possible if the participants agree to connect based on the development of content that is relevant to the specific questions and hypotheses raised in the original post. However, this does not mean that participants build connections purely based on an exchange of mutually beneficial information, as suggested in the connectivist model. Rather, participants who can supply relevant

information build affiliations based on a shared interest in the same subject area, an emotion that is described in this analysis as curiosity and love for speculation. Shared interest can draw participants closer in cooperative efforts that can accomplish the difficult task of coherent textual composition and shared authorship. Moreover, drives toward dominance, as well as provocation (anger) based on another participant's insult of one's commentary, are emotions that also draw participants together in competition for authorship and authority. Although in competitive linear-responsive patterns (debates) participants vie for authorship as though belonging to only one participant, the duel collaboratively composes a text that yields knowledge dialectically. It is important to observe that the competitive type of linear responsiveness constructs scientific communities that are characterized by competence, pride, and elitism, and therefore allow participants to affiliate based on shared emotions rather than connect based on an exchange of information (connectivism).

Since expert communities are based on a specific field of knowledge, they are more exclusive and elitist, than, for example, the communities that evolve with additive and repetitive patterns discussed in Chapters Three and Four. While still collaborative, by elevating the standard for participation to expert knowledge, authorship is limited to a smaller number of participants who maintain a greater share of authorship and control over the direction of the thread. Since only a limited number of participants could keep up with the discussion, the discussion forum of the MOOC on evolutionary biology was dominated by a small number of participants who posted frequently. The portion of threads that are supplied as appendices in this chapter gives a fair representation of the individuals who participated in the discussion forum overall. Thus, Jacob Leach, Peter

Volkers, and Tanya Galdo, were the most active participants in the forum. Jacob Leach participated in almost every thread that has been analyzed for this chapter.

In light of this observation, it is important to understand linear coherence as a textual achievement that is more probable among a limited number of participants. Just as literacy, as a communicative technology, has detached the single author from her social surroundings to compose timelessly valid, logically organized theses, so do scientific communities on online discussion forums filter out lay people to enable a linear unfolding of posts among a few experts in response to specific questions and hypotheses. Like all textual compositions, the scientific discussion thread is linear and tends toward closure in form of a conclusion, resolution, or answer. Those who have the knowledge to provide the answers also have the power to end the conversation and discourage alternative proposals of hypotheses that don't come with cogent evidence. Thus, Volkers directed the conversation by evaluating everybody else's contributions and by confidently answering questions proposed by others. He emerged as an authoritative leader who managed the content and length of discussion due to his expertise.

Since scientific conversations rely on knowledge, which is unequally distributed among participants, the conversation is controlled hierarchically and tends toward single authorship and linear textual composition. That is to say that knowledge is not as egalitarian as proposed by the connectivist school with the information network. Scientific conversations are therefore not global in the democratic sense, although some may argue that they are more universal in the philosophical sense. In the end, the exclusiveness of participants manifests the narrow scope of people who follow and respond to the specific arguments. In their passage on the universal audience, Perelman &

Olbrechts-Tyteca describe speech directed at a universal audience as potentially elitist, characterized by a hierarchical position, and marked by the assumption that serves as the model for everyone.<sup>94</sup>

In light of the global pool of participants of MOOCs, scientific conversations have the advantage that their relevance is not tied to a specific locale and therefore can attract in scientists and science lovers from all over the world. On the other hand, not enough participants are able to contribute to the discussion because it requires a specific expertise. Global education disparities prevent people not only from different parts of the world but also from different classes and social backgrounds to participate in the discussion. The last names of the four participants imply their North American or European descent,<sup>95</sup> and therefore they may reflect the global education disparity. Public policy discussions differ from scientific discussions because they unfold based on social relevance, which usually attracts a more regional audience. The threads on Nigeria show how Nigerians naturally took an interest in the topic of Nigerian reproductive healthcare. Moreover, treating the thread as a more scientific discussion that sought statistical and factual data to learn about the country's healthcare situation, the thread filters out participants by those who can supply knowledge based on research (i.e. Nwanneka) or experience (i.e. Tope). But, again, this information is more readily available to people who take a public interest in Nigeria, who are more likely to be Nigerians. Nevertheless, the Indian discussion thread on reproductive health shows that while a few participants had Hindu names, Christina, Matt and Jack Caresini have English names. Hence, non-native participants can sometimes take an interest in another country.

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<sup>94</sup> Chaim Perelman, *The Realm of Rhetoric* (Notre Dame: University of Notre Dame Press, 1982), 33-34.

<sup>95</sup> The last names have been changed to synonyms that reflect the same ethno-cultural heritage.



## **Pedagogical Implications**

Responsive (linear) patterns are rare even in science MOOCs, but they are pedagogically valuable because they advance knowledge and understanding by exploring epistemic statements collaboratively. The collective benefits derive from the fact that statements are checked by a large number of participants, who read them and either correct or confirm them and thereby establish their validity. This style of peer review happens through both cooperative and competitive styles, where cooperative styles demark more agreement and competitive styles demark disagreement.

The process of massive peer evaluation in linear discussion patterns makes possible the formation of affiliations based on shared interests because the learners are collaboratively participating in the learning. Different from the more solitary activity of reading a science book or the more passive activity of listening to a professor's lecture, the discussion thread allows students to compose and create, which demands a higher level of participation and involvement with the subject in question and challenges learners to integrate the contributions by others with what they already know. In other words, the collective composition requires participants to be both learner and teacher at the same time, composing and creating while reading and evaluating. The linear pattern demands reading and evaluating to be part of the process of writing in order to give a coherent response to preceding statements. The active effort (participation) required as part of the learning process implies the learners' interest in the subject and allows them to affiliate based on a shared curiosity.

While linear discussions represent an interactive and collaborative learning style of reading and writing, the specific knowledge required for participation can exclude

novices from participating in the discussion. Nevertheless, competitive and cooperative linear discussions allow less knowledgeable participants to read along or ask questions, access some of the resources made available by more knowledgeable participants, and thereby gain understanding. Moreover, for those participants who are complete novices, comprehensive video lectures will be indispensable, and educators will need to guarantee that the videos are accessible to a massive number of learners.

Although this analysis suggests that the linear discussion pattern seems to self-regulate the learning process, it also suggests steps that educators can take to foster more responsive discussion among its students. Observing that linear discussions respond to specific hypotheses or research questions, educators can start discussion threads by posting specific questions or hypotheses in the forum. Moreover, in order to give participants across a broader range of expertise the possibility to participate, educators can grade these questions based on levels of difficulty, thus leaving novices the chance to engage with other novices on more fundamental questions. Moreover, since linear discussions usually come up in response to scientific questions, educators still have an obligation to correct answers that are plain wrong, and participate in selected discussions as a way of signaling which discussions are productive. The leadership that evolves among participants in the linear discussion patterns strongly suggests that having someone to serve as a moderator and as a judge is in demand.

# CHAPTER 3

## DEMOCRATIZING EDUCATION THROUGH ADDITIVE DISCUSSION PATTERNS

### **Introduction**

In digital discussion forums, linear responsiveness advances the learning process through peer review and by supplying information that is relevant to the specific question at hand. Linear responsiveness creates content that undergoes testing of truthfulness by way of its openness to careful review and evaluation by other participants, who either confirm or correct the statement. This process of confirming and correcting usually requires a specific level of expertise in a specific area, which binds participants together in more exclusive, scientific communities. Naturally, on a massive forum with thousands of participants, linearity is vulnerable to the interruptions by non-experts, who can post statements that do not respond to the specific question of discussion. Linear coherence is therefore seldom achieved. When analyzing the massive discussion forums of open online courses, it is necessary to attend to the non-linear types of sequences that emerge from massive participation in order to understand the discussion forum's unique benefits and pitfalls. This chapter explores the multiple pedagogical and civic values of additive discussion as a type of pattern that frequently unfolds in open online forums.

For the purposes of this study, additive coherences are defined as a listing in the form of “Yes, and....” Collective compositions add to this listing the special attribute of

brainstorming, which is an uncensored accumulation of statements that do not directly respond to each other, but they may be inspired by each other and relate to a more or less central theme. Hence, rather than analytic processing and responding to the peer's preceding statement, the additive pattern unfolds based on the more creative process of inspiration and association. At the collective level, brainstorming is especially beneficial because it produces diversity, the abundance of statements that a single learner alone could not have possibly invented. So, additive patterns are inventive processes because they scale up creativity through accumulation and collaboration. Similar to the repetitive pattern, the value of the additive pattern is its abundance and excess, whereas the value of the linear pattern is its ability to produce specific, qualitative content. However, unlike the affiliative benefits of the repetitive pattern (discussed in Chapter Four), the additive pattern cultivates among the learners a multi-perspectivism by situating them in a massive net of inputs by different peers, who broaden each other's horizon to ideas that would not otherwise become present to them. Hence, a greater state of awareness and wisdom is the fruit of the additive learning process, which can lead them to acquire a more well-rounded understanding as well as a keener disposition for judgment and decision (phronesis).

Additive discussion patterns are prompted by open questions that awaken the interest of numerous participants, who come together as democratic communities through inclusive, inductive patterns of composition. Unlike linear patterns, additive patterns do not restrict participation to the advancement of expertise introduced in previous posts; additive patterns allow participants to bring in ideas from their personal frame of reference, such as their own speculations, their own experiences and observations, their

own knowledge, etc. Threads don't grow by finding answers to questions (responsiveness) but by inspiring additional questions or comments; therefore, additive threads are open to an inexhaustible number of comments, whereas linear discussions tend toward conclusion and closure. The different logics of addition and linear responsiveness naturally have a large impact on the scope and type of participation.

Additive patterns build democratic communities and foster knowledge inductively. This inductive mode of knowledge production makes use of the multiplicity of authorship in a global digital discussion forum, as individual contributions constitute specific cases that build up a more general statement. Here, "general" is not be understood as shallow, but as a more broadminded and multifaceted understanding that takes into account multiple viewpoints and ideas. This chapter shall illustrate how additive patterns can accumulate an array of personal observations, arguments, and ideas that can foster the learner's development of scientific and philosophical understanding, the learner's ability to judge between two sides of a controversy, the learner's awareness of public knowledge (doxa), and the learner's creative problem-solving skills though practical wisdom (phronesis). I draw my examples from the MOOC on evolutionary biology, the MOOC on public health, and the MOOC on climate change.

### **Accumulating Scientific Speculations**

Additive patterns can accumulate an array of speculations that offer explanations for scientific phenomena in ways that account for multiple factors. These explanations can build a greater level of understanding among participants by taking into consideration a greater variety of considerations. Thus, the thread on three different hypothetical

scenarios about the Earth's position in the solar system (Appendix 3.a) inspired a range of speculations about the various conditions that had to take place for sophisticated life to emerge on Earth. By accounting for the wider spectrum of speculations, the learners can gain a more complex appreciation of the interplay of factors in the realm of evolution.

The thread starts with three hypothetical scenarios in which the Earth switches positions with Mars, in which it switches positions with Venus, and in which it doesn't have an asteroid belt. The writer speculates that intelligent life on Earth requires regular but not too frequent meteoroid impact, which is guaranteed by the position of the Earth in the solar system. The original post presents the question what are the different factors for life to emerge on Earth, giving other participants the chance to bring up additional factors that paved the way for intelligent life on this planet. The first part of the discussion unfolded in the competitive and cooperative linear styles, such as discussed in Chapter Two. The first respondent questioned the original hypothesis, arguing that intelligent life would have evolved even without asteroid-induced extinctions because original invertebrate species would eventually have undergone evolutionary pressures to develop intelligence. The next respondent confirmed the previous remark, adding the example that without the K-PG asteroid impact that wiped out the dinosaurs, birds would have eventually developed intelligence instead of mammals. The third respondent did not continue the linear responsiveness of confirming or correcting the hypothesis raised in the first post about the necessity of the asteroid belt, but questioned one of the premises of the discussion by arguing that humans are narcissists for believing that cognitive intelligence is the apogee of evolution.

From that point, participants continued to add other conditions besides the three brought up in the first post. One of them mentioned the magnetic field, plate tectonics, and crustal geological recycling as factors that conditioned the possibility for life. Another one mentioned the planet's distance to the sun, the single number of moons that influence the tides and gave life to amphibians and territorial life thereafter. Yet another participant mentioned the right amount of UV radiation due to its influence on the mutations in gene pools. The original poster even then sought to make a list of all the possible factors that were mentioned. This thread illustrates how additive coherence can advance scientific understanding by taking advantage of the multiplicity of participants and their knowledge pools to propose different speculations. The participants were able to develop a better understanding of the complex combination of conditions that must be met for intelligent life to evolve. The participants' expression of awe and appreciation for what seems like a miraculous coincidence shows that they were intrigued in the learning process.

The additive discussion pattern usually develops in response to open questions that have multiple possible answers. As this thread demonstrates, open questions can come up in scientific contexts, since not all scientific questions pursue a single causal explanation. When participants can approach the phenomenon not from a dualistic cause-effect logic, but from the logic of multiple conditions co-occurring to produce multiple effects, an additive discussion pattern that involves multiple minds is the most productive way of solving a problem because it draws from the knowledge pool of many participants at once.

Naturally, additive patterns were more likely to emerge in the context of evolutionary biology, which is often about discovering the interplay of conditions that shape the life paths of species. Therefore, additive coherence also developed in response to the question why the large placoderm fish that lived in the Devonian era became extinct, whereas the shark has survived until today (Appendix 3.b). After the first poster hypothesizes that the shark outlived the placoderm due to its greater versatility to adapt to different environments, other respondents added that the shark survived due to the fish's greater range of diet, because the placoderm died out and so the shark thrived in the placoderm's ecological niche, because the shark could replace teeth quickly and had a smaller, swifter body with better maneuvering power in the water, due to the shark's ampullae of Lorenzi, which are receptors that pick up the electric signals from the muscle movement of other organisms, and because sharks can interbreed with different types of sharks to produce more resistant DNA strings. The different considerations of evolutionary fitness of the shark gave participants a more complete understanding of what phenotypical attributes of the shark were advantageous ("fit") for the species to survive over so many years. This is another example of an additive thread that offered a more holistic understanding of a scientific phenomenon by drawing on the knowledge pools of multiple participants, and funneling each consideration into one string of knowledge. In the same way that additive discussion patterns build scientific knowledge, they can fortify positions in a controversy.



### **Accumulation of Counterstatements**

The listing of speculations that offer explanations for the emergence of natural phenomena illustrates how scientific understanding can be enhanced through collaborative, additive discussion styles. In the deliberative realm, addition can function as a collaborative persuasive strategy that works through the listing of different premises for or against a claim. Thus, additive patterns can accumulate an array of counterstatements against a proposed thesis in a way that builds persuasiveness through extensive refutation. The listing of multiple arguments in support of one point of view over another is a persuasive form that allows participants to learn how two sides of an issue are not equally strong, and which position has more abundant and cogent support.

In the public health MOOC, a post on the harmlessness of climate change provokes many other participants to list an array of reasons why and how climate change is harmful (Appendix 3.c). The first post introduces the argument that the effects of climate change are still hundreds of years away and then lists the positive outcomes of these changes: more usable lands for agriculture, longer growing seasons, extra carbon dioxide for plants, the Northwest Passage becomes a reality, less energy required for heating, warmer weather, and more solar energy. Although this post alone lists a lot of reasons why climate change is beneficial, it is overwhelmed by the number of participants and arguments in refutation of this position. The first respondent answers each reason with a detailed refutation that includes rising sea levels, droughts, extreme weather with harmful interferences on farming, lower nutritional value of plants, the correction that the increase in temperature refers to more extreme heat that scales up averages, and that a rising temperature does not necessarily guarantee more sunlight.

1) *More usable lands for agriculture*

- This is not the case, rising sea waters and harsher storms are damaging agricultural land through stripping the topsoil and salination of the land making it untenable to grow crops on. Coupled with increasing desertification and acid rain this is actually leading to a decrease in accessible arable land. <http://www.sap43.ucar.edu/documents/Land.pdf>

2) *Longer growing seasons*

- In some settings yes this is true. However due to drought and overexposure to heat this can also reduce crop yield and lead to a thriving of weeds which require heavier pesticide use (<http://www.epa.gov/climatechange/impacts-adaptation/agriculture.html>)

3) *Extra carbon dioxide for plants*

- This is true, again from the same link as above, however, it is shown that the nutritional value in these plants can also decrease with rising CO<sub>2</sub>, requiring greater consumption to meet the nutritional needs

4) *Northwest passage becomes a reality*

- Yes, but at what cost?

5) *Less energy required for heating.*

- Climate change indicated global averages, not specific warmer climes. The truth is climate change disrupts the global weather systems, leading to more intense storms and natural disasters. [http://www.agci.org/dB/PDFs/05S2\\_GMeehl\\_BAMS3.pdf](http://www.agci.org/dB/PDFs/05S2_GMeehl_BAMS3.pdf)

6) *Warmer weather is healthier*

- see the above point

7) *Solar energy*

- Climate change does not necessarily mean more sunlight, and that is what Solar energy runs off. We do need to look at these alternatives, however, in order to find a future which does minimises our impact on the climate.

I appreciate this discussion, but I find it difficult to find any positives to a man-made phenomenon which is ruining the global weather systems and endangering lives and livelihoods all over the world.

The next respondent adds three reasons for why climate change is harmful: plant and animal species will die out, there will be unpredictable weather patterns, and many of the world's regions will become uninhabitable. Another respondent argues that the climate is already changing, that the IPCC has provided evidence for how climate change is attributable to human greenhouse gas emissions, and then goes into a similar list of refutations as the first respondent. In addition to the first list of refutation, this participant contends that the harmful effects of climate change affect impoverished world regions in particular, that the research to measure the beneficial effects of rising carbon dioxide on plants used unrealistic quantities of CO<sub>2</sub>, that the average global temperature increase will lead to greater precipitation and even snow storms, that there will be a spread of

vector mosquitos, and finally references the World Health Organization as a reliable source.

- 1) *More usable lands for agriculture*. - Here in Australia we are entering another severe period of drought, with massive areas of agricultural land in decline
- 2) *longer growing seasons*. - This holds for some cold and cool-temperate regions, which is not where most of the majority of impoverished people in the world live.
- 3) *Extra carbon dioxide for plants* - Controversial and the some of the research to support this used CO2 concentrations of close to 1000ppm, which is more than twice current atmospheric concentrations.
- 4) *Northwest passage become reality*.
- 5) *Less energy required for heating* - this suggests a misunderstanding of the physics, the term global warming is misleading in that people believe there will be an even warming of the planet. This actually refers to an increase in the global average temperature, which drives increased evaporation from the oceans and heavier precipitation events. These precipitation events may actually be reflected in more severe snow storms.
- 6) Warmer weather is healthier and safer in accidents from raining and ice roads. - warmer weather may support the spread of vectors for disease, such as mosquitoes.
- 7) *Using the solar energy widely as an alternative energy sources. ....I want to put the link where I got this article. But failed*. - It is important to find the source of such information The World Health Organisation have put together a short general summary of the present and projected health consequences, which is much easier to read than some of the more in depth IPCC materials. <http://www.who.int/mediacentre/factsheets/fs266/en/>  
As you suggest we should not respond to climate change out of fear, instead from a proactive position where we seek to improve the lives and health of others, and there are many opportunities to do this.

Another participant challenges the argument about the benefits for agriculture by contending that agriculture uses a lot of fresh water, which will continue to devastate the earths' cycles of water, especially in the Amazonian forest. Yet another participant reinforces that viruses change their behavior with warmer climate, and more tropical vector-borne diseases will spread in Europe. The original poster insists by restating the same arguments, namely, that the effects of climate change are still many years away and that every argument justifies a counterargument. However, her defense statements weaken with each repetition, and they are immediately refuted by other participants. This post illustrates how the position of a single participant becomes weakened democratically by the number of refutations and participants who dispute her position.

Extensive argumentation in support of one position against another can have the effect of outweighing the variant position. Thus, additive argumentation can reveal to the participants that not all sides of an issue merit equal treatment. It is important to realize that unlike the linear pattern, the additive pattern is open to deviant, unpopular arguments because it is inherently open, whereas the linear thread prescribes particular types of responses that tend toward closure and resolution. However, the openness of the additive thread does not promote an equal acceptance of all arguments. Rather, the additive thread sorts out good from bad arguments democratically through the addition of counterarguments that can have the effect of outweighing its contraposition. Nevertheless, additive structures invite any type of contribution to be posted even if it is not popular.

In the additive thread, whether a statement is validated or not is reflected in the quantity of statements that support or challenge it. Extensive refutation occurred also in a thread on Syrian suicide rates, which is also taken from the public health MOOC (Appendix 3.d). A participant from Syria used personal testimony to argue that Syria has a low suicide rate compared to other countries due to its close-knit family structures. In light of the exacerbating situation in Syria in late 2014, this statement provoked an array of dubious statements that questioned its plausibility. This thread had the effect of alerting participants to the limitations of single testimonials. This level of skepticism is appropriate in online discussion forums, where personal testimonials are a frequent type of contribution. It challenges participants to seek out other types of support before accepting single observations of their peers.

The post on how Syrians have a comparatively low rate of suicide surprised participants, who came up with reasons for why this observation is unlikely valid: they demanded more representative statistical evidence, they argued that the population statistics published by the governmental bureau are unreliable, they expressed reservations because of the Islamic prohibition to commit suicide, and because the religious censorship of any talk of suicide could yield inaccurate impressions. Finally, they argued that the Islamic religion silences women, who commit suicide as a consequence of being forced into violent and oppressive relationships. By agreeing with the validity of these reservations, the original poster showed cooperation, although he also defended his credibility derived from personal observation in Syria. The counterstatements in the thread added up to an overwhelming load of challenges that together functioned as a persuasive form of excess. This plethora of reasons for doubt could have had a persuasive domino effect of activating other participants' skepticism to question the validity of statements made from single personal testimonials, and to seek out other support before accepting the testimonial. Unfortunately, participants did not do that research, and argued that data are unavailable. Nevertheless, their inventions of reasons why the single testimonial is unsatisfying could have still awakened a healthy degree skepticism among the learners.

### **Additive Construction of Public Problems**

Additive coherence unfolds with the creativity of its participants. Additive speculations and counterarguments usually unfold when participants are inspired by other posts to continue to contribute with additional comments that cumulatively build up

toward greater knowledge or a stronger argument. In the same way that the participants' ideas build up toward a strong counterargument, they can also work to establish a public problem. For example, Appendix 3.e displays a thread that lists the various ways in which a fast food diet disproportionately harms more vulnerable populations. Participants list the problems of weight gain among children and lower classes, aggressive marketing to children, ethnic predisposition to Type II Diabetes, insufficient education about a healthy diet among the lower classes, the problem of health apathy among the poor, the attractiveness of low prices and convenience for working class families, the power of the sugar lobby in the United States, and the health risks of cardio-vascular disease related to high-fat diets. Although none of these considerations are particularly novel, they work together to present a multifaceted problem. In the realm of policy decision-making, a broader understanding of a problem is often more useful than a profound knowledge of a specific aspect of a problem. Thus, to make a wise decision on how to improve the health of lower class populations it is more desirable to have an awareness of the multiplicity of reasons why working-class families tend toward consuming more fast food (apathy, low education, time/convenience, budget), rather than knowing everything about the psychological reasons for, for example, apathy, alone.

Of course, the additive listing of problems related to fast food consumption among vulnerable populations presents ideas that come from the participants' arsenal of knowledge and are not always corroborated through more rigorously assessable sources or even direct experience. Some of their ideas are validated through research (i.e. the post on the sugar lobby), and other posts are more or less speculations. Hence, while the additive accumulation of ideas can lead to greater broadmindedness and multifaceted

awareness, participants should be encouraged to conduct additional research before posting, or make a contribution from personal experience.

Although the thread on suicide in Syria lists multiple reasons for skepticism toward the participants' first-hand observation, this does not necessarily rule out all testimonials as invalid. Rather, statements from personal observation or experience can attain persuasiveness when they are echoed among a large number of other participants. With first-hand experiences and observations being a frequent way of sharing among a massive pool of learners, related testimonials can additively construct a broadly relevant, multi-faceted problem. When multiple participants add considerations that they draw from their own repertoire of experience, the thread can unfold different dimensions of a problem that affects people differently at different places, which can have the effect of broadening the state of awareness for all participants.

The thread on reproductive rights and health from the public health MOOC (Appendix 3.f) builds a broader range of considerations of the different ways that reproductive rights and health are interlinked and can affect a woman's life in different parts of the world. The first participant introduced the hypothesis that reproductive rights are a requisite for reproductive health. Many participants accepted this hypothesis and responded by supporting it with a diverse range of examples. One participant noted that in Bangladesh, gender norms are an important hurdle for more investments in reproductive health services. Another participant brought up a wave of sexual abuse and rape cases in the Central African Republic. Yet another participant added that women in Africa have no power to negotiate their husband's condom use to shield themselves from contracting HIV, which was reinforced by another participant from Cameroon later in the

thread. A participant from the United States raised the problem of sex trafficking and lamented the Republican Party's resistance to enabling more reproductive self-determination for women. A participant from Latin America stated that the sensitivity of the subject of women's rights stalls any progress in that region of the world. Interestingly, the invitational nature of the additive pattern does not always produce a coherent addition of examples that clearly support the same claim. Rather, it runs the risk of deviating toward examples that are not clearly related to the same problem. For example, a participant from Switzerland deplores the recklessness of sexual activity that leads to a high rate of unplanned pregnancies and sexually transmitted diseases in the hospital she works at. The relationship to the claim about reproductive rights is only vaguely clear. The example relates to reproductive health, but how this is the result of a lack of rights is not established. Participants can reason that the case in Switzerland is a very mild version of the reproductive rights problems in Africa. Whereas the women in the Central African Republic don't have any negotiating power to assert their interests in using preventative measures against reproductive diseases and unwanted pregnancies, a much larger number of affected women in Switzerland have much more negotiative power and responsibility for protecting themselves.

Overall, the thread builds the argument that the connection between reproductive rights and health manifests in distinct, more or less severe, and yet similar ways around the world. Not only does the repetitive addition reconfirm the argument that reproductive rights are indeed a health problem, but it also demonstrates how the disempowerment of women is a problem of global scope and of different degrees and characteristics. Therefore, the additive pattern that is analyzed here presents an accumulation of personal,



regional observations that shapes the learning outcome of its participants by increasing their awareness of the scope and variations of women's reproductive rights around the world.

A similar effect was produced in a thread on weather changes (Appendix 3.g), which was pulled from the Spanish-language MOOC on climate change. Participants of this thread accumulated a range of different personal observations of the weather changes that have taken place in their region and shared the effects they have had on the population. The thread started with a participant sharing his observations about massive deforestations in Venezuela. This in turn invited other participants to share their observations of environmental degradation and climate trends. The first respondent described the unpredictable weather variations in Colombia, which is picked up by the next participant, who added that unpredictable weather in Ecuador posed sowing difficulties for farmers. A multitude of participants from different regions in Latin America continued to add problems observed in their countries: A participant from Bolivia decried the melting glaciers in the Andes. A participant from Uruguay described the milder winters in recent years. a participant from Chile noted the devastating droughts in the Northern and Central part of his country. A participant from Argentina confirmed the mild winters. A participant from Colombia added the extreme weather outbursts and pollution in the city. A participant from Venezuela complained about unbearable heat. A participant from Peru described the urban pollution and the desiccation of the Titicaca Lake. Another participant from Peru confirmed the mild winters. A participant from Ecuador added the risks of rock-sliding in the regions of the Ecuadorian Amazonas. A participant from Guatemala described the unpredictable start of the rain season that posed

difficulties for farmers. A participant from Ecuador described the process of desertification in parts of the country. A participant from Colombia reconfirmed the droughts and heavy rains. Finally, a participant from Ecuador described the long, unseasonal rain periods.

The accumulation of observations about environmental changes in this thread is impressive, and builds up the problems of climate change and environmental damages through the persuasive form of extensive listing. Similar to the previous sample, this form of repetitive addition establishes more certainty and urgency by relying on an accumulation of personal testimonials by participants ranging all the way from Central to South America. Different from the single testimonial by the Syrian participant, this listing of extensive testimonials is what builds its persuasive strength both through the real witness account as well as the statistical representativeness that builds up through long list of cases. With each addition of a testimonial, the thread amplifies the degree of the problem's severity that is of continental scope and affects the livelihood of populations in significant ways. Similar to the thread on reproductive health, participants become aware of both the scope of the problem, as well as its different symptoms, such as drought, floods, and seasonal irregularities.

The invitational nature of additive discussion is particularly useful in bringing to the surface a range of ideas, experiences, and observations that allow individual participants to be able to develop a broader perspective on problems by taking a more holistic view that accounts for symptoms that are otherwise not readily accessible to the single participant. Through the exchange that happens on additive discussion patterns,

personal experiences can be understood as global problems that are still personally relevant.

### **Accumulating Solutions to Public Problems**

The additive listing of different experiences can work to paint a more multifaceted picture of global public problems, but they can also evoke choice and agency when listing different options and solutions. Hence, in a thread on the need for exercise (Appendix 3.h), participants from around the world share with their peers their experiences with public programs to promote exercise, including some evaluations of their effectiveness. The initial post was by a participant from Egypt, who gave an example of an urban program called “Cairo Runners,” a weekly event that invites residents to participate in a run. This example seemed to resonate with other participants, as they contributed with similar observations from their country. A participant from Nigeria mentioned corporate fitness programs for employees, a participant from Sao Paulo, Brazil, brought up the urban biking lanes, a participant from Mexico City described the city’s weekly closings of certain streets for running and walking activities, and another participant from Nepal expressed admiration for the biking system in Copenhagen, Denmark. All of these participants raised ideas from their own arsenal of experiences, thus creating a list of solutions for other countries to imitate. Those who participated in this thread, or at least read it, could learn about other resolutions to the common problem of physical inactivity, and be inspired to demand similar programs to be implemented in their own cities.

Most of the solution statements that were collected through additive discussion threads did not consist of a sharing of actual experiences, as in the thread on physical exercise programs. Rather, they accumulated invented solutions. Since solutions are projections directed toward the future, they rely on the creative problem-solving skills of the learners. Moreover, the art of creative problem solving is often enhanced by the brainstorming capacities of a multitude of participants, who mutually inspire one another, and whose diverse range of experiences and frameworks from across the globe can produce a greater assortment of ideas from which to effectively choose a plan of action.

Threads that listed solutions occurred in both MOOCs on public health and climate change. The thread discussed above on the disproportionate harm of fast food to vulnerable populations also lists various potential solutions. Participants came up with the need for public grants to supply stores in poor neighborhoods with healthier options, the need to teach home economics again in schools to empower students with the skill to cook healthy meals, the need for city councils to regulate fast food chains to limit their number in poor neighborhoods, the reminder that individuals can develop the discipline to engage in daily exercise routines, the need to replace fast food stores with grocery stores, the need to support healthy fast food restaurants, the need to introduce a tax on all kinds of unhealthy products like the soda tax in California, and the need for publicly sponsored education campaigns. After listing these solutions, participants are likely to feel empowered with options to tackle the problem of unhealthy dieting among the poor. While some of these options seem more plausible than others, they may have different application values depending on region and society. Regardless of their strength, they may inspire participants to continue developing more plans of actions for the needs of

their particular community. At least, the process of collective problem-solving may supply participants with a resource for the abundant generation of ideas and with the comfort of knowing that they are not alone in striving for improvement.

In the MOOC on global warming, participants collaboratively composed large lists of ideas for reducing the carbon dioxide impact and one other list of ideas on how to educate the masses and raise awareness about climate change, which is fully displayed in Appendix 3.j. One of the threads that produced an array of ideas to reduce carbon dioxide emissions (Appendix 3.i) generated 33 solution statements across 63 posts. The thread started with the question what, besides the need to reduce, recycle, and reuse, we should do to limit our carbon footprint. It inspired a massive accumulation of ideas listed here:

1. We should recycle, reuse, and reduce.
2. We should buy local products.
3. We should buy products with less packaging.
4. We should use public transportation.
5. We should use digital media to disseminate information instantly.
6. We should do without so many luxuries that we take for granted.
7. We should demand from our government more investment in renewable energies.
8. We should pressure corporations for ecological stewardship.
9. We should use ecologically sustainable architecture
10. We should demand more sustainable development programs from our government.
11. We should demand more collaboration of leaders across different sectors for sustainable development plans.
12. We should reduce our competitive lifestyles.
13. We should pressure government to support the production of electric cars.
14. We should overturn the capitalist system.
15. We should invent an economic system that is in greater equilibrium with nature and its resources.
16. We should support the invention new technologies that reduce CO<sub>2</sub> emissions.
17. We should organize educational workshops with rural populations.
18. We should create economic blockades against economies that use non-renewable energy to a significant extent (China and India).
19. We should educate the children because they are more open-minded than adults.
20. We should support the production of more energy-efficient products and make them affordable for poor populations through government subventions. For example, reduce the price of cheaper energy-efficient light bulbs.

21. We should plant trees.
22. We should arrange workshops on inexpensive ways to lower your CO2 impact.
23. We should pressure government for more efficient water and waste management.
24. We should walk more and use your car less.
25. We should demand public trash pick-up.
26. We should clean up the rivers.
27. We should form a small NGO that works with local communities.
28. We should conserve water.
29. We should find ways of global and local collaboration of administration.
30. We should reuse products that derive from petrol.
31. We should start permaculture.
32. We should push the government for industrial regulations.
33. We need to find ways to hold corporations more accountable for their CO2 production.

This list illustrates how a massive number of engaged participants can generate an impressive list of ideas for tackling the pending problem of climate change. Additive discussion patterns take advantage of the massive number of participants with wide and diverse ranges of experiences for generating various solution proposals to common problems. Participants are not only inspired by their peers to think of additional solutions, but they are also becoming aware of the multitude of approaches that can be taken in order to take control of climate change. The awareness of multiple pathways for resolution can be empowering to the learner and is the result of massive exchange.

The additive style of discussion fosters this exchange through its inexhaustible invitation of additional ideas, which makes it appropriate for massive participation on open online forums. The thread on climate change resolutions and the thread on information dissemination strategies (Appendix 3.j) both show how additive discussion patterns are creativity generators and intense brainstorming mechanisms that capitalize on the abundance of learners and that can have the effect of empowering learners to become actively engaged in their own communities. For example, the plethora of ideas generated

in the thread on knowledge dissemination strategies is not fully listed in this chapter, but includes data mining strategies facilitated through the new media, eco-tourism, governmental departments of education, climate-themed video games, local theatres, workshops, university radio stations, positive frames of efficacy, the need for lay term explanations, etc.

The generation of solutions facilitated through additive discussion patterns makes possible a more collaborative form of practical wisdom (phronesis). Participants do not come up with solutions on their own, but exchange and bounce ideas off one another on a massive scale. Isocrates had declared practical wisdom the central objective of his *paideia*, and understood it as a form of eloquence that aligned the speaker's judgments with the benefits of the city.<sup>96</sup> In the additive discussion thread, the accumulation of various solutions can sketch approaches that already account for the "city's" benefits because the ideas are generated by and for the "city", even though today the "city" is a set of interlinked localities that span the globe. Participants who use the additive thread for developing a resolution strategy to a public problem take advantage of a democratic resource that generates ideas that are in the city's best interest.

### **Global Democratic Communities**

Additive styles of discussion develop as responses open questions that invite a plethora of different input. For example, the additive threads from the MOOC on evolutionary biology responded to the open question what evolutionary conditions took place to favor the procreation of the shark, rather than the placoderm, or what geological

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<sup>96</sup> Takis Poulakos, "Isocrates' civic education and the question of doxa," in *Isocrates and Civic Education*, ed. Takis Poulakos and David Depew (Austin: University of Texas Press, 2004), 59.

conditions must be secured for life to emerge on Earth. The additive threads on the construction of social problems responded to the open question about the ways in which more vulnerable parts of the population disproportionately suffer the harmful effects of fast food, or in what ways reproductive rights are related to reproductive health, or in what ways climate change is affecting the weather where you live. The additive threads on the accumulation of solutions similarly responded to open questions about the ways to remedy climate change or unhealthy diets among the poor. Even the listings of counterarguments against a controversial position are examples of threads that unfold additively by responding to the open question about the different reasons why the thesis is unacceptable.

All of these examples of open questions invite multiple responses and open up a democratic forum of a diverse range of contributions that are not based on scientific expertise, but based on the experiences and referential frameworks of participants. As the sample threads illustrate, the responses to these open questions are not selected based on their truthfulness but based on their creative productivity. For example, through the addition of more and more counterarguments to the benefits of climate change, participants come to understand that they are dealing with a deliberative claim that is neither true nor false, but strong or weak. The argument that climate change has positive consequences is not wrong, but it is weak in comparison to the listing of threats climate change poses to human progress or even survival. Similarly, the personal observation that suicide rates in Syrian society are low is not completely invalid, as there is a reason for why this Syrian participant may be led to think so. The counterarguments merely establish that a single testimonial is not sufficiently strong to establish its truthfulness, or



that a position is weak compared to its contraposition. At any rate, the Syrian testimonial can be taken as a cautious sign that suicide rates in Syria may indeed appear to be comparatively low, especially since the participant mentions having lived in Europe and gained perspective on this issue.

The additive thread does not discontinue because a specific answer to a specific question has been found, but because participants run out of ideas. Since there is no specific expectation of an answer, there is no censoring of ideas, as long as they relate to the introduced topic. Due to its open and invitational characteristics, the additive discussion thread should be considered a democratic style because it brings together participants as a people who exchange ideas in an open marketplace. The additive style constitutes a forum that unites a people based on common concerns and interests, but not based on common opinions or expert levels. The additive style does not construct political interest groups or scientific communities, but gives participants a chance to open their world to new perspectives, thoughts, and ideas, while sharing their own. Even though the list of counterarguments may appear to silence controversial statements, the additive style is more interested in what position generates more and stronger reasons for endorsement. The reasons in support of the benefits of climate change are fewer and weaker, but they found a place to be voiced in the forum, and the participant who expressed her view on the benefits of climate change is as much a part of the forum as the participants who refuted her.

Hence, despite its inclusiveness of all types of positions and views, the additive thread may actually support Leah Ceccarelli's argument that not all perspectives in

scientific controversies are equal.<sup>97</sup> Ceccarelli proposes that manufactured scientific controversies, which are false appeals to balanced divergence on scientific questions,<sup>98</sup> are overcome not by ignoring the opponent, but by overpowering the skeptic with arguments and then quickly moving away from questions of fact onto deliberative questions of policy to find solutions (“We ought to...”).<sup>99</sup> The additive thread can visually and quantitatively establish the imbalance between two positions by accumulating more arguments for one side of the controversy than on the other. By generating a larger and more diverse list of reasons in support of one argument and a shorter list of reasons in support of another, threads unveil the greater strength of one position without completely silencing the opponent as wrong. The additive style therefore does not treat all arguments as equal, although it does treat all participants as equal in the sense that all of them have the same opportunity to contribute to the thread. Although an additive thread on a controversy can garner more supporting justifications for one position than another and thus represent an issue more fairly, it does not silence opposition and therefore may prevent the deviant opponent from becoming celebrated as an anti-dogmatic hero.<sup>100</sup> Moreover, the opponent’s argument is rarely completely illegitimate. In the end, considering the benefits of climate change might be unfathomable in light of its disastrous consequences, but a consideration of its benefits is not per se wrong and may even facilitate more pragmatic ways of constructively preparing for the impending range of crises.

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<sup>97</sup> Leah Ceccarelli, “Manufacturing Scientific Controversy: Science, Rhetoric, and Public Debate,” *Rhetoric & Public Affairs* 14, no. 2 (2011): 195-228.

<sup>98</sup> Ibid, 196. “A scientific controversy is ‘manufactured’ in the public sphere when an arguer announces that there is an ongoing scientific debate in the technical sphere about a matter for which there is actually an overwhelming scientific consensus.”

<sup>99</sup> Ibid, 212.

<sup>100</sup> Ibid, 208.

## **Pedagogical Implications**

The democratic quality of additive discussion benefits its participants not only through political empowerment but through their encounter with new ideas and frames of reference that have the potential to broaden the students' horizon. Additive styles of discussion are pedagogically valuable because they collectively and inductively produce knowledge, expose students to new ideas, challenge them to think creatively and invent additional ideas, and they allow students to understand what one argument in a controversy has more merit than another. Common to all of these benefits is the additive style's potential to facilitate freshness, be it through new knowledge or diverse perspectives.

Despite the deliberative context in which most additive discussion patterns emerge, their pedagogical potential extends into the realm of science. The first two sample threads in this chapter demonstrate the capacity of additive accumulations of speculations to collaboratively produce new knowledge and understanding. The important difference from how knowledge is produced in more linear responsive styles is that the additive form builds knowledge inductively, whereas the responsive pattern builds knowledge more deductively. Chapter Two showed how linear discussion is set off by the proposal of a hypothesis that, if accepted, prompts participants to elaborate and flesh out the hypothesis in more detail. By contrast, the additive style collects specific input from a range of participants that together make up new knowledge. Thus, the thread on why the shark outlived the placoderm resulted in a more sophisticated general understanding that accounts for a range of reasons supplied by different participants. Educators are advised to promote these types of additive speculations by posing open

questions, rather than questions that demand a single answer. In the realm of science, more philosophical questions such as the conditions for life on Earth, are especially conducive to additive speculation, because there is not measure for verifying the truthfulness of answers, and therefore students are invited to invent responses based also on plausibility and creativity, rather than only based on expertise.

In the same way that induction can produce understanding of scientific events, it can generate the presence of social problems and help participants gain a more complex understanding of how populations are affected. As the sample threads on collaborative problem construction illustrate, additive discussions expose participants to the ideas of their peers, which can help them develop a kind of multiperspectivism that can foster tolerance and diversity. Exposing learners to the ideas of others allows them to think in more complex ways about problems by becoming acquainted with a range of perspectives that otherwise would not be available to them from their individual frames of reference. Thus, for a European, who thinks of reproductive health as an infrastructural problem, it may be important to consider reproductive health as a social problem due to its non-normative topic of discussion, and due to violent disempowerment of women in some parts of the world. This understanding may be facilitated after reading the testimonials by African and Latin American participants. For participants who think of the health risks among people of lower socio-economic class as a budget problem, it may be enriching to learn about additional factors, such as the lack of “leisure” time for cooking among working-class, one-parent families. Even though the participants who added considerations to this thread may not have spoken from experience, they still accumulated a list of plausible obstacles for poor families to maintain a healthy diet.

Thereby, participants drew a more realistic picture of the variables that make up real situations for lower-class people that otherwise are more difficult to imagine based on the individual frames of reference available to those accustomed to a more comfortable lifestyle.

Hence, additive discussions allow participants to learn perspectives that are unavailable in their own lives because they would require living the life of someone at a different location, of a different class, or of a different culture. By adding more considerations to a problem, participants get a richer understanding of its real impact on people's lives. The realism constructed through the listing of specific aspects, and the extended attention given to a problem, evoke a sense of presence that invites participants to develop empathy and urgency for public action. Additive problem discussion occurs when there is an understanding that problems are not causal but have multiple dimensions and factors. Besides proposing open questions with multiple answers, educators can promote this kind of broadminded understanding of problems by encouraging students to share their personal experiences when answering open questions. Educators can encourage participants to share their experiences by sharing their own experience, or by starting with a simple cause-effect explanation for problems that provokes students to add considerations.

The cultivation of open-mindedness through a range of diverse perspectives can in turn serve to inspire even more ideas among participants, which can be used for constructive problem-solving. Not only does a multifaceted understanding of a problem increase the participants' wisdom to come up with mindful solutions in consideration of the different angles of a problem, but it may also inspire participants to think in

unconventional ways. Hence, the additive thread does not only draw from the participants' existing frames of reference but creates new frames of reference through the discussion pattern. On the one hand, the threads that generate a list of solutions invite participants to scan their own depot of experiences for possible ideas. On the other hand, the thread may also generate ideas by inspiration, such as when an idea by one participant triggers an associated idea in another participant. Additive discussion patterns are massive brainstorming mechanisms because new ideas are generated through the additive textual form itself. In other words, the additive form is itself creative because it is invitational and inspiring. In terms of the Isocratean educational goal of overcoming local doxa, the additive pattern generates more global doxa democratically by drawing from participants' local arsenal of opinions and impressions. Through this exchange of local doxa, participants can start affiliating as global, democratic communities. In sum, the additive thread is creative because it inspires individual participants to think beyond their conventional limits, by accumulating a diverse range of ideas and options, and by creating global communities.

To activate the additive form of collective problem-solving, educators are advised to encourage students to share personal experiences, as in the thread on public exercise programs in different cities around the world. Educators can ask students to speak from experience by asking them to scan their daily environments for ideas and observations. For example, the thread on solving climate change could have been enhanced had participants contributed with more concrete things that they have implemented or will implement into their routines based on the possibilities that each lifestyle yields. Solving global problems can have intimidating and discouraging effects when focusing on the

global players of the United Nation or the global summits of leading nations. Hence, accumulating concrete ideas for actions that are small but feasible and realistic can motivate other participants to imitate those actions and feel that they have cumulative efficacy. In the context of climate change, these action proposals can be directed at reducing one's personal carbon dioxide emission as well as organizing protest movements against governmental and global leaders.

Besides raising awareness of new issues and accumulating solutions, additive threads can be pedagogically valuable when they allow participants to gain perspective on what side of an issue has a greater range of supporting arguments. As discussed in the previous section on democratic communities, the additive form brings controversial positions to the attention of participants without allowing these positions to take on the same degree of legitimacy as the opposing position. The additive style of argumentation can potentially challenge participants to consider new positions and also present participants with a perspective on their legitimacy. Educators are advised to abstain from shunning unpopular positions, such as the “pros” of climate change, but instead challenge participants to engage in a contest: What are ways in which climate change is harmful? What are the ways in which it is helpful? Of course, it is to be hoped that participants accumulate more reasons for why it is harmful. If participants come up with invalid responses for how it is beneficial, it is the instructor's responsibility to make corrections and ask for arguments that explain the harmful consequences of climate change. If the reason for why climate change can be beneficial has validity, then it must be accepted and understood in the context of various other reasons for why climate change is harmful. In all four types of additive discussion patterns, I believe it can be valuable to ask

learners to compose concluding summaries of the various points that were raised in the threads. Not only does this require learners to read each other's statements, but it also challenges them to engage each post not as a true-or-false statement but as one dimension of a larger phenomenon, problem, or process.

Finally, it is important to consider that additive discussions involve participants in the learning process and therefore give them the power to partially determine what issues and questions are attended to. Just like any oral discussions, the learners are challenged to advance the learning through participation, which may increase engagement and gratification. The knowledge, problems, solutions, and arguments that are established through the additive, inductive processes are expressions of the things that affect and interest the learners themselves. Hence, learners come together as publics through common needs, interests, and affections. Through the additive accumulation of statements, the thread lets participants become the authors of what matters to them. In an age in which information is abundant, what we attend to and declare of importance can be democratically negotiated in additive threads of discussion.



## CHAPTER 4

### DIGITAL MIMESIS AS A FORM OF GLOBAL ACTIVISM IN RESPONSE TO CLIMATE CHANGE

#### **Introduction**

The cultivation of resourceful and mindful character, appropriate for civic practice, is the mission of a liberal arts education. According to Robert Hariman, the acquisition of resourcefulness is an educational process that cannot be theorized and conveyed to students through given templates and guidelines. The formation of resourceful, civic character is an aesthetic process that requires a particular type of practice that follows practice, rather than application that follows theory. Hariman notes that “Democratic polity can get by without theoretical direction because it already has a more workable hermeneutic practice: the practice of imitation.”<sup>101</sup> Resourceful imitation involves prudential reasoning, the observation of current problems afflicting societies, and the inventiveness to apply old models to address new situations. Robert Terrill argues that civic-mindedness is marked by duality, which involves the study and appreciation of cultural models for the effective response to pertinent situations.<sup>102</sup> In this chapter, I study mimesis as a digital style of composition that can create global civic character through individual reiteration of common environmental experiences.

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<sup>101</sup> Robert Hariman, “Civic education, Classical imitation, and Democratic Polity,” in *Isocrates and Civic Education*, ed. Takis Poulakos and David Depew (Austin: University of Texas Press, 2004), 230

<sup>102</sup> Robert Terrill, “Mimesis, Duality, and Rhetorical Education,” *Rhetoric Society Quarterly* 41, no. 4 (2011): 305.

This chapter explores the inventive potential of imitation and repetition in the online discussion forum of a Spanish-language massive open online course (MOOC) on global climate change. Due to my interest in extensive repetition, I analyzed only those discussion threads that had over 20 posts. The MOOC was highly effective in motivating large numbers of participants toward diverse forms of civic action. By Week 5, participants had expressed intentions to start local activist groups to pressure their governments for more rigorous policy, to restrain their consumer lifestyles, to disseminate the knowledge they had gained in this MOOC in local schools and universities, and many participants had already started discussions on other social media platforms in the hope of continuing this form of international exchange. One group that had developed on Facebook had even begun the process of founding a Latin American non-governmental organization called “Grupo Cambio Climatico Latinoamerica.”

I argue that in a massive global forum with over 6,000 participants, public formation and disposition toward political activity was enabled by the massive repetition and imitation of key statements. Mimesis spurred along a repetitive text that had the effect of reinforcing key statements around which a global public could organize. I further argue that this type of reiteration is the product of affective excess triggered by statements with particularly high resonance across participants. Participants were able to affiliate as environmental activists based on shared affect in relation to common experiences, observations, and attributions. I will first describe how repetitive discussion patterns help participants diagnose commonalities that form the foundation for public affiliation. Second, I show how repetitions of blame against a designated party helps a public to further define its disposition against a moral culprit, illustrating how different

assignments of blame fuel different emotions and types of affiliations. Third, I analyze additive repetition as a deliberative style for the digital age. Finally, I theorize digital mimesis as an affectively spurred process and provide a discussion of its contributions to a liberal arts education in the global, digital age. I conclude that civic character in the digital age is the collective product of repetitive speech patterns, rather than an individual speaker's qualities of practical wisdom and dual-mindedness.

### **Diagnosing Commonalities**

MOOC discussion forums can be effective in bringing to the surface similarities of experiences among participants dispersed across different geographic locations. This is important at a time when public problems oftentimes have global dimensions that pose organizational challenges for activists. Climate change is a perfect example, as it manifests in different ways all across the globe, and its amelioration demands a global consistency in policy implementation. In the MOOC on climate change, participants were eager to describe their personal observations of how the climate has affected the population in their own region. A number of symptoms were repeated with frequency across many different discussion threads. Observations that were made with the greatest frequency were about drought and water shortage, flooding and heavy rains, rising temperatures, weather instability, and hardship for subsistence farmers and fishermen (see Table A: Diagnosing common experiences of climate change).

The repetition of observed symptoms that are attributed to the phenomenon of global climate change provides an important diagnostic process that brings participants together as a public under the recognition that they suffer shared consequences of climate

change. John Dewey defines a public by a sharing of indirect consequences, proposing that problems need to affect a larger group of people, who are not all directly and immediately impacted, but who yet have a stake in the way the problem is managed. He writes, “The line between private and public is to be drawn on the basis of the extent and scope of the consequences of acts which are so important as to need control, whether by inhibition or by promotion.”<sup>103</sup> The more distributed the problem, the more democratic is the public that comes into existence. Repetition as a diagnostic process of global public problems is especially effective when it occurs across participants in different geographic locations because it fosters empathy despite geographic distance. For example, the observation of drought and water shortage was repeated by individuals in eleven different countries ranging from North to South America, including non-Spanish speaking regions (United States, Mexico, Guatemala, Nicaragua, El Salvador, Honduras, the Dominican Republic, Ecuador, Peru, Brazil, and Chile). The problem of unpredictable weather and its difficulty for subsistence farmers was repeated across participants in nine different countries ranging from North to South America (Mexico, Guatemala, Nicaragua, Honduras, El Salvador, Dominican Republic, Ecuador, Bolivia, and Chile). Shown here is an example of a thread that repeats the observation of an increase in vector-borne diseases across participants in different countries. Since the thirty-four post long thread extends across sixteen pages, only the repeated claims about the increase in vector-carrying mosquito populations is shown here:

- Hola a todos.  
Ciertamente los efectos a la salud ya son evidentes y se estan documentando en los distintos países y regiones. Un ejemplo claro es la incidencia del Chinkungunya a finales del año 2014 e inicios del 2015 en centroamerica,

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<sup>103</sup> John Dewey, *The Public and its Problems* (Athens: Swallow Press, 1927), 15.

epidemia que creo una alarma sanitaria en la región y que dejó consecuencias sanitarias en las personas que lo padecieron.

**We have a Chikungunya epidemic in Central America.**

- En efecto todos estamos de acuerdo con la relación cambio climático-salud humana, es importante recalcar el tema ya que nuestro planeta es un ecosistema en constante relación y poco a poco nos damos cuenta de la aparición de enfermedades desconocidas y epidemias que incluso se las consideraba desaparecidas y están regresando por ejemplo la peste bubónica.

**We are witnessing the return of diseases we thought had disappeared.**

- En mi país, Costa Rica, no solo están retornando enfermedades que se consideraban erradicadas, por el rompimiento de las barreras sanitarias a causa del clima. También se han encontrado vectores en zonas que antes no eran susceptibles a la propagación de enfermedades, como el caso del dengue y obviamente la incidencia del Chikungunya provocó una alerta sanitaria.

**Chikungunya is also a problem in Costa Rica. We are struggling with a return in Dengue fever, too.**

- Los vectores de muchas de las enfermedades humanas tropicales requieren de condiciones climáticas que ya están consiguiendo, en el caso de Colombia, en pisos térmicos más altos donde antes no se conocían. Estos patrones cambiantes de enfermedades también se pueden observar en plagas y enfermedades en plantas y animales.

Pero, además, también se están incrementando problemas de salud pública derivados de los picos de calor que afectan a las poblaciones entre 0 y 1000 metros, que afectan a los adultos mayores y a los niños.

**Tropic diseases are spreading into new areas in Colombia.**

- En efecto, la salud humana es uno de los indicadores que se ven afectados por el Cambio Climático, en nuestro País quizá lo más evidente es el incremento de vectores como los mosquitos, así como las enfermedades gastrointestinales se han elevado, tal como es comentado por los videos. De igual manera, existen algunos estudios (básicos) sobre la disminución drástica de anfibios y la dispersión de otras plantas en zonas que antes no eran reportadas.

**We are witnessing an increase in mosquito populations, which can cause gastrointestinal diseases.**

- Las altas temperaturas son el caldo perfecto para la proliferación de mosquitos y a su vez conlleva a la propagación de enfermedades de tipo endémicas transmitidas por estos, ya se ven los efectos con casos de personas con Dengue, Malaria, Chikungunya, fiebre amarilla, etc; todas transmitidas por insectos, en nuestro País Tropical, Venezuela, esto es un problema de sanidad que ya lleva tiempo en la palestra. Enfermedades que ya se habían extinguido o erradicado vuelven a manifestarse, producto de las altas temperaturas, del mal uso de las aguas, en las poblaciones más pobres el agua no llega a través de tuberías, sino de pozos, ríos, acantilados, donde estas aguas son envasadas sin llevar un control de almacenamiento, trayendo consigo una razón más de proliferación de mosquitos. Esto es un problema sanitario que se le debe abordar cuanto antes, sino tendremos plagas sin control en un futuro no muy lejano.

There's an increase in mosquitos carrying dengue, malaria, and chikungunya in Venezuela. Diseases that we thought had gotten under control are returning, which could be the product of high temperatures and bad hygiene.

- De acuerdo con lo expuesto por los distintos compañeros y compañeras del curso, ya tenemos el incremento de las enfermedades tropicales como la malaria y el dengue y la aparición de nuevas como el chikungunya; además de la presencia de estas enfermedades en lugares donde no llegaban.

En mi ciudad (Bucaramanga, Colombia), además de estas enfermedades tenemos recientemente, en el sector urbano, la enfermedad del chagas, generada no por la picadura del triatomo (conocido comúnmente como pito) sino por el consumo de alimentos con los cuales los triatomos están teniendo contacto (ejemplo bebidas como jugos; faras que han sido picados por dichos vectores y son transmisores de la enfermedad), afectando las vías digestivas de las personas con posibilidad rápida de fallecimiento sino se detecta y trata rápidamente. Sus síntomas se confunden con el dengue. Estos vectores eran propios de las áreas rurales, hospedados principalmente por la mata de palma. Parece que hay nuevas especies hospederas de los mismos como producto de los cambios de temperatura y de la movilidad de las especies.

Agrees with her peers that we have an increase in dengue and malaria, and chikungunya. There's an increase in the vector pito/triatomins that is transmitted through food intake, and symptoms are often confused with dengue. There are new hosts for these vectors due to changes in temperature.

- Totalmente de acuerdo con los compañeros, en mi país Colombia, es triste conocer estas cifras que reportan la situación crítica de una zona, pero que reflejan la situación general sobretodo del sector rural de un país; porque a pesar de que no se visibiliza, muchas comunidades sufren día a día los efectos asociados al cambio climático, ya sea por escasez de alimentos, dificultad en el acceso y disponibilidad de agua de calidad o a causa de las enfermedades que tanto se han mencionado Chikunguña, dengue y ahora el virus del Zika.

La problemática existe, está presente hace mucho tiempo pero hasta ahora no hay una política pública efectiva frente a la toma de decisiones y acciones de adaptación al cambio climático.

We have a problem with Chikungunya, Dengue, and Zika in Colombia. There is insufficient political action.

- En la zona planetaria donde vivo pues el cambio climático está incidiendo en la proliferación de enfermedades tropicales, malaria, dengue, chikungunya.

Los comportamientos que se han documentado en investigaciones de años anteriores y la experiencia de otros países, sobre la proliferación del virus del dengue y la malaria, han tenido una relación evidente con las variaciones del clima, permiten vislumbrar que en Ecuador la incursión del chikungunya aumentará, de no tomarse las debidas medidas.

La malaria y el dengue han tenido puntos críticos en épocas húmedas y secas, es decir con los fenómenos de El Niño y La Niña, y ya se ha establecido que cuando estas anomalías climáticas tienen lugar en el trópico, hay un aumento evidente en los casos de personas infectadas y enfermas.

En este momento tenemos las condiciones climáticas que fortalecen la proliferación del Aedes Aegypti que, como bien se sabe, es el mismo mosquito o especie portadora y transmisora del dengue y el chikungunya. La variabilidad climática ha ocasionado epidemias de dengue y malaria en esta zona del continente, lo que nos lleva a inferir el posible comportamiento que pueda tener el virus que recién llega al país.

**Malaria, Dengue, and Chikungunya are problems related to the variations of climate. Ecuador is not taking measures to reduce the outbreak. It gets worse during extreme climates, such as El Nino/La Nina. Aegypti and Aedes are types of the same mosquito specie as Chikungunya and Dengue.**

- Las consecuencias son impactantes, estamos recibéndolas directamente y muchas veces no se nos ocurre relacionar las afecciones a la salud con el cambio climático.

En el material de estudio se menciona una serie de repercusiones sobre la salud humana: paludismo, fiebre del dengue, desnutrición, entre muchas más.

En Honduras, muchas enfermedades han ido afectando al país, posteriormente a las inundaciones que se han vuelto tan frecuentes, a la pérdida de cultivos y escasez de alimentos en muchas zonas, al difícil control de vectores que atacan a la población, como la Chikungunya, o el cólera, que perjudicó mucho a nuestra población hace algunos años.

Como hondureña considero que mi país, siendo realmente tan vulnerable al ser un país en vías de desarrollo, con una ubicación geográfica que nos pone en el primer lugar en vulnerabilidad ante el cambio climático, y con un sistema de salud quebrantado por las malas prácticas gubernamentales, no estamos preparados; la corrupción gubernamental es un factor que no se está considerando y que aún sin 4°C más tiene a nuestro país agonizando, es difícil traducirlo en términos amigables en un contexto que nos tiene con las manos atadas; no somos los únicos, sin embargo, es preocupante que como país no se pueda hacer frente a las enfermedades frecuentes de los ciudadanos, con el cambio climático ¿qué nos espera? esa es la pregunta que todos los hondureños nos hacemos

**In Honduras we are suffering from Dengue, malnutrition, and malaria, as well as inundations, bad harvest, and a difficulty in controlling vector mosquitos. Our country is already afflicted with governmental corruption and poverty, and it is also one of the most vulnerable to climate change in the world. How do we resist against all of this?**

- En Venezuela las enfermedades se han incrementado y un Gobierno Nacional sin recursos para combatir las diferentes epidemias, aunado a que la población no consigue las medicinas en las farmacias, implica desmejoramiento de la calidad de vida y aumento del número de afectados.

**There are more epidemics in Venezuela today. The population doesn't receive the right medicine in the pharmacies.**

Also see Appendix A for a 68-post long thread that repeats the observation of water

shortage and floods as problems related to climate change. The global discussion forum

facilitated the discovery of commonalities that aligned individuals under shared symptoms of climate change. The thread consists of an abundance of individual testimonials, which support the claim that global climate change is real to the extent that it shapes the experiences of populations worldwide. The repetition serves as support that inductively builds the claim that climate change is a real problem with qualitative support in form of testimonials and quantitative support in form of massive repetition. Therefore, the repetition of the same observations (disease, drought, floods, etc.) construct a shared problem (global climate change) based on interrelated consequences. Moreover, the reiteration of a shared problem unites participants as a public of shared concern.

The construction of a public through the repetition of similar witnessing and experiencing is perhaps the most radical form of grassroots organizing. Through the repetition of common experiences and observations, a nascent global public emerges independent of pre-existing ideologies or identities. Repetition constructs the public as a text that is in process of becoming, open to modifications, expansions, and delimitations, depending on the types of comments that continue to be posted and repeated. The public that is constructed through this type of iterative process is democratic because it takes on formation in response to widely shared problems and experiences. Hence, single testimonials become politically significant “stitches” that knit a public into existence.

In taking a closer look at Appendix A, it should also become apparent that repetition is not pure coincidence, but often triggered by the types of statements that precede it. Statements two and three introduce the three topics of floods, drought, and farming challenges that are being repeated throughout the rest of the thread. The thread shows that these observations are not the product of multiple participants coincidentally



thinking the same thing at the same time, but take off in a “domino effect,” growing in power and maintaining a timely presence with each additional repetition. Repetition therefore needs to be understood not only as a process of discovering pre-existing commonalities, but also as a mimetic process propelled by textuality itself. Mimesis, the copying and reappropriation of existing statements, occurs in digital discussion forums as an echoing of preceding statements that has the effect of fortifying observations with wide, public resonance. It is similar to the simple “Me, too!,” which is an utterance that signals a sharing of affect with affiliative potential. While these types of repetitive statements don’t develop or build on the content introduced in preceding posts, they are inspired by it, which produces an affective excess that motivates confirmatory reiterations. Hence, statements that grow in power and align a multitude of digital participants are both discovered and constructed affectively through the mimetic form.

### **Motivating Actions by Assigning Responsibility**

While an international public of shared consequences took shape through repetitive discussion patterns, it showed variation in terms of the assignments of blame for climate change. The type of accusation was significant for determining the course of public activism. Participants showed variation by attributing blame to the indolence of their national governments, the pollution of industrialized and industrializing nations, and human recklessness.

Participants in the MOOC on climate change repeated a shared frustration with their governments as passive, indifferent, and corrupted. The observation, “Our government is not doing enough,” “Our government is ineffective,” and “Our

government is not trustworthy,” was reiterated in 75 posts across 16 discussion threads, and the statement “Economic interests win over sustainable policies was reiterated in 25 posts across ten threads. Participants from Venezuela, Peru, Chile, Ecuador, Spain, Honduras, Mexico, Nicaragua, Colombia, Guatemala, and Honduras repeated the observation that their governments are not doing enough to avert climate change. Specifically, the governments are misguided by unsustainable economic interests, they don’t follow the law, and they don’t make an effort to publish studies to educate its citizens about climate change. Participants from nine countries (Uruguay, Venezuela, Colombia, Chile, Guatemala, Peru, Spain, Paraguay, and Nicaragua) made the repeated statement that economic interests divert the government from sustainable policy solutions. These statements range from general observations such as, “Our world is run by economic interests” to specific observations about how the Venezuelan government is run by the petroleum industry or how the mining industry in Chile is destroying the Patagonian landscape and the extraction of petroleum in the sea is polluting the waters and destroying the fish populations. See Appendix B for an example of a thread in which the repeated denigration of the government was especially prominent. The frequency of statements that expressed despondence with their governments reveals how participants hold their government accountable as a primary agent in reducing carbon emissions.

With each repetition about governmental indifference and corruption, the participants grew as a public based on the circulation of frustration and anger. The participants’ cohesion in frustration and impatience against their governments constitutes them as activist publics who demand actions. Similar to the process of diagnosing the common affections of climate change, the reiteration of governmental irresponsibility is a

mimetic process in which participants' expressions of frustrations invite other participants to post similar governmental critiques. With each additional repetition of frustration with the government, the claim becomes stronger and more accepted throughout the discussion forum, thus delineating a public that is motivated to take action. Appendix B depicts how the expressions of frustration with the government pick up between posts two and 17.

Besides the accusation against national governments, participants also turned to industrialized nations as accountable for global warming. The problem statement, "Agricultural economies are the most vulnerable to climate change while industrialized economies do the most harm to the environment" shifts the responsibility onto a group of developing and wealthy nations. Statements that reflect this attribution were repeated throughout eleven different discussion threads and came up 31 times. One post predicts how the 2015 summit on climate change in Paris is not going to result in a legally binding international contract because China, India, and the United States oppose it. Another post notes that it is a shame that those countries that are the greatest polluters are not stepping up to the task of reducing greenhouse gases. Another participant provocatively asks whether the carbon emission of a European is the same as that of an African. In three threads, the United States Congress specifically is held accountable for its failure to approve more rigorous policy to avert climate change.

The repetition of attributing blame to economically powerful nations strengthens public unity among the participants who are mostly from developing nations in Latin America. The repetitions of blame against wealthy nations built up as a collective anger among participants, expressed in statements like "You don't even notice climate change

if you have air conditioning!” With each additional repetition, the perceived division between rich and poor nations becomes stronger, and the public that is constructed takes on a more defined position in opposition to industrialized nations. The problem with this general public of poor farming nations is that it does not facilitate a truly global public of climate change sufferers, but a more abstract and simplified identity in opposition to industrialized nations. By repeating the claim that wealthy and industrialized nations are primarily responsible for global climate change, the participants are constructing a guilty party that is geographically distant from them. Hence, the frustration was not in response to an array of personal observations and experiences but to an accusation that relied upon a more abstract division of global rich and poor. The repeated distribution of blame against “industrialized nations” constructs a more abstract public of agricultural nations in opposition to a distant industrialized polluter.

The denigration against industrialized nations is frequently challenged by numerous participants who assign responsibility to all humans as consumption-driven creatures (see Appendix C). For example, when a participant in a thread from the first week posts a long essay about the environmental degradation committed by the multinational corporations for the benefit of economically powerful nations, many participants challenged her critique and argued that all humans are equally responsible for moving toward a resolution. Human greed, indifference, and careless consumption were raised as the main problems in 55 posts across eight threads. Moreover, human blemish was often associated with ignorance about climate change, which was repeated in 34 posts across ten threads. Observations about reckless consumption and ignorance often came up together with other statements about individual agency, such as the

responsibility to educate the next generation on how to become stewards of the environment, or the observation that we are all to blame for climate change and need to become environmental citizens.

The vilification of consumerism was often articulated as a somber view of human nature. For example, in Appendix C posts 15 to 22 reflect the attribution of primal human drives as the problem associated both with inactivity and with wasteful consumption. The excerpt raises different types of “human sinfulness”, such as desire for luxury, laziness, habit, selfishness and indifference, hubris, and ignorance. Through the repetition of accusations against humans for their drive toward excess, a more general human responsibility for global climate change becomes present and leads to the conclusion that it is also our human responsibility to make changes. The repetition of human responsibility constructs a globally inclusive public vis-à-vis the problem of climate change. This public exceeds any geographic boundaries because it points to everyone and no one in particular, while pressing for individual responsibility to make lifestyle changes. Hence, the public that is constructed through this type of repetition is not demarcated by its antagonistic position against an Other; it is open-ended and inclusive of everybody who is willing to accept their own burden on this planet. Unlike the public of “poor farming nations,” the public that is constructed through the repetition of human responsibility is not articulated as an abstract category. The repeated assignment of human responsibility fuels a general human guilt that can lead participants to confront themselves as individuals who can be held accountable for their own life choices.

Through the repetition of human blame and individual responsibility, this global public can actively reproduce and maintain itself without requiring an outgroup. Without

an ‘Other,’ this global public does not exist as an abstract, timeless name, such as “Bolivians,” “Mexicans,” or what some call the “Global South.” Rather, its existence hinges upon regular participation. Repetition plays a central role in the construction of this human public because it constitutes the process by which individual acts turn into public activism. Active, iterative participation on the discussion forum thus constitutes a style of global, non-governmental activism that aspires toward difference through the reiteration of individual lifestyle changes.

In the discussion forum on climate change, the Latin American body of participants split into three overlapping activist groups based on different emotions and accusations. While some posts concentrated on the responsibility of their national governments in implementing effective environmental policies, other posts shed blame on the wasteful lifestyles of wealthy nations. Again other posts emphasized the importance of human agency by attributing climate change to human wastefulness. It is important to consider that these attributions of responsibility for climate change are not exclusive types. All three attributions can coexist, as there is not a single group or party that is solely responsible. These variations are facilitated through the repetitive pattern of the discussion threads. Although a difference in attribution can potentially lead to debate, such as depicted in Appendix C, repetitive addition presents a quantitative pattern of argumentation whose potency is based on the number of reiterations, rather than the qualitative composition of a single argument. Although debate occurred seldom, argumentation on massive open discussion forums generally comes closer to a race or contest than a debate. Conceiving of argumentation as a race of repetitive claims, all three

attributions of blame can coexist, but some of them will be more potent due to their greater appeal throughout the discussion forum.

All three attributions imply three types of environmental activist groups, whose presence hinges upon the amount of repetition of key statements. Each public is constructed by a distinct set of emotions felt toward a different moral culprit, which each implies a different set of actions.

### *Uniting in Action*

Solution proposals were subject to avid repetition in the discussion forum. One of the most ubiquitous claims was a call of urgency, “We need to act, now,” which came up in 53 posts throughout 14 discussion threads. This general sense of urgency was a response to a widespread sentiment of worry about the changing climate on earth. Across eleven discussion threads, thirty-three posts expressed sadness and concern, for example, about the disappearance of glaciers in Bolivia, or about the disappearance of marine life in the seas. For example, one participant expresses his desperation thus: “Hello, I’m Ramon from Honduras what a pity that our planet is destroying itself by our human hands I feel like crying but it’s better to find alternatives to save it.” While all participants seem to be in agreement about the urgency for change, Table B on The Repetition of General Solutions shows the variation in solution approaches that are in line with the differences in accusing global elites, humanity, or national governments.

The call for more educational initiatives to spread awareness about climate change was by far the most reiterated statement in the whole discussion forum. This is also reflected in how many participants praised the World Bank and their peers for the

educational experience that the MOOC offered. Over the course of the MOOC, twenty-nine statements of thankfulness were made, with 22 of them occurring only in the final week. This emphasis on education corresponds with the assumption that more information will lead to self-reflection at the individual level for more environmentally sustainable lifestyle choices, and, hence, reflects the charge of human wastefulness. See Appendix C for how an emphasis on education often co-occurs with statements of individual responsibility. The accountability of individual action is explicitly expressed in 27 posts across ten threads, and is also implied in the second-most-frequent solution statement that we need a cultural revolution that steers society away from capitalist consumer lifestyles, which was reiterated in 28 posts across twelve threads. With an overall 148 posts reflecting the human charge to make individual changes, this approach to resolve climate change was the most popular across the discussion forum.

Second was the more traditional turn to governmental policy, which came in the form of calls for sustainability plans, calls to organize local protest groups, and the general expectation that governments are to implement policies that are favorable for its citizens. Together, attributions to governmental policy changes made up 65 posts of the discussion threads that were analyzed. Lastly, participants expressed the need for a legally binding treaty at the global level to commit industries to a reduction of carbon dioxide emissions. Comparatively, only 19 posts reiterated this solution. Appendix C shows how the repetition of individual responsibility often occurs in competition with statements that attribute blame to global centers of power, such as industrialized nations and multi-global corporations.



All three attributions articulate activist publics that imply different paths of actions. The effectiveness of all three paths of activism hinges upon the same iterative style with which statements become popular on the digital discussion forum. The more participants support joining global non-governmental organizations, for example, the more effective are activist goals of putting pressure on global institutions to sign international treaties to curb carbon dioxide emission. The more people commit to cutting down their individual energy consumption, the more effective is the activism against reckless consumer lifestyles in response to human charges for climate change. The more participants organize protests for more sustainable policy, the more effective is the activism in response to governmental accountability. With each individual's additional commitment, the movement strengthens in the same way that repetitions of key statements on the global discussion forum grow into popular movements. To borrow from Kenneth Burke's distinction of action and motion, additive repetition is the mode of catalyzing a public movement from the massive repetition of individual actions.

For example, the popular appeal to education by "spreading the word" mirrors the mimetic form by which statements become reiterated throughout the discussion forum. This suggests that additive repetition is the style of activism in the global, non-governed, arena. Each repetitive imitation adds a layer of confirmation that is not contained by national boundaries. As each participant takes deliberate action to educate others of climate change, a global environmental public ensues. In the context of ignorance and recklessness as human charges of climate change, the dissemination of information serves to address the global human self as culprit, as victim, and as agent of climate change. It is

through the reiterative process of “spreading the word” that the activist plans of education create real potential for change.

Unfortunately, besides the need to inform others of climate change, participants fell short of reinforcing other types of direct actions that they could carry out individually. Statements that expressed the need to recycle or to plant trees were barely repeated in ten and twelve posts, respectively. It is possible that human charges were perceived to concern others more than self. This would suggest that the general interest in education reflects a mentality of passing responsibility to other humans who are perceived to be more ignorant than the participants in this MOOC.

Instead of reinforcing individual paths of action through repetition, a significant number of participants looked for ways of organizing through digital media sites. For example, throughout the course, many participants addressed the need to form online discussion groups. Four entire threads (280 posts total) were dedicated to organizing groups on different social media such as GooglePlus, Skype, Facebook, and even via a single email account. The interest in continuing the discussion on platforms that would persist beyond the duration of the MOOC reflects the participants’ more general interest in “spreading the word” as well as the interest in organizing as a global political movement to face global challenges of climate change. Thus, by the end of the MOOC, 240 participants had started an active initiative to create a Latin American NGO. As Appendix D demonstrates, the final week of the MOOC was marked by an especially strong urge for activism that had grown steadily over the five-week course.

While 34 posts across eleven threads emphasized the political objective of digital organizing, a lot of participants reiterated their intentions of using social media for

educational as well as affiliatory purposes. Participants had developed such pleasures in affiliations that several participants expressed interests in continuing the discussion forum that was provided by Coursera. No course assistant responded to a participant's request to keep the discussion forum open beyond the duration of the course. However, upon another participant's request to create a listserv with the email addresses of all participants, a course assistant replied that this was an unlikely option due to participants' rights to privacy. The assistant then proposed that the participant join one of the discussion groups that are emerging on blogs, Google Plus, and Facebook in response to this MOOC. Interestingly, the participant insisted in creating a listserv and asked each individual participant in the final week of the course for their contact information. The participant's persistence, as well as the massive cooperation from his peers in supplying their email addresses, illustrates the strong motivation to affiliate via social media. Unfortunately, it is ambiguous whether these social media sites present any political leverage to evoke change in individual choices or environmental policy. Indeed, the high rates of expressed worry and anger could have built up a motivation for action that was harnessed as the motivation to create online discussion groups and making additional posts *instead of* direct actions. The pleasure of affiliating as a group of educated environmentalists risks a kind of contentment that condones passiveness with regards to climate change.

Unfortunately, it is ambiguous whether these social media sites present any political leverage to evoke change in individual choices or environmental policy. Indeed, the high rates of expressed worry and anger could have built up a motivation for action that was harnessed as the motivation to create online discussion groups and making

additional posts *instead of* direct actions. The pleasure of affiliating as a group of educated environmentalists risks a kind of contentment that condones passiveness with regards to climate change.

Although this analysis is unable to show whether affiliations result in direct actions, the general disposition toward organizing reflects the success of the MOOC in producing public affiliations in response to climate change. I have shown in this analysis how public affiliations were the product of repetition and mimesis. Although the repetitions of the observed symptoms of climate change and the repetitions of accusations allowed participants to organize as a public, the ambiguity about who to blame and against whom to take what type of action stifled a global public from taking specific actions with more defined objectives. Instead, participants seemed to adhere to the digital media for disseminating information and cultivating public affiliations. As demonstrated across nine discussion threads and 15 posts, many participants expressed their pleasure of being part of a community of people with whom to share their fears, sadness, and worries. For example, a participant from Venezuela writes:

Hello, I live in Coro, Falcon State in Venezuela. It is terrific when we unite as a group of people from all across the world through our shared feelings. I hope that through this course we won't just learn and share our experiences but become mouthpieces to create more awareness for humanity about our use of the planet's resources so that we can realize more efficient extraction. Not just the planet cries for it, but it is a biblical mandate. Blessings.

If the pleasure of affiliating as educated environmentalists vis-à-vis ignorant masses is greater than the fear and the worry about the effects of changing climate, digital communities will continue to exist without any efficacious action.

Although it is beyond the scope of this study to tell whether participants took direct actions upon completing the MOOC, it is fair to venture that individual action may

be encouraged by the observation that many other people across the globe are starting to become active. In the absence of global governmental institutions with the power to implement environmental policies, the mimetic form bears prospects for a digital type of activism that begins with the acknowledgment of individual, human responsibility. Different from parliamentary debate over the strength and weaknesses of different policies, digital “deliberation” is a matter of massive reiteration of particular acts that can grow into a large movement with the potential for real change. Starting a global activist group on a social media site is a good idea in theory, but its effectiveness is conditioned by the amount of participants who decide to spend their energy on this type of activism to pressure global authorities for change. Similarly, affecting change at the level of human consumption is only effective if enough participants decide to follow suit and make restrictions to their consumption. Hence, activist movements become effective in the same way that statements on discussion forums build affiliations: through the quantitative process of repetition.

Mimesis in the digital discussion forum could be considered a global style of activism because it is the process that converts dispersed individual actions from across the globe into more coordinated, popular movements. Through mimesis, individual observations with strong resonance multiply among numerous participants and allow a public to take shape. In this MOOC, many participants across Latin America shared the sensation that climate change is affecting their lives, and that it is time to act. Hence, the MOOC had the potential to call into existence a global public of environmentalists.

## Repetition as an Emotive Catalyst for Activism

The analysis has shown how the reiteration of worry about the effects of climate change constructs a global public, that the reiteration of frustration and anger based on the accusation against governmental and global institutions constructs more traditional public activist groups, and that the reiteration of human guilt may construct more individualized forms of activism. Affiliations are affective rhetorical processes with politically significant action tendencies. Scholars like Celeste M. Condit and Sara Ahmed have shown how emotions imply specific actions that position individuals in distinct relationships with others. Sara Ahmed observes that “it is through emotions, or how we respond to objects and others, that surfaces or boundaries are made: the ‘I’ and the ‘we’ are shaped by, and even take the shape of, contact with others,”<sup>104</sup> and Condit defines emotions as “social messages,”<sup>105</sup> explaining that they “are not merely warning signs within an individual, but rather they are generally also relational signals for co-orienting people.”<sup>106</sup> Based on Brian Massumi’s distinction of emotion from affect, which he defines as pure intensity, Condit argues that affect is pivotal for coordinating affiliations regardless of and even in contest with dominant ideologies.<sup>107</sup> The digital discussion forum on climate change illustrates how affective intensity fuels mimetic repetition that iteratively builds up a public emotion that shapes public character and dispositions the public toward particular sets of actions.

Digital mimesis is a style of proliferation that is fueled by a surplus of affective intensity that is necessary in order to make a given statement one more time and thereby

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<sup>104</sup> Sara Ahmed, *The Cultural Politics of Emotion* (New York: Routledge, 2015).

<sup>105</sup> Celeste M. Condit, “Pathos in Criticism: Edwin Black’s Communism-As-Cancer Metaphor,” *Quarterly Journal of Speech* 99, no. 1 (2013): 6.

<sup>106</sup> Ibid

<sup>107</sup> Ibid, 5-7.

reinforce its validity. Unlike the singular act of memorization, translation, and paraphrasing, digital mimesis is a collective form of composition. All threads that are shown in the appendices illustrate how the posting of certain statements is propelled in the immediate context of similar or the same statements, thus suggesting that repetition occurs through mimesis, rather than by coincidence. In Appendix C, the statement that industrialized nations and large corporations are to blame for global warming is repeated frequently in the first eleven posts of the thread and slows down thereafter. Indeed, it becomes replaced by the gradually growing counterstatement that all humans are to blame for global warming, which picks up in the later part of the thread in combination with the equally growing repetition that humans are mainly motivated by immediate gratification and that education is key to fostering more awareness and motivating individual action. Digital mimesis therefore should be understood as a form that breeds massive imitation among participants.

The motivation to restate something that has in fact already been established in a previous statement would seem superfluous and redundant from a purely formal, argumentative standard. However, understanding mimesis as an affectively driven repetition that provides confirmation and reinforcement allows us to appreciate its central role in shaping a public from publically consistent emotions in relation to common interests and struggles. Indeed, the mimetic circulation of publically relevant statements occurs through a surplus of affective energy that maintains a public presence through time.

The construction of a collective civic character is the mission of a liberal arts education. Whereas traditional liberal arts education had as its goal to build mindfulness

and resourcefulness in students to train them in eloquence, a digital model for liberal arts education builds mindfulness and resourcefulness as the results of collaborative speech activity.

### **Pedagogical Implications**

The repetition of common observations and experiences is not only a political process of public formation and activism, but a valuable educational process of cultivating global awareness and mindfulness. Participants in the discussion forum were able to recognize their own personal fears and frustrations in the statements of many others, and climate change skeptics<sup>108</sup> were able to see their own denial outshined by the abundance of contrary testimonials. The repetition of claims in the discussion forum allows participants to understand climate change not just as a scientific theory that predicts environmental consequences due to an excess in human carbon dioxide emissions, but also at the experiential level of how the changing climate is affecting city dwellers and farmers at different locations on Earth. Hence, the discussion forum restores the human dimension of global phenomena and complements scientific theory with real-life testimonials. Moreover, the type of additive validation that was produced through repetition of statements with the most popular appeal gives repetitive discussion forums a strong democratic foundation that allows students not just to learn about popular griefs and challenges but also to participate in the construction of popular problems. Put differently, the discussion forum situates the learner as a co-author in a collective text, rather than as a reader of a pre-written textbook.

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<sup>108</sup> There was not a single participant that questioned the existence of climate change in this MOOC. That is not to say that they didn't exist, especially in the beginning of the MOOC. However, they might have stayed quiet due to the overwhelming agreement that it is real.



As the most repeated statements receive the most validation, digital discussion forums are vulnerable to the accusation of populism. That which is valid, right, and best is determined democratically, and might evoke the fear in some that the “wrong” idea becomes selected by an ignorant, irrational mass. In order to prevent discussion forums from reiterating invalid claims without requiring participants to ponder scientific evidence, lectures can regulate the quality of the discussion. In MOOCs, teams of reputable scholars rely on peer-reviewed literature to compose their lectures, which serve to somewhat moderate discussion.

Whereas the video lectures provided students with a scientific understanding of climate change, the discussion forum put a human face on the phenomenon. However, the lectures also significantly moderated the types of statements that were reiterated in the discussion forum by framing participants’ direct observations as evidence of global warming. Personal observations were understood through the lens of climate change even though a small degree of weather variation has always existed. For example, some participants attributed weather catastrophes during the season of El Nino to global warming. Although the repetition of personal observations is a democratic process through which participants connect as publics, the course material also qualifies whether these publics can strictly be considered grassroots phenomena.

Scholars of rhetorical pedagogy have often decried the degradation of a rhetorical education based on imitation since the Age of Enlightenment. In reference to Cicero and Quintillian, Terrill argues that a pedagogy based on mimesis fosters in students a double-mindedness with dual commitments to present situation and past cultural artifacts. As students rely on cultural resources to compose their speeches, they become more self-

conscious of their fragmented authorship, and more aware of real public demands.

Memorization and translation, primary components of mimesis, “seem less like withered or withering classroom exercises, in this context, and more like training in the important ability to appreciate the arguments of others as resources for the invention of one’s own reply, and thus engage in a sort of talk that makes deliberation possible.”<sup>109</sup> According to Terrill, a rhetorical education in mimesis allows students to become more self-aware, more politically aware, and more open to otherness because of their training in perspective-taking.<sup>110</sup>

The digital discussion forum has both intensified and significantly changed the educational qualities of mimesis as theorized by Terrill. The discussion forum has intensified these qualities because the massive repetition of statements lets students see their own posts not as original messages but as confirmative reiterations of other statements. Instead of students posting original arguments, they find their post echoed in a matrix of similar posts. Due to the massive extent of activity in the discussion forum, participants are able to reflect upon their own posts in terms of how they are like and unlike other comments, rather than on how their single message will impact other participants. This allows participants to see each other as partners in a collaborative process of composition that renders participants both audience and author at the same time. As co-authors of a collective text, students gain perspective when they get the chance to see their statements in the context of similar and different observations and opinions of participants around the world.

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<sup>109</sup> Terrill, “Mimesis, Duality, and Rhetorical Education,” 308.

<sup>110</sup> Ibid.

As the discussion forum intensifies the pedagogical effects of mimesis in the areas of self-consciousness, political awareness, and openness to difference, it speeds up the process of imitation to such the degree that it significantly alters mimesis from how it was theorized as oral style by Terrill and the Greeks. Since the reiteration of statements in digital culture is an instant process, mimesis does not entail the students' careful dual analysis of speech and situation, as described by Terrill. Instead of a single speaker aligning both model speech and situation through reasoned judgment,<sup>111</sup> repetitive discussions construct a public as a civic speaker. It follows that the speaker does not precede a political situation that she or he can contemplate before addressing. Rather, both civic speaker and the situation are constructed in instant waves of reiteration that shortcut any form of strategic analysis. Without a reasoning author, digital mimesis should be understood as an iterative repetition that is spurred affectively, rather than strategically. This conclusion begs the question whether the digital form of mimesis builds the resourceful, mindful character that is idealized by Hariman and Terrill.

Repetitive and additive discussion patterns provide evidence for assuming that digital discussion forums do cultivate Hariman's resourcefulness and Terrill's "double-voiced multiperspectivism,"<sup>112</sup> albeit in form of a collective character, or, ethos. Instead of attributing reasoned judgment to the individual speaker, we must attribute reasoned judgment to a collective character that is reasonable insofar that it responds to popular worries and needs, and that itself is borne from affectively spurred patterns of mimesis. I

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<sup>111</sup> Ibid, 300-301. In responding to Ronald Greene's virtue of debating both sides of an issue, Terrill notes that reasoned judgment is a requisite characteristic of democratic citizens that is also cultivated through mimesis.

<sup>112</sup> Ibid, 312.

thereby suggest to argue that affect is essential to the additive construction of reasonable, resourceful character in the digital age.

Educators are advised not to reject repetition as a redundant form, but appreciate its value in promoting affiliations and public character. Due to the liberal arts emphasis on civic character, instructors should encourage mimetic discourse by assigning that students speak from experience in order to discover commonalities and build affiliations. Another strategy may be to ask students to actively seek out and respond to those statements that they agree with, rather than challenge those they disagree with. Further, the escalating effect of repetition suggests that course designers who are interested in promoting public activism and organizing allow the discussion to remain open through the end of the course. Upon observing that numerous participants expressed interest in continuing the discussion on other online discussion platforms and even requested that the course's discussion forum stay open beyond the duration of the course, the author encourages MOOC designers to expand their concept of "openness" from meaning global reach to including open time, or, duration. Finally, since mimesis in the digital forum mirrors mimesis in the global physical arena, teachers of public policy subjects should aspire to extend the mimetic form into the realm of behavior choices. This can be done by encouraging students to share on the forum what they are doing individually to take action. Students who are active may be eager to post their action as a way of demonstrating their commitment, whereas other participants may become inspired to engage in similar actions upon reading the actions of their peers. Ideally, this kind of mimesis would have a spiraling effect to motivate more and more people to become active as part of a larger movement.

## **Conclusion**

This analysis has revealed the importance of repetition to the formation of public consciousness and civic character. I have shown how repetition of common experiences and observations brings together a public of shared consequences. Common attributions of blame served to build emotions of frustration, anger, and guilt, which in turn may motivate participants to seek out particular paths of activism. I have shown how the incongruence of attributions rarely produced any arguments of disagreement and was primarily a quantitative matter of additive repetition as a form of confirmation.

Consecutively, I have presented mimetic repetition as appealing to the liberal arts mission of building civic character, arguing that mimetic repetition in the discussion forum had the potential of cultivating collective character that allows individual participants to understand their own thoughts and feelings through a text that mirrors the thoughts and feelings of other individuals from around the world. This allows participants to recognize cross-national commonalities and disparities that otherwise wouldn't have been discernible. Finally, I have provided an explanation of mimesis as an affective process that cultivates affiliations among human beings. These affiliations were defined by desperation, anger, and pleasures of association.

As noted in my analysis, most participants attributed blame to all humans by repeating statements about their self-centered, consumerist lifestyles, and they called for a greater conscientiousness as the solution to climate change. On the one hand, by treating the human as both a victim and a culprit of climate change, participants were able to form a truly "global" public in the non-exclusive sense of the word. Every time a public aligns against another group, it is inherently exclusive and non-global. Yet, when a

public turns against its human, consuming, individual self, it can reach the global dimension of a human public. It shall be noted that the human public of individuals is not necessarily run by individualist interests. Rather, it is a human public that turns to individual choice as a solution to common problems. On the other hand, the massive appeals to human ignorance created a more exclusive elite of environmentalists who stand apart from “general humanity”.

Repetition is an affective rhetorical process that is pivotal to the formation of a public with political goals in the digital sphere. While I have argued that repetition was a democratic process of public formations, other explanations exist for why participants were remarkably fast to agree on the need for activism. Firstly, this MOOC covered a political issue that demands activism. Unlike the science MOOC on evolutionary biology, this MOOC covered a political issue that demands activism. Secondly, the scope of the MOOC on climate change was sufficiently narrow to make repetition of key statements more likely. The global health MOOC dealt with the political issues of public health, but failed to rouse a public toward activism, possibly because it covered too many subjects, ranging from reproductive health, psychological health, vector-borne diseases, non-communicable diseases, and climate change. Repetition in a discussion forum that deals with such an extensive number of subjects is highly unlikely.

Third, the participants in the MOOC on climate change were from a culturally coherent region. By offering the MOOC in Spanish, participants from Latin America and Spain had an exclusive invitation to participate. This affected repetition in two ways: On a global scale, the preceding cultural identity as Ibero-Americans predisposed participants toward public coherence as sharing a common fate of climate change that

some believe to be worse in Latin America than in other, wealthier regions of the world. Thus, accusations against industrialized nations may have been more popular in a MOOC that targets participants who see themselves as part of a culturally coherent region that relies on farming and, as a whole, is less economically powerful. Further, the common geography increased the likelihood of overlapping experiences of climate change among participants, which may have led to more repetition. However, it is necessary to consider that the MOOC involved participants all the way from North to South America, which covers a diverse range of geographic regions. What's more, the significance in repetition was not that the forum reiterated the same symptoms of climate change but that it repeated the effects of climate change as a globally collective problem.

CHAPTER 5

FLUENT IDENTITIES:

TOWARD A LIBERAL ARTS EDUCATION OF GLOBAL RELEVANCE

**Introduction**

The chapters on linear responsive, additive, and repetitive discussion patterns illustrate how online discussion forums have the potential to uphold a liberal arts standard of education and cultivate civic character among the learners. With the exception of the competitive responsive style of discussion, all three patterns break down authorship and thereby empower learners to participate in the collective production of knowledge while undermining a prideful concentration of authorship and expertise. Online discussion forums can offer a civic education because the learning process of posting and sharing productively entangles the learners in a web of affiliations that guarantee a relation of relevance between knowledge and community: The knowledge that is produced maintains a strong relation to the interests and needs of the learners. As participants share information and experience, they construct collective knowledge, or *doxa*, in the image of the communities that have an interest in this knowledge.

All three styles of discussion construct new knowledge around the collective needs and interests of participants, which form the basis for different types of affiliations. The first chapter has shown that linear responsive styles of discussion construct scientific communities who affiliate based on shared curiosity. The second chapter has shown that



additive discussion styles construct democratic publics based on the egalitarian invitation to post on questions participants collectively care about. The third chapter has shown that repetitive discussion styles construct activist groups who affiliate based on shared emotions of worry and anger. A strong liberal arts education fosters the development of the students in both areas of knowledge acquisition as well as socialization, and allows them to see the relevance between knowledge and the public. Altogether, linear, additive, and repetitive styles have the potential to cultivate scientific knowledge, public awareness, public solidarity, broadminded perspective, practical wisdom, and activism, which are all valuable components of a liberal arts education.

In this final chapter, I offer a response to the inadequacies of the connectivist model by arguing that global discussion forums are more than information networks because they have the potential to build public affiliations based on the production of public needs and interests as a timely construct that is produced through additive and repetitive discourse. Presence is a communal state of awareness that is affectively moderated. Digital discussion forums reinvent a collective presence that has been lost since the age of oral cultures. This digital presence is characterized by a punctual, scattered, interactive timeliness, which gains escalating momentum with each additional discussion post, and thereby constructs a public through time. This chapter will first establish how a strong liberal arts education needs to put a double emphasis on both scientific and public knowledge. Second, I will show how additive and repetitive discourse builds public knowledge due to its ability to establish presence. Third, I will discuss the importance of affective energy as a requisite for the prolongation of presence.

## **Liberal Selves: Knowing and Caring**

From the age of literacy and print, we have inherited an elitist model of education that centers on the acquisition of knowledge and information as a marker of intelligence and sophistication. As suggested by Ong, literate cultures have enabled a detachment of knowledge from the public realm of consequences, and education became a more elitist activity for those who could afford the time and energy to engage in study. With print and digital communication technology, knowledge is now becoming more and more accessible to larger masses of people. Whereas an education was an upper-class luxury, information acquisition is now a requirement for all working class people in order to make a living. Hence, our “information society” has turned a scholastic education model into a mass education that is often described as vocational schooling. The connectivist model of MOOCs, which is explained in Chapter One, is an example of a vocational lens through which to make sense of open online education resources. However, at the same time that the digital communication technologies are making abundant information more accessible to global populations, not all information is equal. What populations need to know and what they are interested in knowing, are affective processes that mediate what people attend to. When a lot of people attend to the same questions, publics can develop as a textual arrangement. This resulting public significance of knowledge (doxa) is what completes the mission of a liberal arts education.

Current vocational pedagogies delimit the value of learning to the comprehension of scientific theory or the consumption of information and facts. A liberal arts education complements scientific knowledge with questions of public interest and relevance, so that the natural sciences, the social sciences, and the humanities can work together toward a

greater quality of public awareness, resourcefulness, solidarity, and expertise, which shall empower a public and improve the quality of life of its members. According to Celeste M. Condit, scientific discourse can be more beneficial for the needs of the people through a greater integration of science with rhetorical studies.<sup>113</sup> She presses upon the need for a more interdisciplinary rigor in higher education, and for a more global, cosmopolitan perspective. Both shall resist the trend toward anti-governmental dynasties that materialize as private universities and suppress any study of what could threaten their power.<sup>114</sup> In reference of the interplay between the humanities, the social sciences, and the natural sciences, Condit writes: “The tendencies of these three supra-disciplines, each in their own way, [help] to expand the breadth of vision, self-control, and empathy of young people [and] have been productive contributors to the decline in violence, torture, ethnocentrism, rape, domestic abuse, and child abuse.”<sup>115</sup> The achievement of higher, more dignified standards of living through a character-building education is what the liberal arts tradition aims at. With this goal in mind, scientists should not pretend to pursue self-appraising, apolitical scholarship that narrows the conversation to a small group of experts, but identify the public implications of their knowledge and bring it into public conversations.<sup>116</sup>

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<sup>113</sup> Celeste M. Condit, "Mind the Gaps: Hidden Purposes and Missing Internationalism in Scholarship on the Rhetoric of Science and Technology in Public Discourse," *Poroi* 9, no.1 (2013): 2.

<sup>114</sup> *Ibid.*, 3.

<sup>115</sup> *Ibid.*

<sup>116</sup> *Ibid.*, 4: “To be an academic should not mean to find the narrowest possible community to credit or gain accreditation with. It should be to accept the mission of enhancing understanding where understanding engages maximal possible breadth under the – necessarily and desirably vague – trajectory of improving the richness of life for human beings while protecting the world around us. Scientists cannot expand understanding in this way without the humanities, social scientists cannot do this without the humanities, and humanists (or post-humanists) like rhetoricians also can’t do this without the natural and social sciences.”

As Chapter Two has shown, linear discussions that respond to specific scientific questions filter out participation based on higher levels of expertise, and thus threaten to close scientific communities off from appealing to the lay interests of the public. Although linear scientific discussions are fueled by individual curiosity, interest, and dominance, they abstain from appeals to personal interests through which participants could potentially identify and affiliate as a public. The interest of dominance may be personal, but it is an individualist, competitive emotion that contradicts collective affiliation. As John Dewey notes, sciences have always been occupied with the abstract and specialized, that which is “not conceived in terms of its bearing upon human life.”<sup>117</sup> Linear contributions mostly entail depersonalized information that elaborates or refutes the preceding statement.

In order for the sciences to become a more integral part of a liberal arts mission of education, scientists must occasionally make an effort to relate their studies to how they affect a large number of people on a personal level. Thus, the information from the evolutionary biology MOOC needed to occasionally engage questions of how this information could help us understand the current evolutionary pressures of climate change and the human role in shaping its outcome. The question of climate change came up regularly in this MOOC, although it never maintained a sustained subject of discussion. A good example is depicted in Appendix 2.a, in which Peter Farrell brings up ozone depletion as an example of Jacob Leach’s hypothesis of earth-life feedback. Leach responds by confirming Farrell’s proposition, elaborating that humans are destroying their own conditions for living. This observation sparks further commentary by Peter

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<sup>117</sup> John Dewey, *The Public and its Problems* (Athens: Swallow Press, 1927), 172.

Volkert, who elaborates that humans have a special responsibility for action due to our knowledge of climate change. This comment is crucial because it creates the important relation between scientific knowledge and public responsibility that scientists need to make in order to bring their expertise into the public sphere.

Similar to Condit, John Dewey deplores the separation of the sciences from human experience as an irresponsible depoliticization and dehumanization of knowledge. The departmentalization of knowledge into fields is a symptom of treating knowledge as an intellectual engagement with subjects that bear no consequence on human lives, and of drawing a separation between the mind as the bearer of knowledge and the body as the bearer of affection and consequence. Dewey writes, “The isolation of the humane subjects from one another is connected with their aloofness from physical knowledge. The mind still draws a sharp separation between the world in which man lives and the life of man in and by that world, a cleft reflected in the separation of man himself into a body and a mind.”<sup>118</sup> Dewey discards the celebration of pure science as a “shirking of responsibility,”<sup>119</sup> and calls upon scientists to explore how their knowledge bears upon human consequences and to translate technical vocabulary into more popular terms: “One would think, then, that a fundamental and every-operating aim would be to translate knowledge of the subject-matter of physical conditions into terms which are generally understood, into signs denoting human consequences of services and disservices rendered.”<sup>120</sup>

Dewey’s key term for distinguishing political affairs from science is ‘human consequences,’ which must be perceived as consequences and managed “so as to secure

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<sup>118</sup> Ibid, 171.

<sup>119</sup> Ibid, 175.

<sup>120</sup> Ibid, 173.

some consequences and avoid others.”<sup>121</sup> For Dewey, not all consequences enter the realm of the political. Dewey differentiates between direct and indirect consequences, with indirect consequences defining the public vis-à-vis the state as an organized body of people who manage these consequences with the help of officials and material agencies.<sup>122</sup> Direct consequences pertain to the private interests because they don’t take up the scope of relevance that indirect consequences have. Dewey reasons, “When the consequences of an action are confined, or are thought to be confined, mainly to the persons directly engaged in it, the transaction is a private one.”<sup>123</sup> For Dewey, the exclusion of direct consequences from political affairs is not just that they are personal but that they don’t have the popular scope of significance that indirect consequences have. In the end, for Dewey, it is the scope of consequences that matters more than the personal interest for bringing a public into existence. He writes: “The line between private and public is to be drawn on the basis of the extent and scope of the consequences of acts which are so important as to need control, whether by inhibition or by promotion.”<sup>124</sup>

In light of Dewey’s emphasis on the perception of consequences,<sup>125</sup> the difference between direct and indirect consequences is not of category but of degree. Indirect and direct consequences entail incremental levels of affection and perception: To some, a problem is glaring, and to others it is barely noticeable. When publics are defined

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<sup>121</sup> Ibid, 12.

<sup>122</sup> Ibid, 16, “The public as far as organized by means of officials and material agencies to care for the extensive and enduring indirect consequences of transactions is the *Populus*.”

<sup>123</sup> Ibid, 12.

<sup>124</sup> Ibid, 15.

<sup>125</sup> Ibid, 12, We take then our point of departure from the objective fact that human acts have consequences upon others, that some of these consequences are perceived, and that their perception leads to subsequent effort to control action so as to secure some consequences and avoid others.

categorically by state lines, they include individuals who are not always directly affected by governmental policies. By contrast, a massive global public requires a more active involvement with their consequences, and an active organizing in order to become recognized as a public. Global publics are more fluent and they transition with the specific consequences that are pressing at the time. The analysis in Chapter Four has shown how digital discussion forums can facilitate the organizing of a global public by accumulating responses by a large number of people from around the world who perceive a direct stake in the consequences of climate change. Hence, the digital communication media can facilitate that a massive number of individuals who perceive similar consequences come together as a public. Through specific arrangement of discussion posts, a discussion thread can bring together the direct, lived consequences of a massive number of globally dispersed individuals and thereby construct a global public.

The liberal arts model of the digital age must aim at teaching public engagement by starting with private individuals as the building blocks of a public. This aim relies on the recognition of privacy as a publicly relevant domain. Michael Warner argues that the necessities of the body are occasions for forming publics.<sup>126</sup> In his famous chapter, *Publics and Counterpublics*, he argues that “counterpublics of sex and gender are teaching us to recognize in new and deeper ways how privacy is publicly constructed. They are testing our understanding of how private life can be made publicly relevant.”<sup>127</sup> In particular, private experience becomes publically relevant when they resonate among others, and when this shared resonance is perceived as a common phenomenon. The analyses on additive and repetitive styles of discussion have shown how digital

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<sup>126</sup> Michael Warner, *Publics and Counterpublics* (New York: Zone Books, 2002), 61.

<sup>127</sup> Ibid, 62.

communication media can facilitate the discovery individual experiences as common occurrences, and thereby realize the production of geographically dispersed publics.

This chapter makes the argument that additive and repetitive discussion patterns create a public presence that is marked by a timely, collaborative attentiveness to, or perception of, shared consequences. Public presence is an important element of a digital liberal arts education because it allows students, who live in an age of information abundance, to increase their awareness and direct their attentiveness to matters of public consequence. Digital public presence is a punctual, dispersed timeliness that is created through iterative styles of discussion. In combination with relevant scientific knowledge acquired in linear discussions and the collaborative resourcefulness of additive discussions, this public awareness can train the learner to become a civic-minded actor in a global arena.

### **Digital Presence**

Knowledge enters the discourse of public consequences usually as a kind of awareness. In the MOOC on climate change, participants did not need to understand the entire science behind the process of global warming in order to be aware of it as a threat to their existence. Unlike knowledge, awareness is not enduring and universal, but tied to a present, affective arousal that is usually perceived through the senses. Chapter One draws from Perelman and Olbrechts-Tyteca's definition of presence as an art of emphasis,<sup>128</sup> from the Connectivist literature's definition of social presence as emotional

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<sup>128</sup> Chaim Perelman, *The Realm of Rhetoric* (Notre Dame: University of Notre Dame Press, 1982), 37. Perelman borrows this definition from Richard M. Weaver, who wrote, "Rhetoric comprehensively considered is an art of emphasis."



language,<sup>129</sup> and from Walter Ong's description of oral cultures as eventful,<sup>130</sup> and as essentially tied to the ephemeral presence of sound as a sensual experience that generates attention. Based on Perelman and Olbrechts-Tyteca, Connectivism, and Walter Ong, I define presence as an affective energy that generates awareness and attentiveness at the intersection of knowing and feeling. If this affective energy resonates among many, a collective presence emerges that is conducive to affiliations around public interests. As a form of awareness, presence is a state between knowing and feeling. A liberal arts education that puts dual emphasis on increasing students' knowledge and socializing them so as to enhance their civic involvement, presence is a useful concept that can guide educators in maintaining publicly useful relations between knowledge and its timely and affective consequences.

Perelman and Olbrechts-Tyteca define rhetoric as "the art of making presence."<sup>131</sup> By defining presence as a deliberate product, Perelman and Olbrechts-Tyteca seem to have a notion of presence that is influenced by literacy. While presence is a fundamental element of both oral and literate rhetoric, it is more deliberately produced in literate cultures. By contrast, oral cultures have presence to begin with. Speech has presence because it is produced through sound. Ong describes sound as an inclusive sense that invites everyone who can hear.<sup>132</sup> By contrast, literate cultures create an individualized presence because they store knowledge as portable text that reaches single readers at different times. Whereas oral presence is communal and sensual, literate presence is

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<sup>129</sup> Koutropoulos et al., "Emotive Vocabulary in MOOCs," 4.

<sup>130</sup> Walter Ong, *Orality & Literacy: The Technologizing of the World* (London: Methuen Press, 1982), 31. Ong describes speech by the Hebrew word 'dabar,' which means both speech and event.

<sup>131</sup> Perelman, *The Realm of Rhetoric*, 37.

<sup>132</sup> Ong, *Orality & Literacy*, 72. "Sight isolates, sound incorporates. Whereas sight situates the learner outside what he views, at a distance, sound pours into the hearer."

individual and taken in through the symbols made up of homogenous letters. Although a written text can evoke presence because it can trigger in its readers a concrete imagination, it can only evoke vicarious experiences (i.e. a novel), whereas oral cultures create direct, immediate experiences through sound. Although a text is consumed through the visual sense, the visibility of letters does not entail any affect. Rather, it is the meaning of those symbols next to other symbols that builds presence artistically in literate communication.

Since the presence created in sound invites everybody who is situated within the radius of the soundwaves, speech builds a collective presence between at least two communicators. Letters, by contrast, are individually composed and consumed and thus create presence for one reader at a time. The chapters on additive and repetitive styles of discussion have illustrated how digital modes of communication can create collective presence despite relying on literacy. Although the typing of messages via digital technologies have accomplished the greatest physical distance between communicators, immediacy and presence is still collectively created as a product of instant correspondence. On the one hand, digital communication relies on the isolating technology of literacy and print, which has moved communicators farther and farther apart. On the other hand, the instantaneity and massive participation of online media make it possible to produce collective presence as a linear unfolding through time. Whereas speech creates presence as a connection in time and place, and literacy produces presence through the linear arrangement of symbols in space, digital messages create presence as a linear arrangement of posts through time.

Just like literate presence, digital presence is artistically produced through letters. However, unlike literate presence, it requires collective engagement and attention. According to Perelman & Olbrechts-Tyteca, who see rhetoric as “the art of creating presence,”<sup>133</sup> specific rhetorical tactics are especially capable of creating presence by prolonging attention.<sup>134</sup> Strategies for prolonging attention in individual orations are “repetition, accumulation of detail, [and] accentuation of particular passages.”<sup>135</sup> Hence, additive and repetitive communication styles are especially effective strategies for building presence. For example, amplification is a rhetorical form that “utilizes, to create *presence*, the division of the whole into its parts.”<sup>136</sup> By dividing a whole and listing each part, attention to the whole is prolonged. Further, aggregation is a rhetorical form of “enumerating the parts and ending with a synthesis.”<sup>137</sup> Orators are advised to use inductive patterns to list specific elements and ending with a general synthesis in order to create presence. Examples of repetitive strategies include synonymy and metabole, wherein “the same idea is repeated in different words, which seem to correct the thought.”<sup>138</sup> Emphasis and attention is created by offering a better articulation of the same idea with each repetition.

While Perelman & Olbrechts-Tyteca focus on offering rhetorical advice to individual orators, it is clear that their additive and repetitive strategies create presence for speakers just as for writers. By defining rhetoric as “the art of creating presence,”<sup>139</sup>

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<sup>133</sup> Perelman, *The Realm of Rhetoric*, 37.

<sup>134</sup> Ibid, “In prolonging the attention given them, their presence is increased. Only by dwelling upon a subject does one create the desired emotions.”

<sup>135</sup> Ibid

<sup>136</sup> Ibid

<sup>137</sup> Ibid, 37-38.

<sup>138</sup> Ibid, 38.

<sup>139</sup> Ibid, 37

Perelman & Olbrechts-Tyteca specifically see presence as a deliberate, artistic product of arrangement, whereas Ong's description of oral speech suggests that presence is a natural effect of all sound that is inclusive. As a deliberate choice of arrangement, Perelman & Olbrechts-Tyteca see presence in speech controlled by a single author and collectively shared. Based on the three analyses of digital discussion forums, I build on Perelman & Olbrechts-Tyteca's strategies for creating presence by arguing that presence is not only a cognitive form of prolonged attentiveness that is the result of deliberate choices, but a state of attentiveness that is affectively stimulated either as a sensual stimulation (sound) or as an addressing of a matter that affects the audience and is of consequence to them. Further, I argue that *digital presence* is an active, participatory process that is fueled by the circulation of affective energy. Although the communicators rely on silent, distant communication technology, additive and repetitive patterns are collaborative creations that build collective presence as an instant, yet scattered timeliness which is the product of continued and prolonged responsiveness.

Chapters Three and Four have shown how addition and repetition are collective creations on digital discussion forums that effectively build public presence by bringing attention to questions and problems that participants collectively care about.

Amplification occurred collaboratively when participants in the MOOC on evolutionary biology brainstormed the partial contributors to why the shark has such a long genealogy, or when they brainstormed the partial contributors that led to the overall phenomenon of life on Earth (Chapter Three). Each participant amplified the discussion with an additional aspect that formed a part of the whole phenomenon of life, or, the survival of the shark. Participants started with a general observation that life emerged, or, that the

shark survived, and then listed the partial reasons to offer a more general explanation for the phenomenon. In the realm of policy, amplification occurred when participants proposed the hypothesis that unhealthy dieting disproportionately affects the poor, and listed different reasons for why this is true. Participants moved from a general hypothesis to bring up specific reasons, which built up the issue's presence as an urgency.

Aggregation moves more inductively by listing parts and ending with a synthesis. Aggregation occurred as a collaborative process when participants built awareness of the problems of climate change (Chapters Three and Four). As each participant continued to bring up personal observations of climate changes in their region, they collectively and inductively established the claim that climate change is indeed happening, while driving up the presence and urgency of this problem as a public exigence. Further, Chapter Four has abundant examples of metabole, which Perelman & Olbrechts-Tyteca define as a rephrasing of previous statements. Since metabole is a collective process in the digital discussion forum, repetitions come from different participants and therefore are not verbatim. For example, Appendix 4.a shows how the repetition of drought is mentioned in the beginning and later becomes elaborated as a real experience by other participants. Moreover, Chapter Two gives examples of how repetitions can serve as confirmations for validating scientific hypotheses (Appendix2.a, Chapter Two, p.5). These forms of repetition can also build presence as a product of collective interest.

It is important to consider that digital presence is not the opposite of an absence of information. The internet is an overflowing net of information that is produced by a global population; hence, information, impressions, and experiences abound. In this digital environment, presence is the product of *arranging and organizing* massive

information, impressions, and experiences in ways that reflect the common interests, concerns, and questions of a significant portion of a population. However, this arrangement is not within the strategic control of a single orator. Collective presence on digital discussion forums is a collaborative arrangement that occurs as a democratically produced effect, which reflects collective interests, concerns, and questions. Additive and repetitive patterns on digital discussion forums collaboratively produce a collective awareness of popular, timely knowledge, or, doxa. In an age of information abundance, public awareness is not a response to information that is available, but it is a response to information that is made present through iterative arrangements.

The additive and repetitive forms of digital presence are the product of massive, popular interest and concern, which cannot be strategically controlled by an orator. Besides a strategic, rational choice of composition, the interactive digital age requires us to think of communication as an affectively spurred composition that brings about important public statements and doxa. Digital communication still relies on silent, abstract literacy, and single users of digital technologies can search the Web to find information and social groups that respond to the interests, questions, and concerns that are individually present to them. Whereas reading is an individual activity, the instantaneity of the digital communication technologies brings individuals closer through punctual time. In open online discussion forums their individual interests are integrated into a larger collaboratively produced text. The digital forum allows participants to take that which is individually present to them and add it to a string of similar or related posts in a way that the posts build collective presence. In a world in which the advancements of communication technologies are driving communicators physically farther apart, the

digital discussion thread can bring strangers together through punctual time based on the instant sharing of interests and concerns. A naturally limited attention span forces participants to focus on statements that resonate with their own experiences, interests, and concerns. As the statements resonate among more and more participants, the thread grows longer with each post, thereby increasing the statement's scope of relevance and its timeliness. Hence, digital texts collaboratively build up a "punctual" presence as *a matter of arranging* large numbers of statements as a "concatenation of text through time."<sup>140</sup>

Michael Warner argues that all public formations entail a timely component that is made up of attentiveness and participation. "No single text can create a public. Nor can a single voice, a single genre, even a single medium. All are insufficient to create the kind of reflexivity that we call a public, since a public is understood to be an ongoing space of encounter for discourse. Not texts themselves create publics, but the concatenation of texts through time."<sup>141</sup> Warner's emphasis on participation as a requisite of public formation is an interesting challenge to constitutive rhetorical approaches, which often study single texts for the audience that they interpellate while addressing.<sup>142</sup> Through Warner's emphasis on participation we can understand the public as a formless body that morphs through time along with interests and needs as they arise. Warner's public delineates a democratic model that gives publics a greater degree of self-efficacy and responsibility in accepting and rejecting affiliations based on whether they participate

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<sup>140</sup> Warner, *Publics & Counterpublics*, 90.

<sup>141</sup> Ibid

<sup>142</sup> The classic rhetorical literature on the second persona and constitutive rhetoric is:

Edwin Black, "The Second Persona," *Quarterly Journal of Speech* 56, no. 2 (1970): 109-119.

Maurice Charland, "Constitutive Rhetoric: A Case of the Peuple Quebecois," *Quarterly Journal of Speech* 73, no. 2 (1987): 133-150.

Both Black and Charland make arguments about how communities are called into existence by single texts or speech events.

or not. Specifically, Warner sees the public as a textuality that exists in a cross-citational field and that can be moved in different directions.<sup>143</sup> He writes that a public is “a space of discourse organized by discourse. It is self-creating and self-organized; and herein lies its power, as well as its elusive strangeness.”<sup>144</sup>

Since Warner’s public is self-organized, its existence bears upon the need for participation. Warner points out that a public does not exist in a fluent and indefinite temporality but as defined by an intertextual citationality, whereby the public changes in form with the punctual rhythms of the media. For example, print and television programs occur in punctual, daily or weekly rhythms.<sup>145</sup> Interestingly, in 2002, Warner had predicted the internet to threaten participatory punctuality and pose organizational challenges to publics due to the medium’s constant availability to different individual users at different times:

One way the Internet and other new media may be profoundly changing the public sphere is through the change they imply in temporality. Highly mediated and highly capitalized forms of circulation are increasingly organized as continuous (24/7 instant access) rather than punctual.<sup>146</sup>

I believe that Warner’s projection about the internet contradicts his own argument about the public being a participatory discourse. Warner argues that participation, not identity, territory, or belief, is the building block of a public.<sup>147</sup> His public is self-organized

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<sup>143</sup> Warner, *Publics & Counterpublics*, 95.

<sup>144</sup> Warner, *Publics & Counterpublics*, 69.

<sup>145</sup> Ibid, 95.

<sup>146</sup> Ibid, 97-98. Warner writes that hypertext links and search engines are not punctual and worries that “the absence of punctual rhythms may make it very difficult to connect localized acts of reading to the modes of agency in the social imaginary of modernity. It may even be necessary to abandon ‘circulation’ as an analytic category.”

<sup>147</sup> Ibid, 75.



because “it openly addresses people who are identified primarily through their participation in the discourse.”<sup>148</sup>

As the analyses in the previous three chapters have shown, the digital media open opportunities for public self-organizing through massive participation. The participation in open, global discussion forums are marked by a rapid punctuality that has been described as repetition and addition in this dissertation. With each additional post, the text maintains and builds presence, allowing participants to come together in time, rather than place, based on common and current needs and interests. Hence, the longer the thread can maintain presence through continued participation, the larger grows its scope of relevance, and a public emerges as text. When a text ceases to attract additional posts and comments, it loses its public presence. Due to its collective composition, the digital discussion thread requires participation as a symptom of interest and attention. In light of the need for participation, we ought to understand the digital public as moved forward by affective energy.

Digital, multi-authored texts gain public presence only when the thread continues to circulate an affective energy that motivates participants at different locations to add a post. Among a massive number of posts, participants only respond to those that resonate with them affectively. As Chapters Three and Four have illustrated, public policy threads often grow based on concern or worry about a perceived problem. For example, the threads on fast food diets and reproductive health are motivated by the concerns about the health risks among poor populations and women, respectively. The solution proposals on how to diminish your carbon footprint were likely driven by a mix of concern and a sense

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<sup>148</sup> Ibid, 74.

of efficacy. Moreover, concern was widely expressed in the repetitive discussion threads in Chapter Four. Worry is an appropriate public emotion in light of Dewey's definition of a public as marked by common consequences. Consequences imply that a negative impact is happening or is impending, and those affected will come together in worry about their health, about their possibilities to farm, about the global food supply, etc.

Another emotion that has occurred in the realm of policy was anger. Chapter Four has shown how anger and frustration have all been expressed in the discussion forum on climate change with regards to governmental inaction and global disparities of CO<sub>2</sub> emissions. Anger fuels an intense motivation for action that extends beyond adding another post, but that seems to make participants want to go out and protest. As the numerous appeals to form digital activist groups have demonstrated, anger is an emotion that motivates public engagement and allows people to affiliate as activist groups. The activating effect of anger may explain why this emotion was prevalent in the repetitive discussion threads of Chapter Four. In general, repetitive threads seem to require more affective energy to post than linear or additive threads because a repetition does not add any new content, but merely restates a previously expressed statement. While in the linear responsive thread, a repetition can have the effect of confirmation, in the public policy MOOC on climate change, repetition did not just create validity, but extended the scope of relevance of how, for example, droughts and floods affect a massive number of people worldwide. This redundancy of content in the repetitive thread requires a more intense affective energy to get participants to add yet another restatement. This more intense energy serves mainly affiliatory purposes.

As both chapters on additive and repetitive communication styles have emphasized, the digital discussion thread is more than an accumulation of prior individual experiences and knowledges, but a text which also makes certain questions and concerns present to participants in return, and which invites them to post additional contributions. Affectively composed discussion threads are not only the platforms for expressing individual frustration or worry. Their reiterative form produces an escalation of emotion that reaches public levels of significance and thereby fosters public affiliations. In other words, not only do participants attend to threads that discuss questions that resonate with their own emotions, but they are also inspired to reflect and reproduce an emotion that has already been building up throughout an additive or repetitive discussion thread. The affect that circulates through the forum is strongly contagious. As participants see other participants express worry about weather catastrophes, they are invited to scan their own repertoire of knowledge and experiences for similar incidents to share.

Hence, it is through the reiterative circulation of affective energy that threads grow public significance and build momentum. Affective energy is what connects the participants through a timely significance of consequences, and it allows them to come together through punctual timeliness as a growing public. Public, or collective, presence is the result of a state of awareness or attentiveness that is affectively aroused. Just like in oral cultures speech creates local presence through the radiant reach of sound waves, in digital cultures affective energy draws attention that continues to produce more and more attention through time. Whereas oral presence draws people together based on the affective energy that defines a physical place, digital presence draws people together

through the affective energy that fuels rapid punctual timeliness. However, oral presence and digital presence differ slightly based on the degrees of participation and agency. Speech is commanding and compelling, and its sound is inescapable. A speech may or may not resonate with listeners, but they cannot turn off the sound of speech. By contrast, the digital thread grows based on the choice to participate or not. It does not split communicators into speakers and audience, but all participants come together as a collective author based on their participation. Affective energy may motivate participation, but this energy is more or less compelling to different participants, who can choose to ignore the thread.

Finally, it needs to be considered that affective energy can build communities that are not necessarily public, and can even foster individualism. In the linear discussion threads, participants responded to posts based on their curiosity and interest on cooperative threads, and based on their dominance drive in competitive threads. For example, Jacob Leach's thread on Life-Earth feedback attracted comments from Peter Farrell and Tanya Galdo in posts 2 and 2.b, who expressed interest in Leach's post and enjoyed elaborating with their own speculations. Moreover, Peter Volkert's array of rejections of the responses by other participants shows his interest in affirming his dominance as the main expert. In the linear responsive, and in some additive threads, the circulation of curiosity and ambition motivated participants to collectively compose knowledge and exchange information. The additional requisite for pertinent, new information filtered active participants into more elitist expert communities that, by definition, did not reach public levels of participation.

## **A Global Liberal Arts Education in the Digital Age**

This project has shown how linear, additive, and repetitive styles of discussion have civic value that deserves consideration as prospective elements of a digital liberal arts education. Based on the Isocratean model of civic education, this study has analyzed the community-building value of speech as it relates to the open online discussion forum. The discussion forum offers a rapid, and massive version of Isocratean mimesis that collapses individual authorship or oratorship into collective patterns of composition that connect people as publics through time. The digital speech contains the same components of the classical rhetorical situation, yet, they are differently distributed. The timeliness that precedes speech (the exigence) is now collectively produced through affiliative reiteration, and the speaker that imitated past models is now a collective, authorless figure that exists as text. It could be argued that the text is taking over and collapsing all the different rhetorical elements into a single formless mass that occasionally takes on a specific, recognizable, public formation. Despite these differences from the classical rhetorical situation, this dissertation has shown that the digital discussion forum may still cultivate of the civic character that an Isocreatean education aims at.

The different communicative styles of the open discussion forum have shown to foster knowledge, perspective, practical efficacy, shared problem awareness, and affiliation. Together, these qualities can contribute to the formation of knowledgeable, publically engaged, tolerant, and committed public members, who are able to understand that learning is not just the acquisition of knowledge, but the acquisition and production of publically valuable knowledge that serves to advance the collective needs and interests of a community. The dissertation has offered a liberal arts model that responds to the

connectivist sole emphasis on information exchange as community building by arguing from a rhetorical perspective that information and knowledge can only advance communal formations when it is relevant to timely, collective needs and interests. Even in linear responsive threads, the information exchanged was relevant to the interests of the participants, based on which they were able to form scientific communities.

This ability of participants to constantly form new affiliations around common interests, needs, and emotions, is perhaps the most important civic quality in the global, digital age. It cultivates in the learners the crucial ability to maintain an open identity that is not strictly attached to prior, abstract symbols of nationality, race, gender, or culture, but that is willing and able to accept new international, interracial, and intercultural identities that respond to material, present needs and interests. In the global age, an open identity that stays adrift of prior symbolic “umbrella” categories is a central skill that promotes a more pragmatic and democratic approach to global problems. Openness is a quality of the self that allows the most pressing problems to search and constitute its publics, rather than a prior-defined national public to perceive global problems as national ones. This narrow view on global problems may lead to undemocratic, non-pragmatic, nationalistic responses. Open selves allow a global population to become empowered through a better synchrony between their needs and their affiliations. While digital discussion forums don’t necessarily disrupt the participants’ stable identities as tied to place, race, or culture, global forums extend an invitation to participants from all over the world to see the common, transcultural trends of us humans.

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## APPENDIX 2.A

### Life-Earth Feedback MOOC on the Emergence of Life

1. *Jacob Leach*: Life-Earth Feedback is a very rich topic for discussion. I will focus on the three points of question 7, namely, how does life influence and control Earth with an example, how does this view compare to my earlier understanding, and how are these processes reflected on the diagram of the Emergence of Life.

#### PHOTOSYNTHESIS

The most striking example of how life rises to control the Earth the process of photosynthesis. Photosynthesis is certainly a game changer for life-earth co-evolution. Photosynthesis is the process cells use to absorb light energy and split carbon dioxide and water into oxygen O<sub>2</sub> and carbohydrates.

The great turning point for life changing the earth's atmosphere was the Great Oxygenization Event 2.4 Billion years ago. Cyanobacteria appeared about 200 million years before the O<sub>2</sub> event. Before the Cyanobacteria, the O<sub>2</sub> produced by photosynthesis was captured in oxygen sinks before it could accumulate in the atmosphere. One of the oxygen sinks are the iron oxide precipitations that create the Banded Iron Formation layers [1]. When the cyanobacteria saturated the oxygen sinks, the excess O<sub>2</sub> was released into the air and water. Life and photosynthesis has maintained a very high concentration of O<sub>2</sub> in the atmosphere ever since.

Also astounding to me, is even though photosynthesis is taken for granted as an elemental life process, scientists "still do not know exactly how it works" [2].

#### LIFE-EARTH FEEDBACK

The evidence that life and earth are intertwined in a complex web is consistent with my earlier understanding. The life-earth feedback is a good description. Yet, to me, it still seems to be inadequate for a full description. A simple mechanical feedback like the thermostat in your living room or refrigerator: the thermostat measures the temperature, and controls the air conditioner to maintain a stable temperature. More complex than a single feedback, a radical description is the "Gaia Hypothesis" proposed by scientist James Lovelock in the 1960's. Lovelock postulates that life and earth are intertwined to maintain a self-regulating system of equilibrium. The implication is the earth operates like a living cell.[3]

Another strong proponent of Gaia Theory is microbiologist Lynn Margulis. Margulis' theory of eukaryotic organelles created by endosymbiosis is now widely accepted. Margulis objects to the depiction of Gaia as a living organism, but argues Gaia is an "emergent property of the interaction among organisms" [4]

## EMERGENCE DIAGRAM

I believe the [\*Emergence of the Tree of Life\*](#) diagram shows very powerfully the interplay of emergence of life juxtaposed to the geologic timeline on the bottom. Visuals help us make connections and see relationships. I note that time is not linearly depicted on the horizontal scale; the emergence of life is greatly emphasized. Life's development of photosynthesis can be understood as forming stromatolites in the earth, and then the Great Oxygenization event. Earth also affects life with the depiction of Snowball Earth, and then life responds with the Cambrian Explosion. We are just beginning to take in the implications of life-earth feedback: a cycle of emergence leading to extinction, then an explosion of diversity, and then to equilibrium.

Jacob Leach

### Citations

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[2] [Life on Earth before the rise of photosynthesis](http://www.futurity.org/life-on-earth-before-the-rise-of-oxygen/), Futurity. Accessed 11-3-2014. <http://www.futurity.org/life-on-earth-before-the-rise-of-oxygen/>

[3] Wikipedia, Gaia Hypothesis. Accessed 2014-11-03 [http://en.wikipedia.org/wiki/Gaia\\_hypothesis](http://en.wikipedia.org/wiki/Gaia_hypothesis)

[4] Margulis, Lynn. Symbiotic Planet: A New Look At Evolution. Houston: Basic Book 1999

2. *Tom*: Thank you Jacob for introducing me to Lyn Margulis's interpretation of Gaia as an "emergent property of the interaction among organisms". Though I have read a number of Lovelock's books and liked what he says I have never felt that self-regulating was what was happening; emergent is a much better term.
  - a. Thanks Tom. I'm by no means an expert. Perhaps I could find other MOOC's that may explore Margulis' work in more detail.  
However wikipedia does a good job of illustrating some of the adaptations the earth over geologic to keep conditions favorable for life.  
The sun is 25% hotter now, than when life evolved 4 billion years ago.  
Life-earth carbon cycles have stabilized the atmosphere and temperature for much of the earth's history. The stable oxygen content, and the stable salinity of the oceans are two other factors of life-earth feedback creating a homeostatic world for life to exist.  
I think Margulis is right, however. Snowball earth indicates the self regulation breaks down.  
Jacob Leach
  - b. *Tanya Galdo*: Jacob, your explanation flows beautifully, I'm no expert either, but I've always felt interconnected with everything (sort of like a "circle of life" thing, like in the Lion King)  
Jokes aside now, after doing tons of reading in order to answer this week's assignment, a thought came to ponder, and that is, what about fusing or merging together the "self-regulating" theory of Lovelock's Gaia and the "emergent" interpretation of Margulis's?  
I might not make much sense, its all a bit fuzzy all the ideas that I'm thinking of, this is the way I see it, as life emerges (by life I mean all life forms) everyone begins a process of intertwining and connecting with

each other, and the environment, as a walking together not one first and then the next. Does this make sense to you?

Please forgive my lack of scientific terminology, its so hard to put into words all the pictures I have in my head.

Here's a link to a nice wiki read, I loved the diagram of the Geological time.

[http://en.wikipedia.org/wiki/History\\_of\\_the\\_Earth#Oxygen\\_revolution](http://en.wikipedia.org/wiki/History_of_the_Earth#Oxygen_revolution)

Here's another one I found pretty interesting too.

<http://www.ecology.com/2011/09/10/earths-beginnings-origins-life/>

And this one, though long, is a must read, did I mention I love reading?

<http://www.lifeafterearthscience.com/massexinction.php>

Regards

Tanya ;-D

c. *Jacob Leach*: Hi Tanya,

I like your thinking of merging Lovelock and Margulis' ideas. Lovelock is a physicist, and Margulis is a biologist. They both come to similar conclusions when trying to explain the behavior of earth-life interactions.

To me, earth-life feedback and co-evolution is best described by complexity science, which I have mentioned in other [threads](#) of this course.

The idea of self-organization and of emergence is fairly new to science.

Physicist [Ilya Prigogine](#) [1] won a Nobel Prize in Chemistry for describing complex systems behavior and self organization in chemistry. Complexity science is a robust multi-disciplinary field of mathematics, information science, biology and many others [2].

To me, life-earth feedback is the process of self-organization and evolution of life and the earth. Life radiates organisms in earth ecosystems becoming more complex up to a point of collapse and mass extinction. The K-Pg asteroid impact event 65 million years caused a mass extinction. The process starts all over again. Sometimes the collapse is due to a convergence of a new way for organisms to exist, such as the Great Oxygenization event. That mass extinction 2.4 Billion years ago was caused by cyanobacteria which made photosynthesis the primary mode of nutrient and energy distribution of life on the planet. This is an example of "emergence" in my view.

So in my view, Lovelock and Margulis may find some common ground in looking how complex systems self organize and co-evolve to maintain equilibrium.

[1] Wikipedia, Ilya Prigogine. Accessed 11-3-

2014. [http://en.wikipedia.org/wiki/Ilya\\_Prigogine](http://en.wikipedia.org/wiki/Ilya_Prigogine)

[2] What is Complexity Science, [Bristol Centre for Complexity](#)

[Sciences](#). <http://www.bristol.ac.uk/bccs/whatis/#whatis>

Jacob Leach

3. *Peter Farrell*: What about the current life-earth feedback mechanisms? One is the ozone depletion, and its effects on climate as well as plant and animal life (see <http://www.epa.gov/ozone/science/effects/>), for example. There is also current

climate change, and its interaction with life forms  
(see [http://en.wikipedia.org/wiki/Climate\\_change#Life](http://en.wikipedia.org/wiki/Climate_change#Life)).

- a. *Jacob Leach*: A great and obvious question. Humans have become a global species, and changing the earth's ecosystems. It's happened very fast in geologic time over the past 200 years. The life-earth feedback will result in mass species extinction, climate change, ocean acidification. Within 100 years, I think there will be significant changes. The earth, and bacteria, will do just fine. Can humans adapt? I think it is an open question. What we do in the next 10 years will tell a lot.  
Jacob Leach

4. *Peter Volkert*: Jacob, great initial post and good discussion in the follow-ups so far!

One point I'd like to add is that humans are the first species to have a consciousness of the earth/life feedback mechanisms. Not that we understand the whole complex network of interactions but "we" (or some of us...) at least are aware that there exist such dependencies. That gives us a chance and also a responsibility (in my view) to put some sort into our actions (which is a long ways to go for many decision-makers who are led by completely different goals most of the time). Contrast that with e.g. the cyanobacteria who produced all that oxygen: they had a huge influence on the earth's atmosphere and the evolution of life but they sure didn't know what they were doing.

In addition we also have a more or less clear picture of what the long-term future of the solar system will look like. We know that it and therefore also Earth will cease to exist in some 5 billion years or so. While that's certainly a long time to go and no need to worry about right now it gives us the unique perspective of knowing that our current home will not be around forever and so it might be a good idea to think about colonizing other planets (for which the technology obviously doesn't currently exist).

I'm not a big fan of the Gaia hypothesis but it fits really nicely into the gist of this question #7, so good move to reference it!

Citation:

[1] From Quarks to Quasars: Death From the Skies: How Our Solar System Will Die

<http://www.fromquarkstoquasars.com/death-from-the-skies-how-our-solar-system-will-die/>

- a. *Jacob Leach*: I agree with you about the uniqueness of humans, we are certainly the first with language and symbolic logic (on earth, probably not in the universe). Certainly, consciousness gives us a responsibility for our actions. The consequences of bad decisions won't affect the earth that much. The earth is indifferent to snowball earth, it is indifferent hothouse earth. The responsibility is to future generations of humans, because civilization depends on a stable earth in a very narrow range of equilibrium. Perturb the earth equilibrium a little bit, and our agriculture and our coastal infrastructure are affected. Figuring out Life-earth feedback is much more for the benefit of humans, than it is for the Earth. Personally, I think Gaia hypothesis is good theory, and a much better

description of how the earth operates. I would not go as far as Lovelock to say the earth is a living cell. Margulis' description is much better. I'm willing to defend it, even though admittedly I only have "Wikipedia" level of knowledge.

"Frontier mentality" to describe the earth is very bad theory. The earth's resources are finite, so continually expanding to new hinterland to exploit is not an option. To me, even viewing the earth as a bunch of "resources" is not productive. If we take life-earth feedback seriously, the ecosystems of earth should be regarded as co-evolutionary partners that human activity should enhance. I am very opinionated, but this all fits under the rubric of Life-Earth feedback. It fits under the rubric of evolution, which is very good science.

Jacob Leach

5. *Tanya Galdo*: My sincere apologies to all, I have neglected this class for 2 days because I have deadlines in 2 other classes, I promise I'll be back soon to answer with more time.

Thanx

6. *Sonya Vick*: Tanya, I have had the good fortune to work with Lynn Margulis for a few years before her death. She saw variation, the fuel for evolution, to come not from chance mutations, but from lateral gene transfer by the close association of organisms living together, or symbiosis. This symbiosis produces symbiogenesis, or new forms of life better adapted because they embody several lines of organisms, each having had to go through the sorting of natural selection. The cumulative effect is greater than the sum of its parts.

- a. *Jacob Leach*: Thanks for your post Sonya!!! I think the description of symbiogenesis says perfectly what I've been trying to say. Perhaps what I've been calling "emergence", namely evolution based on cooperation, is related to symbiogenesis?

Jacob Leach

- b. *Tanya Galdo*: Hi Sonya, what a great experience you must have had. As I read on the concept of symbiosis and symbiogenesis (in order to understand them better) it does sound to me as Jacob said above. Organisms living together (symbiosis) new organisms "emerge" from this cooperative relationship (symbiogenesis). By living close together they share characteristics (lateral gene transfer) to help them adapt better to the environment producing better adapted/evolved organisms (emergence/evolution)

Thank you Sonya and Jacob, your explanations were perfectly clear.

7. *Sonya Vick*: Symbiogenesis or the combining of genomes through close association resulting in a new variation happens often. In Lynn Margulis' book "Acquired Genomes" she presents many examples. She, of course was the person who developed the idea that mitochondria and chloroplasts were once separate organisms that were incorporated into a larger cell giving the origin of eukaryotic cells that could tolerate oxygen and produce food. Mitochondria of course still retain their prehistoric DNA which is more like prokaryotic DNA than eukaryotic DNA. Mitochondria have even transferred some of their DNA to the nucleus.

These large changes in organisms and their DNA drive evolution in new directions. Lynn felt that evolution happened more when organisms networked (shared DNA) to solve problems rather combat each other as some see survival of the fittest.

- a. *Jacob Leach*: My first thought is to apply symbiogenesis to multi-cellular organisms as well. For example liver cells, and brain cells, and lung cells specialized within the human body. I think it is the same idea that the whole is greater than the sum of the parts effect. But perhaps since all the cells contain the same DNA, it would not be symbiogenesis, it is some other type of cooperation among trillions of cells in the body.

Jacob Leach

- b. *Tanya Galdo*: The whole idea of chloroplasts and mitochondria living as separate organisms, then coming together to give birth to what we have now is so amazing.

Just thinking of it is mind boggling, mitochondria still retains its ancient/prehistoric DNA, how cool is that!!!

Thanx again Sonya, I love to learn everything about Genetics, it is my passion.

- 8. Wow! Thank you everyone for such an excellent read! Great thread!



## APPENDIX 2.B

### Big Guys Small guys - Bacterial influences on Eukaryotes MOOC on Emergence of Life

1. *Sonya Vick*: Ninety percent of the DNA in my body is not my own. It is as if I am not an organism, but a committee! These small bacterial and archaea cells are 6 magnitudes smaller than I am, only a few microns big. We do more than provide a home and food for them, they influence our lives incredibly and do more good than I ever imagined. Suddenly missing any or all of them would have dire effects to any organism having evolved with them in a symbiotic relationship. Some bacteria are however decreasing in populations of humans, and in the book “Missing Microbes” by Martin Blaser consequences of those missing microbes in our systems is grimly pointed out.

The loss of *Helicobacter pylori* may be responsible for the dramatic increase of esophageal cancer, ( of all the cancers it has the greatest rise in incidence). This is the same bacterium found responsible for ulcers but losing it has far worse consequences. The rise of Caesarean births may inhibit the transfer of maternal microbes in the vaginal canal to babies, giving them fewer and different bacteria to colonize their guts. This may have consequences in everything to digestive problems later in life, and some are even tying it to the increase in autism. Gut bacteria have been shown to effect autoimmune diseases <http://www.sciencedaily.com/releases/2013/01/130117133003.htm> and even play an important role with sex hormones. We have been blasting all microbes with antibiotics and sanitizers and unfortunately been selecting for those which cannot be killed which often cause grave illnesses like *Clostridium difficile* or *C.diff*. Increases in autoimmune diseases, asthma, obesity, food allergies, certain cancers and diabetes may all tie in to a lower biodiversity of bacteria in us.

The variation of abundance of different gut bacteria may be dependent on our genetics, showing that not only do bacteria influence us, but our genes could determine who among the bacteria is to live or die. <http://health.usnews.com/health-news/articles/2014/11/06/genes-may-determine-body-weight-by-shaping-gut-bacteria> Differences in populations of these bacteria tie in to who is obese and who might be thin.

Not only do these bacteria that live on and in us, help us, but they can also take control of us. We as humans pride ourselves in free will. We are able to choose foods we eat, mates, and our path through life. However bacteria on our skin may be producing and sending out messages of their own in the form of pheromones to

cause us to act differently towards different people. <http://www.scientificamerican.com/article/pheromones-sex-lives>  
 Humans are not the only organism to have its sex life regulated by bacteria. Fifteen percent of all insects on earth are infected with the bacterium *Wolbachia*. It needs to get into the next generation of insect and infects eggs. It will tamper with a *Wolbachia* infected male so that he will only mate with an infected female. In wasps, an infection of the egg will result in only females able to mother only more females. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1560322/>  
 These are but a few of the interactions between bacteria and eukaryotes. Certainly life as we know it would instantly disappear if all bacteria and archaea were to disappear. We need them and they need us. All is connected. If all Eukaryotes were to die, then only the homes of some of the bacteria would be disrupted. After all, they have billions of years of evolution to utilize other spaces for a home such as extremophiles have done.

2. *Jacob Leach*: Great post Sonya, you give so many pertinent examples. I did not know about the importance of H Pylori. If all Eukaryotes suddenly died, and the environment was not disturbed in a way that harms bacteria, I suppose there would be massively more food for the bacteria and archaea and much less competition for resources. This would fuel evolution for the bacteria into new life forms, perhaps new eukarya, perhaps other unknown forms. I haven't been able to find any article mentioning death of all eukarya!
3. *Natalia Torrez*: You mentioned many key points in your post Sonya! The articles you recommended look pretty interesting too. It seems to be very evident that the whole Eucaryotes would be into big trouble without these organisms. Unfortunately, we are often avoiding the esencial contact and interaction between them and us.

I think so that a good way to appreciate and deeply understand their importance on Earth is to continue the research, the experimentation, and especially to keep discovering not only their industrial or biomedical "value", but their intrinsic importance for life, for the chemical and biological cycles that support the life on Earth.

As an additional comment, I'd like to express you my interest on one of the examples you displayed: today's role of the bacterium *Wolbachia* on insects' life. This bacterium is able to induce a curious mechanism for reproduction on the insects they infect: after being infected, female insects only give origin to other female insects. Moreover, some studies have showed that the symbiotic relationship they develop -in most of cases- gives to the infected insects a better "fitness". This would represent, maybe, an evolutive advantage. This mechanism of reproduction is related to the parthenogenesis ( a way of reproduction trough the one a female organism originates offspring from not-fertilized eggs) and it occurs not only on procaryote organisms, but in eucaryote such us reptilian and some specific birds. This topic is really exciting and you showed us some important references and opportune information!

Parthenogenesis idea has a lot of interesting points of view. If you would like to

study a little bit more about it, here's an article I found very useful:

<http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.0050099>

- a. *Sonya Vick*: Thank you so much for that article. Every year when I have to clean the leaves out of my eave troughs I reward myself after with a look at the soggy mush at the bottom. That is where I met rotifers and have enjoyed seeing them again each year under the microscope. I am fascinated with photographing very small things! I had learned from the book "Parasite Rex" by Carl Zimmer that Rotifers do not have sex, and he said that might be true because they did not have many parasites. It seems sex might be used to offer a different genetic variation for organisms to stay one step ahead of their parasite load. Certain Australian animals living in the desert also reproduce pathogenically and are in a situation of a low parasite load.
- b. Sonya, if you missed the Radiolab episode that included an interview with Carl Zimmer, you may enjoy it. Much of it is about larger parasites, but fun anyway:  
<http://www.radiolab.org/story/91689-parasites/>
4. The Human body is a collection of colonies, like a squadron of aircraft flying in VERY close formation!! Hit one and the rest are in Big trouble.
  - a. *Jacob Leach*: The trillions of cells in the body self organize, and seem to cooperate in an amazing symphony.  
They adapt quickly, and seem to know how to get back to equilibrium when there is a malfunction or an intruding infection.  
Jacob Leach
5. *Jeff*: You mentioned Blaser's book, Missing Microbes, which is a very interesting read and whilst it contains many valid points I think it fails in a few. Particularly the idea that *H. pylori* is responsible for esophageal cancer. *H. pylori* is very definitely a cause of stomach cancer and possibly a factor in colorectal cancer (1) but that its loss leads to esophageal cancer is wrong. *H. pylori* eliminates stomach acid, which is essential to our health. Stomach acid is, of course, implicated in esophageal cancer as it damages the lining of the esophagus, but the issue revolves around issues with the lower esophageal sphincter letting acid out, hiatal hernia, transient lower esophageal sphincter relaxation etc which have nothing to do with *H. pylori*. *H. pylori* is only 'protective' in that it depletes the stomach acid to the point that any reflux is not as damaging. (2)  
The loss of bacteria though is a definite cause for concern though the issue is very complicated and much work still needs to be done.
  1. Testerman TL, Morris J. [Beyond the stomach: An updated view of <i>Helicobacter pylori</i> pathogenesis, diagnosis, and treatment.](#) World J Gastroenterol. 2014 Sep 28;20(36):12781-12808. Review. PubMed PMID: 25278678; PubMed Central PMCID: PMC4177463.
  2. Thirumurthi S, Graham DY. [Helicobacter pylori infection in India from a western perspective.](#) Indian J Med Res. 2012 Oct;136(4):549-62. PubMed PMID: 23168695; PubMed Central PMCID: PMC3516022.
6. *Sonya Vick*: Jeff, Thank you for that comment. I was under the impression that GERD, or indigestion is increased in the absence of *H. Pylori*. GERD irritates the

esophagus which might lead to cancer there. These articles say that reducing H.Pylori in people would have negative effects, but is not specific on those effects. You say " H. pylori is only 'protective' in that it depletes the stomach acid to the point that any reflux is not as damaging. (2)" Is that not the same as saying having no H.Pylori means high stomach acid which could result in GERD irritating the esophagus and leading to cancer there?

7. *Jeff*: Hi Sonya,

The issue of GERD and H. pylori is a controversial one with many studies presenting conflicting results. One interesting idea is that GERD is caused by a build up of intra-abdominal pressure in which the presence of H. pylori is a causal factor. H. pylori depletes acid which can lead to delayed gastric emptying, the low acid environment then allows bacteria greater time and access to food in the stomach with the result being gas which then causes a build up of pressure on the lower esophageal sphincter. This is just one of many competing theories, though. This issue of having too much acid again is a red herring as it tends to be very rare, though one of the main causes is infection of the stomach antrum by h.pylori pretty much all other cases of excess stomach acid result from rare and serious conditions. <http://www.evovemental.com/importance-stomach-acid/>. Stomach acid is very important for our health and under no circumstances should we seek to lower it, unless it's the result of one of the rare conditions mentioned in the above link. There is also the issue of hiatal hernia which is present in the vast majority and possibly with better screening techniques all cases of GERD. "Endoscopic and radiographic studies suggest that 50% to 94% of patients with gastroesophageal reflux disease have a type I hiatal hernia." <http://www.nature.com/gimo/contents/pt1/full/gimo48.html>

## APPENDIX 2.C

### Where does inflation derive its energy from?

MOOC on Emergence of Life

1. *Peter Volkers*: Since Edwin Hubble's discovery of the expansion of the universe we have come a long way of establishing the "big bang theory" of the universe. It is corroborated by a number of scientific observations from various fields, e.g. the measurements of redshifts of galaxies, the precision measurements of the cosmic microwave background radiation by satellite probes and the abundance of elements in the visible universe.

However, the "simple" big bang model came into trouble in the 1980s when it was realized that there were significant features which couldn't satisfactorily be explained by it, especially the "horizon problem" and the "flatness problem". The horizon problem refers to the fact that on it's largest scales the universe appears to be very homogenic which is hard to explain because the cosmic expansion makes it impossible for far-apart regions of the universe to "communicate" and therefore to have the same structure. The flatness problem refers to the fact that at present the universe seems to have a mass-energy density close to the "critical value" needed for a flat universe which is also hard to explain because expansion would have driven away the universe from flatness if it wasn't exactly flat to begin with. In the 1980s Alan Guth and Andrei Linde introduced the idea of "inflation", i.e. a super-rapid expansion of the very early universe, namely in the period from about  $10^{-36}$  seconds through  $10^{-32}$  seconds after the big bang (singularity?). Inflation solves the flatness problem as well as the horizon problem. So far no empirical observation is in disagreement with inflation and the idea is now widely considered part of the mainstream big bang model.

However, inflation remains puzzling and hard to accept for me because there really is no known physical mechanism which drives this super-fast expansion period in the early universe. The known forces of physics (gravitation, electroweak force, strong force) can't account for it and so an ad-hoc energy field would have to be introduced. As usual with ad-hoc answers they open up many new questions even if they solve old ones. So inflation still is mysterious to me and in need of more empirical evidence.

Some month ago data from the BICEP collaboration seemed to offer such evidence as well as the first evidence of gravitational waves but that claim seems to be in doubt now.

Would do others think about inflation?

Citations:

Wikipedia article on cosmic inflation:

[http://en.wikipedia.org/wiki/Inflation\\_\(cosmology\)](http://en.wikipedia.org/wiki/Inflation_(cosmology))

(Relatively recent, 2007) paper from Andrei Linde on inflationary cosmology:

<http://arxiv.org/abs/0705.0164>

BICEP2 paper from March 2014:

<http://arxiv.org/abs/1403.3985>

2. *Christine*: Yes, it will be puzzling for some time to come, I expect. Higgs' Boson and Higgs field help, as well as the new particle accelerator finds of other new particles. Dark Matter and Dark Energy come seriously into play too! And seems to be accepted now that the BB is not a singularity as such, but happened everywhere at the same moment, also the start of time.....
3. *Christine*, thanks for commenting on my original post.  
I didn't bring dark matter and dark energy into the picture because I think the question of what drives inflation is not directly tied to them. But of course you're right that they play a huge role in the overall picture of the cosmic expansion and ultimate destiny.  
I as many hope that the new particle accelerators (esp. LHC after the energy upgrade) will find evidence for new particles which will enable another step in our understanding of the cosmos. However, I think there's a significant probability that in the next 10 or 20 years no new particles are discovered. What then? For one thing, that would be the de-facto death of SUSY (according to my understanding). Will scientists (in this case physicists) then be able to get the massive funding to build another hadron collider beyond the LHC energy range or a e+e- Linear Collider with enough bang to create Higgs bosons en masse? I somewhat doubt it...  
As to whether the BB is a singularity as such I too find that question very interesting. Some month ago I've read Martin Bojowald's book "Once before time" which has some original ideas on this.
4. *Ken*: Peter,  
An interesting thread, thanks for posting this. What are your thoughts about the possible effect of quantum fluctuation to "power" inflation?
5. *Peter Volkers*: Thanks Ken. You mean the possibility that primordial quantum fluctuations were expanded to macroscopic scales by inflation in the very early universe? That is, as far as I know, the working assumption of some cosmological models. For me it offers a possible understanding of why there is a universe at all (as we know it, i.e. with matter and everything) and not just "nothing" (in the sense of a completely empty space-time or not even that).  
However, I still would like an explanation of what inflation really is, i.e. what drives the super-rapid expansion? Is there another force-field? Or a completely different mechanism? And how does it fit into the overall picture of the physical forces?  
By the way, I recently read an interesting book on the question why there is something (actually, a lot) and not just "nothing":  
Jim Holt: "*Why Does the World Exist? An Existential Detective Story*". It tackles the question with possible answer from science as well as from philosophy.  
Needless to say, no definitive answer is reached ;-)

6. *Pat*: Inflation seems fairly straightforward to me if you use an explosion here on Earth as an analogy. Let's say, hypothetically, someone wanted to blow up a cement dump truck and capture it with high speed video. [1] I would expect to see a very abrupt and large movement initially with the particles eventually slowing down towards the end of the explosion due to gravity, wind resistance, etc. If that explosion happened in space then those particles would go on for quite a while longer.

[1] [The MythBusters blow up a cement truck](#)

- a. *Peter Volkers*: Paul, the explosion on earth is unfortunately not a good analogy. For one, it's completely clear what drives it (the chemical reaction of the explosive, like, TNT, with the oxygen from the air) while for inflation that's exactly the question from my original post (what drives it?).

Secondly, for the chemical explosion the debris get their initial velocity from the explosion and then fly outward, getting slowed down by friction etc. For the universe the picture is completely different. Space-time *itself* expands and it did so in an *accelerating* manner during inflation (and even today as current measurements seem to indicate). So inflation remains somewhat of a mystery.

- b. *Pat*: I looked into it a bit more and you are right, it was an expansion and not an explosion. The below links explain it a bit more, it is a bit stranger than I initially thought...

<http://profmattstrassler.com/articles-and-posts/relativity-space-astronomy-and-cosmology/history-of-the-universe/big-bang-expansion-not-explosion/>  
<http://profmattstrassler.com/articles-and-posts/relativity-space-astronomy-and-cosmology/history-of-...>

7. *Ramiro Diez*: Nice post Peter!

It is always nice to know other people thinking about how the Universe emerged and works. Inflation, as you pointed out, is a tricky question. You have commented that science have "solved" the question about the flatness of the Cosmos. I could also add something about what you have called the "horizon problem".

As you said, the Universe looks quite similar (that is to say, more or less uniform), but in fact, it is full of small wrinkles. These irregularities are created by tiny ripples at the beginning of the inflation because of [the uncertainty principle](#). **Small differences in the beginning have big consequences in the final result**, a good sentence that Ian Malcolm could have said. And it can be applied at the macroscopic level (the Cosmos) but also in biological systems (this course!). What do you think about this phenomenon?

It is also important to mention [dark energy](#), as Christine have commented in the first response to this post, but that is hard stuff. If you like to know more about this, I personally recommend you to have a look at the next session of the course *From the Big Bang to Dark Energy*.

Ramiro Diez CTA



- a. *Christine*: Hey, Ramiro, that is such a good course! I have done it twice:). I have largely concentrated on astronomy courses so far, but someone recommended this one.
  - b. *Peter Volkers*: Thanks, Ramiro!  
I did *From the Big Bang to Dark Energy* last year and liked it very much. Short but full of good stuff.  
As for dark energy, I didn't mention that in my original post because I wanted to keep things (relatively) simple. But of course it plays a big role in our current understanding of the cosmos, mysterious as it is. It is part of the explanation why space-time is flat in our day and age and not being driven many orders of magnitude away from flatness by its expansion.  
Nice discussion, thanks to everybody!
8. *Ramiro Diez*: @Christine: good for the student who recommended this course! I believe that he or she was right to do it.  
@Peter: glad you took as well. And as me, I see that you wanted more! And maybe you would get it in this course, but just focused on [a pale blue dot](#).



\*Source: [News Discovery](#).

9. *Peter Volkers*: That image never fails to amaze me. Even decades after seeing it the first time I still get goosebumps every time. Thanks for posting it!  
And yes, as interesting (and humbling!) as cosmological questions are that blue dot of ours offer plenty of questions and challenges itself.
10. Everything well explained on our  
blog: <http://societyofmodernastronomy.wordpress.com/2014/10/23/the-inflationary-multiverse/>
11. And just in by the eminent Brian Koberlein on  
expansion: <https://briankoberlein.com/2014/10/23/not-nothing/>
12. *Jacob Leach*: Hello Peter,  
Thanks for such a thought provoking post.  
Inflation seems to be the accepted theory for the present. I can't say I understand the physics about it. . Popular Physicist Sean Kelly argues that the rate of



expansion during inflation needs to be very precisely within a perfect rate. It is commonly called a fine-tuning problem. When all cosmological histories are counted, inflation only occurs in  $10^{-\exp(6.6 \times 10^7)}$  (1). An extremely infrequent event in simulations.

Also, is this big bang inflation related to the current expansion of the universe due to dark energy? Where does the universe get the energy to drive expansion today?

What energy could account for the expansion? Is the first law of Thermodynamics still true when all galaxies are traveling away from each other at an accelerated rate.

(1) Unitary Evolution and Cosmological Fine-tuning. Sean Carroll,  
<http://arxiv.org/abs/1007.1417>

Jacob Leach,

13. *Mitch*: Actually, I don't mind inflation as an idea. In Einstein's equation, matter gives gravity and contracts while energy makes space expand. So dark energy and its effect on the current expansion of the universe. Imagine it is some milliseconds after the big bang and suddenly the strong force freezes out of the soup. You now have tons of energy, and tons of expansion. Voila, inflation. I thought the picture of the big bang looking like an explosion in the first week video was really lame. Not what the big bang looked like at all.
  - a. *Peter Volkers*: Mitch, energy doesn't make space expand in and of itself. The nature of dark energy is still very mysterious and whether it can account for the current accelerated expansion of the cosmos is an open question. Certainly the fact that shortly after the big bang there was lots of energy in the (then very small universe) doesn't offer a satisfying "Voila" explanation of inflation (for example, why did inflation stop after about 10–32 seconds?).
  - b. *Mitch*: Hi Peter,  
>> energy doesn't make space expand in and of itself.  
Actually, yes it does.  
>> The nature of dark energy is still very mysterious and whether it can account for the current accelerated expansion of the cosmos is an open question.  
Actually, the reason physicists propose the existence of dark energy is to explain the expansion of the universe. That's its *raison d'être*.  
>> why did inflation stop after about 10–32 seconds?  
Using my (hypothetical, imaginary, gratuitous) example of the strong force freezing out at that time, the strong force freezes out at that moment, tons of energy, tons of expansion, inflation. After that moment, no new strong force freezing, no new energy (except for residue energy and dark energy), and so the inflationary period ends.  
Great post here with 164 views. My post on "The Perfect Storm" got 4 views and no comments. I am so jealous.
  - c. *Jacob Leach*: I guess to keep the 1st Law of Thermodynamics true, where energy is neither created nor destroyed, we need to keep coming up with Dark particles, Dark fluxes, and Dark fields to balance it out.

- d. *Mitch*: I sort of disagree with this last comment. Just because I, an amateur cosmologist would glorify it, don't understand what is going on, doesn't mean it is not happening.
- e. *Jacob Leach*: Oh thank you, I'm just trying to understand with limited vocabulary and knowledge in physics. I'm not trying to prove anything, but understand. I welcome disagreement, if any healthy discussion comes out, then I will learn something.
- f. *Mitch*: Well, if you think about it, if one galaxy is moving away from another there must be work done overcoming gravitational potential energy. Where is that energy coming from? Maybe space is just expanding with no work done but it seems odd to me.
- g. *Peter Volkers*: Michael, the energy for overcoming the gravitational field is coming from the kinetic energy of the galaxies which are slowed down by gravity. That's the classical picture anyway. Because now we think the expansion is actually accelerated we postulate an additional force which overcomes gravity and as a net effect has the expansion accelerated. That's dark energy.

And to follow-up on an earlier post of yours: just because we give a thing a name ("dark energy") doesn't mean we understand it's nature and it's properties. That's exactly what I'm asking (for inflation, but also for dark energy): what's its nature? How does it fit in with the other, known forces (e.g. for gravity or strong force we don't just have names but we know a lot about them, including mathematical structure and associated fields and carrier particles).

>>>> energy doesn't make space expand in and of itself.

>> Actually, yes it does.

No it doesn't. Energy is (in the  $E=mc^2$  sense) equivalent to mass and therefore gravity acts on it. Relativity theory tells us that masses influence ("bend") space-time which we can actually observe in some circumstances. However energy doesn't necessarily make space expand, that's simply not the case.

And yes, I'm happy that this thread got a lot of views and comments ;-)

- h. It fits in string theory, right?  
And what about multiverses?

A TED talk with Brian

Greene: <https://www.youtube.com/watch?v=bf7BXwVeyWw>

- 14. I watched a program last night about this whole question. There seems to be a new theory about a phase transition (like water to ice) extremely early on (at one trillionth of a second). The 'vacuum of space' still had some energy left, though, possibly the DE. They also said that DE came into play about 8 billion years ago, which started the accelerated expansion. This will go on. All stars will burn out, it will be a black hole universe. Protons will start to fall apart, BHs will evaporate into gamma rays in about a quadrillion years.

It was a program made this year for Discovery Documentaries.

- i. I will try to find some material on it online

15. The latest on expansion by Brian Koberlein. Extremely interesting!  
<https://briankoberlein.com/2014/10/26/phantom-menace/>  
j. *Peter Volkers*: Thanks for posting this! Obviously a very active field with lots of new data and analysis coming in all the time.
16. I always read his postings.  
Here is something new on DE, DM and  
BB[http://www.sciencedaily.com/releases/2014/10/141027145008.htm?utm\\_content=bufferb15e6&utm\\_medium=soc...](http://www.sciencedaily.com/releases/2014/10/141027145008.htm?utm_content=bufferb15e6&utm_medium=soc...)
17. You guys have such a great discussion going on so far! On a quick note:  
If you are interested in "inflation" and wish to find out more about it, note that World Science U has set up a short master class on inflation led by Alan Guth **himself**. It is self paced so you can access it at anytime you like, so do not worry if you have already overdosed on MOOCs already (as I do already!) Keep checking out the site because there will be new master classes every three weeks and some of these might be big bang related.

## APPENDIX 2.D

### Thread on Collective Evolution MOOC on Emergence of Life

1. *Peter Volkers*: I think the term "survival of the fittest" is commonly interpreted in a somewhat wrong way. As the description of question 3 of this week's discussion topics implies it does not necessarily apply only to the individual organism. Rather there are abundant examples of collectivism in nature of which I want to give just two examples:

- 1) Colonies of state-building insects, e.g. ants, bees, wasps:

These kind of species have a lot of highly specialized individual members which perform tasks within the division of labor which are clearly not to their personal benefit but to that of the community as a whole. That behavior is called "eusocial". Because typically only one of the many members actually reproduces (the "queen") there is obviously no way that the workers can give their genes to the next generation themselves. However they perform important tasks in nest building, food acquisition, care for the queen's offspring, defense against intruders and so on which benefit the queen's offspring and in that way also their own genes which are shared with the queen's. [1] [2]

- 2) Humans:

Humans have developed a number of traits which enable them to survive as a group much better than they would do without these traits. The most important one in my view is language, i.e. the ability to communicate in abstract terms. This enabled Homo Sapiens to build increasingly sophisticated societies with ever-increasing technological achievements which in turn made them populate basically the entire world (it's surface, at least) in the last 50.000 to 100.000 years on the expense of other Homo species and lot's of non-Homo species as well. To achieve this, a high level of cooperation is needed with individual members often showing altruistic behavior not only in supporting their next of kin but also strangers, i.e. society as a whole. This works even when some individuals clearly act in selfish ways as long as they are in a relatively small minority. So in evolutionary terms Homo Sapiens had some very successful tens of thousands of years lately. Of course, the moral implications of making a lot of other species getting distinct in the process are an altogether different thing which evolution doesn't stress itself with. [3] [4]

#### Citations:

Wikipedia on Eusociality:

[1] <http://en.wikipedia.org/wiki/Eusociality>

[2] Bert Hölldobler and E.O. Wilson: "The Super-Organism: The Beauty,

Elegance, and Strangeness of Insect Societies"

[3] Steven Pinker: "The Blank Slate: The Modern Denial of Human Nature"

[4] Robert Wright: "Nonzero: The Logic of Human Destiny"

2. Hi Peter. I think you have a handle on what they are looking for. I think the distinction probably is that to survive long enough to reproduce, it isn't the biggest and strongest but the organism's ability to fit in long enough to reproduce. Sometimes it's even survival of the "luckiest!"

- a. *Peter Volkers*: Luck is certainly a factor. As a popular example, the dinosaurs (and many other species) were doing quite well when that asteroid came along changed everything...

3. *Jacob Leach*: Hi Peter, I personally, think you have hit on something fundamental.

As one student opinion to another, survival of the fittest seems to emphasize the competitive aspects of evolution, and drives radiation of species based on variation. Collectivism, as in your excellent examples, seems to drive the other end of evolution toward emergence.

An example would be eukaryotic collectivism of single cells evolving toward specialization of multi-celled organisms. Single cell organisms originated, and radiated many species according to survival of the fittest. But then, DNA organism structures learned the trick of collective cooperation and specialization of cells; and then something amazing happened. An emergence of a new way of organizing life evolved. Multi-cellular life grew orders of magnitude larger in size than all the single cell organisms. The bigger eukaryotic organisms could exploit the ecosystem on larger scales that the single cell organisms could not. An open niche based on size was readily available and created a whole new class and way for life to begin a new round of radiation. I call increasing complexity based on the cooperation of simpler component units "emergence"(1). I believe a similar process happened with the progenote pre-biotic soup crossed the darwinian transition (Fouke) of cellular life.

(1) Wikipedia, Emergence. accessed 11-1-

2014. <http://en.wikipedia.org/wiki/Emergence>

Fouke, Emergence of Life, video 2.5

Jacob Leach

4. *Peter Volkers*: Great comment, thanks! I think your example of cells working together forming an organism much bigger and more complex than a cell would be able to produce on it's own is a very nice example of "the whole is more than the sum of it's parts".

5. *Jacob Leach*: Peter,

What is intriguing to me, I think these are universal concepts not confined to biology. The emergence of the hydrogen atoms when protons captured electrons 380,000 years from the big bang literally created a universe of chemistry that did not exist before that. Heavy elements emerged from the fusion of atoms created by supernovas gave the universe robust toolbox of elements needed for DNA and life.

I'm sure most disagree with me, but from particle physics to human language and symbolic logic, evolution drives the universe toward complexity. The second law

of thermodynamics drives it toward chaos.

If we want to understand the emergence of life, we should understand the mechanics of evolution. I agree, this middle approach between reductionism and holism will give us insight to drive science. This will also help us recognize new life in other parts of the universe that does not look like life in Earth. I think Dr. Fouke does a great job in this course illustrating geology and biology in a 4 billion year context to describe how life emerges, and continually co-evolves with the earth.

Jacob Leach

6. *Peter Volkers*: James, interesting that you bring elementary particle physics into the picture. But I think the analogy only goes so far because once the temperature of the early universe was low enough it was pre-determined by the laws of physics that electrons would bound to baryons, no chance involved (of course, on an individual level of a single particle there's lots of chance involved). So the emergence of e.g. hydrogen was clear from the beginning (not that there were any observers to actually predict it...). Also today's large-scale structure of the universe is determined from by the laws of physics and not subject to evolution in the Darwinian sense.

Also the fact that certain processes you mentioned (e.g. the "cooking" of heavy elements in supernovae) were necessary ingredients in the emergence of life does not involve evolution per se, I think. If, let's say, pre-mordial density fluctuations weren't large enough to be expanded by inflation and act as seeds for galaxy formations we may today have a very boring universe of a low density gas of light elements (no big enough gravitational centers to attract more matter to build a star) and there's nothing for evolution to act on. Unless one thinks the laws of physics themselves are subject to evolution (which I don't).

In contrast I think in biology maybe (!) the emergence of life was probable but which forms would arise has a lot of variability in it and was not pre-determined. I completely agree on the great job done by the instructor to lively illustrate the complex path the emergence of life has taken!

Nice discussion once again!

7. *Jacob Leach*: I agree, this is a nice discussion!!! I agree with 100% that the laws of physics have to be considered immutable and constant, not evolving. I'm certainly not qualified to debate particle physics, and yes, it is ambitious to extend the concept of emergence or evolution. I'm admittedly out on a limb, trying to learn.

Still, to me, if you start with a universe protons and electrons (3 minutes after Big Bang), and then try to predict the properties of hydrogen and then chemistry is a big step. I prefer to call that "emergence" of atomic properties and chemistry.

This emergence still operates under the same laws of physics, but changes the structures and properties in the universe. Hydrogen is so ubiquitous, it is hard to imagine a universe without it. But it took the universe a lot of steps to get there. Looking back after it happened, it seems easy to say, and of course that is reductively predictable "put 2 and 2 together..." To me, I see the holistic side, and looking at protons and electrons and predicting *the properties of (edited)*

hydrogen is a little like looking at 50,000 termites and their DNA, and saying it is obvious that after one year they will create a 15 foot tall [termite mound](#).

Just one question, are the properties of hydrogen fundamental laws of physics, or are the fundamental laws of mass, electromagnetism, quantum mechanics acting to "organize" hydrogen?

Thanks for your comments, this is very interesting to me!

Jacob Leach

8. *Peter Volkers*: James, once the laws of physics are fixed the properties of the hydrogen atom only depend on the values of some fundamental constants of physics like Planck's constant ( $h$  or  $\hbar$ ), the speed of light ( $c$ ) and the charge and mass of the electron. We assume these to be constants, i.e. to not change over time. So yes, the fundamental laws of physics, in this case especially Quantum Electro Dynamics (QED), do organize the hydrogen atom and all other atoms as well. For heavier elements, the strong force comes into play in the atomic nucleus and the weak force play a big role in radioactive decays of heavier elements.

One interesting related question is why do these constants have just the values they do have, i.e. the ones we measure? We know that if the values were slightly different no stable matter (like hydrogen) would be possible and therefore no life. Some people invoke the "anthropic principle" [1]

to explain this but I don't find that really satisfying. Other explanations involve some higher entity (i.e. a god fixing the constants) or a multiverse [2] where

each universe in the multiverse has another set of constants (there are, as far as we know, about 28 of them which have to be fed into the standard model of particle physics) and we necessarily happen to live in one where they have values which allow life.

[1] [http://en.wikipedia.org/wiki/Anthropic\\_principle](http://en.wikipedia.org/wiki/Anthropic_principle)

[2] <http://en.wikipedia.org/wiki/Multiverse>

9. *Jacob Leach*: Fascinating! Multi-verse is truly mind-bending and exciting to think about.

Thank you for answering my questions! I'll reserve the possibility in my mind that someday, perhaps some element of emergence or evolution may be seen to play a role outside of biology. I do have more questions, but they are out of scope for the class.

I definitely know that instead of going from biology to physics, if we go the other way from physics to biology, that there are a lot of breakthroughs that will explain how life works.

Astro-biologists are trying to find the signatures of life elsewhere in the universe.

Edwin Schrödinger wrote a book "What is Life" in 1944 that Crick and Watson credited with helping them find DNA (1) here on earth. I'm sure physicists will play a major role in finding life elsewhere in the universe.

(1) What is Life? The physicist who sparked a revolution in biology, Guardian. Feb 7, 2013. <http://www.theguardian.com/science/blog/2013/feb/07/wonders-life-physicist-revolution-biology>

Jacob Leach

10. I know it is a bit late in the chain but James stated the **laws of physics have to be considered immutable**. I believe there is some concern/doubt on this issue and that these laws may have changed over time. see the two links ( I acknowledge they are some years old).  
<http://news.bbc.co.uk/1/hi/sci/tech/1991223.stm>  
<http://www.nytimes.com/2001/08/15/us/anything-can-change-it-seems-even-an-immutable-law-of-nature.ht...>  
 I attended a lecture by Rupert Sheldrake (<http://www.sheldrake.org/>) who I know is not the most respected scientist but he did state that many of our laws and constants are accepted and have not been rigorously tested or questioned. I can understand that the assertion '*have to be considered immutable*' will enable us to progress - even scientists need some degree of faith!.  
 Do we know for certain that the laws and constants are truly immutable?
11. *Jacob Leach*: Thanks for the links, it seems immutable is no longer the way to describe laws of nature. A lot has changed since my physics classes in the 1980's!  
 Jacob Leach
12. *Peter Volkers*: James, in science we really don't know anything for certain. We formulate hypothesis and test them as good as we can against empirical data. That said, it is widely assumed that the laws of physics are immutable. Without this assumption physics as a science would basically cease to exist. And considering the spectacular success it has with many many experiments that doesn't seem likely.  
 There are some speculative extensions of the "agree to" physical laws which introduce a variability in the laws itself. So far that's just speculation though, not the least bit of empirical evidence for it.
13. *Jacob Leach*: Thanks for clearing that up!  
 Jacob
14. *Tom*: I was out running this morning - ok jogging - a great activity for mulling over things and today I was pondering this question of the immutable laws and life.  
 In support of the immutability of the laws of chemistry and by association the physical laws - at least for the last 4.5 billion years - must be the emergence of life. We believe life started as a result of chemical reactions that occurred at this time and (at least as far as I know) the chemistry continues to hold good today. Then one could propose the laws that govern today's reactions must be the same as those 4.5 billion years ago. In addition the manufacture of some elements from the Big Bang and the star's could also be considered relevant.  
 I guess this can also imply the emergence of life was not a completely random event but a consequence of natural laws influenced by the local environment: analogous to our view of evolution.  
 Maybe not strong arguments but then it was a short run!
15. *Jacob Leach*: Tom, to me there is a tension between two different conceptions of the universe. One is a completely deterministic universe[1]; the second is an evolvable universe. I think the implications are enormous. The emergence of life and evolution begs us to ask fundamental questions.  
 For the past 500 years humans have flourished in science. Largely viewing the



universe as a giant mechanistic clock; laws of physics playing out completely deterministically in a one way march toward heat death according to the 2nd law of thermodynamics.

However, to me just speculating, what emergence and evolution says is that the universe is in some way hard wired to attain more and more complexity. This complexity produces new properties which cannot be determined today. The universe is not just a clock slowly winding down increasing entropy. There is a second tendency in the opposite direction decreasing entropy, and increasing complexity (see my [other discussion](#)). I call this tendency “Omega” for argument’s sake.

This discussion post starts with examples how cooperation propels evolution. I would explain the emergence of complexity as the tendency toward Omega which introduces new properties into the universe. The universe evolves. I’m not using omega in the same way Frank Tipler uses it; but I borrow the term inspired by the [Omega Point](#) conceived by Pierre Teilhard de Chardin [2]. Obviously, this theory does not make falsifiable predictions that we can test. It is not science, it is metaphysics. Just throwing it out here because I think evolution may one day be thought of as a fundamental law of the universe. Oh well, I guess I should have enrolled in the philosophy course instead...

[1] Wikipedia, Deterministic System accessed 11-8-

2014. [http://en.wikipedia.org/wiki/Deterministic\\_system\\_\(philosophy\)](http://en.wikipedia.org/wiki/Deterministic_system_(philosophy))

[2] Wikipedia, Omega Point, accessed 11-8-

2014. [http://en.wikipedia.org/wiki/Omega\\_Point](http://en.wikipedia.org/wiki/Omega_Point)

Jacob Leach

16. *Volker Schmidt*: Anonymous,

I would just like to add that when you speak about cooperation of eukaryotes to form bigger organisms, you could add, that for example in the human body, there are as well bacteria and archaea present. Some of which are necessary for the functioning of the whole. Bacteria, fungi and archaea largely outnumber human cells in the human body. See [https://en.wikipedia.org/wiki/Human\\_microbiome](https://en.wikipedia.org/wiki/Human_microbiome)

- a. *Jacob Leach*: Excellent point Volker! I think in some sense, the microbe archaea, bacteria do not view the the human body as competition, they view it as habitat.

The niches that bacteria exploits, and the niche a human body exploits, barely intersect. If my immune system lets down, and the bacteria and infection start getting the upper hand, it is bad new for me. If my body dies, then the bacteria and archaea will die along with me. But there is a largely symbiotic cooperative relationship between my existence as 200 lb human, and the vast bacterial ecosystem I host.

Jacob Leach

- b. *Jacob Leach*: BTW,

I'm posting as a student as anonymous, because I'm not in the CTA role.

CTAs are 100% volunteer students. We are not in any authority to interpret course material for staff or the professor. I want to converse as a student trying to understand. I don't want to have the CTA label on my

postings here. These forums are very enjoyable for me.  
Jacob Leach

- c. *Tanya Galdo*: James, thanks for explaining that. I was wondering why you post as Anon but put your name in the post. I think at least one other CTA does this, too.

17. *Tanya Galdo*: I was going to ask you that same question, but I thought that you were doing it because of the same reason you explained.

No matter, your answers are as valuable, so keep them coming James.

Regards

## APPENDIX 2.E

### Reproductive Health in Nigeria MOOC on Global Health

1. *Emmanuel*: Nigeria is a country of approximately 170 million people with larger number of the population mostly young people. sexual and reproductive health has always been a problem in the country. Although in recent time, there has been an increase in awareness on sexual and reproductive health issues , however there is still much to be done. for example, in the area of child mortality, children still dies at alarming rate in the country due to fragile and unstructured health system which are mostly ill-equipped. most local areas are not well funded to handle health issues and most times most women in such area especially expectant mother will have to travel a long distance for medical assistance and most times its too late. on the hand, the main issue here is that the government strategy on health and well being of the population is not robust and appears not to be that effective, yes the government has been trying in recent time to deal with so many health issues in the country for example, their effective and efficient intervention on Ebola outbreak in the country was commended globally to the extent that even the Americans sent delegates to study the country model. however, in the areas of sexual and reproductive health , there are still a lot to be done. The Government must invest in infrastructural development in the area of sexual and reproductive health, NGOS should also help and ensure that their resources are used by the people it was intended for because there may be dubious local partners who will always divert the fund donated by foreign donors or NGOS. There should be more awareness on the areas of sexual and reproductive health in general.
2. *Tope*: Of course Emmanuel the points you have raised are actually true, but I would like to point out to you that even though Nigeria may not be able to achieve the goal 4 and 5 by the end of 2015 but if given a little more time say 2 years for instance the country may be able to achieve the said goals. Especially with the current measures put in place in the country by a great organization mentioned some where in this discussion. Amongst other points you mentioned above below are also some barriers or problems;  
Getting access to good and proper health care especially those in the hard to reach areas  
Conversion of provided items or materials to personal use or sale of such items  
Reluctance of Health Staff giving injectibles to expectant and or nursing mothers and sick children

Out break of violence, Crises and or Conflict making reaching the hard to reach areas difficult or impossible etc.

Despite the above barriers, there are currently efforts by eHealth Africa an organization that utilizes appropriate technology to effectively design, implement, manage, and evaluate health projects especially in the areas of discuss and this is actually helping a whole lot in the area of health in Nigeria presently amongst other activities. Take the Ebola case for instance the great assistance from eHealth in collaboration with other Stake Holders helped in containing the disease faster than expected. So with the current effort of eHealth in partnership with other international NGOs as well as various States Government, it is possible for Nigeria to achieve these goals as at when expected. Also if other countries can contact the above mentioned organization, and engage their partnership and services, the goals in discuss can be achieved faster as well as in other areas of Health.

3. @ Emmanuel and Tope! You are very right! Nigeria is capable of producing and promoting sexual reproductive health. However I think the political aspect might seem to retard this high-spirited goals.
4. Yes these seem to be the common problems of most countries. I believe there are audits and reports that local government officials have to fill out about resource allocation i.e. indicating how donated resources was allocated to helped citizens. Perhaps this will help with corruption. If not we need to take bottom up approach to confirm resource audits. Perhaps random interview to hand picked individuals who benefited from resources. They do provide lists of people who came to clinic.
5. Yes I agree, using the bottom up approach would go a long way to reduce issue of resources getting to the right source, which is being adopted now in some part of Northern Nigeria in the area of health though not with resources.
  - a. I think this is a problem in many countries only a different levels and we are slowly developing strategic ways to overcome all issues.
6. *Nwanneka*: I disagree that these goals would be achieved in 2015 or even 5-10 years afterwards. Addressing child mortality, highest number of death still comes from preventable diseases. Nigeria in fact is the 2nd largest contributor to the under five and maternal mortality. Malnutrition still accounts more than 50% of all under five deaths. I agree we are making progress in cutting down the mortality rate, however the pace still remains very slow. The health system as mentioned here is still fragile and under equipped. There are numerous barriers but the major one is the unwillingness of the government/ system in cutting all these down. The wealth possession of just one Nigerian politician is well enough to feed or tackle malnutrition but the idea of the one person remaining rich while the rest remaining poor has eluded us. Corruption on the other hand has barred Nigeria from its right to development. Nigeria is part of the group of African countries that has no real reason to account for its perpetually high poverty rates which is where these under five mortality emerge from.

Furthermore, when it comes to reproductive health, we still have a long way to go. Contraceptive use is still low and youth underestimate risk of unprotected sex. Young women are still at risk of unintended pregnancy leading to unsafe abortion.

Youths are at risk of HIV and lack of knowledges of sexually transmitted infections. Gender inequality is still a major problem we are facing. So I believe to achieve these goals, The system should be willing to forfeit their pockets , and for maternal health,legalising abortion will go a long ways in cutting down unsafe abortion, female education is utterly important, gender inequality which surprisingly is still experienced in Nigeria should be tackled, all these are interlinked and should be all be looked into.

a. Well said Tope.

In addition to that, I do think we have to break the barrier in talking about sex - safe sex. Because of the religious factor, unmarried adults actively engaged in sex are stigmatised...females especially. This makes them unable to actively seek contraception - How many women can go to their doctors and feel empowered enough to ask for contraceptive pills? As a result they rely on their partners faithful use of condoms (and we know how unreliable that is).

2. Unsafe Abortions are still the norm because of the illegality of abortion. I admired the governor of Imo State for making abortion legal in Imo State despite the antagonism from the churches. Hopefully, other states will borrow a leaf.

7. *Tope*: Nwanneka, Talking about malnutrition, some of the rich you are talking about do not own what those you referred to as poor has. I work in rural communities very close to the rural settlers. Do you know those in the rural areas have everything it takes not to be malnourished? For instance most of those in the rural areas do farm, they rare animals such as goats, sheep, cattle, birds(chicken, guinea fowl, turkey) etc. and with this they get eggs and milk from these but do you know such settlements you still find their children malnourished and having kwashiokor they themselves do not feed well only in the name of they want to sell those things to get money. Eating from it becomes problem. You and I know that an average Fulani man is rich but do they feed well, NO. During my visit to some of these settlements we try to educate them on the need to eat from their produce and things has change for the better especially their pregnant mothers and children.

In the area of education I agree with you that women need to be educated but not only women everyone including men and children about health and on the need of nutrition and other health issues. This is one of the programmes I want to embark on though peace education but peace entails health body and soul. We all need to join hand together not leaving it to the Government alone. Health workers particularly need to be reoriented on their community services.

- a. *Nwanneka*: Yea. Well said. Though i would like to think that the hungry livestock rarer cannot afford to eat their animals because in as much as their stomach is filled, their pocket goes empty and the business suffers. Most of these farmers borrow the capital money for their business and are required to pay back over a given period of time. So you can understand why they cant afford the luxury of eating any of their livestock. There should be a good/intensive support to these farmers. Am proposing the introduction of food bank, sponsored by the

government where the less priviledges can obtain food. Its currently works in UK and with proper initiative and management,.can work for us. You suggested universal education,.yea!.definitely.That will go along way.

And yes we should all put hands together to battle these.

Well done with your work in rural areas.

8. We should not shy away from the truth. Many of the developing countries including the health sectors never put SRH among their priorities and that is why we shall continue to see violations, early marriages, death due to abotion, martenal and neonatal mortality raising.
9. Great contribution by all . All comments are valuable

## APPENDIX 2.F

### Thread on Missing MDGs in India MOOC on Global Health

1. *Matt:* Child mortality is a sensitive indicator of a country's development. In India, the Infant Mortality Rate (IMR) (under one year) has shown a modest decline in recent years. The average decline of IMR per year between the years 2004 to 2008 has been about 1 per cent per year.

India continues to contribute about a quarter of all global maternal deaths. WHO defines maternal mortality as the death of a woman during pregnancy or in the first 42 days after the birth of the child due to causes directly or indirectly linked with pregnancy.

**Barriers include:**

About 70 per cent of the childhood deaths are caused by perinatal conditions (33.1 per cent), respiratory infections (22 per cent) and diarrhea (13.8 per cent).

Malnutrition is an underlying cause responsible for about one third of all deaths in childhood.

About half of the total maternal deaths occur because of hemorrhage and sepsis. A large number of deaths are preventable through safe deliveries and adequate maternal care.

More than half of all married women are anaemic and one-third of them are malnourished (have a body index below normal).

Interventions should include antenatal care, the presence of healthcare workers at birth, ensuring that first referral units are equipped to deal with emergency obstetric care and ensuring that both the mother and newborn are followed up post partum.

ref. <http://www.unicef.org/india/health.html>

**The following examples (excerpted from**

"Success Factors: Ten countries spotlighted for reducing mortality rates" accessed at [http://www.who.int/pmnch/about/governance/partnersforum/success\\_factors/en/index1.html](http://www.who.int/pmnch/about/governance/partnersforum/success_factors/en/index1.html)

**provide some best practices that have been shown to be effective:**

**Bangladesh** has reduced under-five mortality by 65 percent and maternal mortality by 66 percent. These reductions are associated with improved coverage of essential interventions, such as immunization, oral rehydration therapy and family planning, particularly in underserved areas. Partnerships between government, NGOs and the private sector contributed to improved service delivery. Bangladesh also focused on increasing access to education for girls and

gender equity, as well as improving road networks and access to information and communication technology.

**Cambodia** saw a 75 percent reduction in maternal mortality between 1990 and 2010. Between 1995 and 2010 there was a 57 percent reduction in child mortality, associated with early access to immunizations, early and exclusive breastfeeding and improvements in socioeconomic conditions. In a particularly innovative use of communications, Cambodia leveraged the reach of mass media to launch a campaign promoting exclusive breastfeeding, which included a storyline in a popular TV soap opera.

**China** decreased under-five mortality by 80 percent and maternal mortality by close to 80 percent. It has improved coverage of essential interventions and strengthened the health workforce by training more than 300,000 community workers to become general practitioners. China also made many improvements in sectors outside of health, including improving access to water and sanitation facilities.

Not Indian, sounds English. Introduction of pressing problem/case study of India. Compares what worked in Cambodia, Bangladesh, and China. Very thorough discussion of solutions. (phronesis)

2. *Christina*: Hey Mark! Good work! Thanks for contributing to the discussion with your analysis of Sexual and Reproductive Health in India. I did some research and came across CARE India which aims to "facilitate the empowerment of women and girls from poor and marginalized communities in the fight to overcome poverty, exclusion and social injustice. We nurture leadership internally and among partners to achieve this mission" - <http://www.careindia.org/healthcare>  
Are there any regions that face more barriers than others? Are there regions that are closer to reaching MDG4 or MDG5? What international programmes/initiatives have had a major impact?

Christina

3. *Matt*: Great questions Christina, did you find any hints to the answers during your research? I would guess there are going to be differences among the states. Maybe others with direct knowledge can respond.
4. *Jack Caresini*: Hey Matt, I am currently working in India on a health intervention targeting the poorest of the poor (PoP) in rural parts of my state. We are focusing on the 1000 day interventions, from pregnancy through to two years of age, and use free meals as an entry point activity.

First we survey all eligible women in the village (the village organisation does at least) and then all pregnant women, lactating mothers and children up to the age of 2 years old are offered free meals (or heavily subsidised depending on the area). Once they start coming for the meals they are given health education, regular ANC and PNC care and all the immunisations necessary. We also perform growth monitoring for children up to the age of 5. These interventions are linked to an mHealth system and also to the government systems - when a woman is recognised as high risk she is referred to the government facilities to receive additional care.

In organising this intervention we went on many exposure visits to other projects in neighbouring states. As you mentioned there is a huge variation in the



achievements of these areas, and I wonder if anyone has a solid reason for this variation? Kerala, for example, has a phenomenal record with regards to public health (especially sanitation - although some doubts have been cast on the longevity of these interventions), whereas Assam still languishes behind (SRS 2011 - found

here [http://censusindia.gov.in/vital\\_statistics/SRS\\_Bulletins/MMR\\_release\\_070711.pdf](http://censusindia.gov.in/vital_statistics/SRS_Bulletins/MMR_release_070711.pdf)).

5. Although India has seen a consistent decline in the Under Five Mortality Rate (U5MR) since 1990, the current trend shows that India is unlikely to meet Goal 4 of the MDG. The huge inequality in socioeconomic status contributes to this huge inequity in mortality rates across the country. Studies show that child mortality is three times higher among the poor than the rich. Moreover, many risk factors still exist: mothers have low-level education, child bearing occurs at the adolescent age, and birth spacing is not far apart enough (births that are less than 24 months apart increase the likelihood of child mortality).

Some promising initiatives involve addressing the huge socioeconomic gap. Since the poor population is three times more likely to experience child mortality under 5, efforts should be focused on the needs of this group. Another initiative would be to promote education to ensure that everyone is literate and knowledgeable of basic health information; additionally, this initiative is important because education is a determinant of child mortality.

In order to achieve Goal 5, the same issues must be addressed. The gap in socioeconomic status means that not all mothers have access to the resources and health care they need. Moreover, the lack of education makes them more likely to engage in risk behaviours, such as giving birth within 24 months apart or giving birth during adolescence, even though these two situations are known to increase the likelihood of child mortality.

It is helpful to look at Japan's circumstance considering they have the lowest child mortality rate in the world. One of the reasons they have such an impressive rate is because of their universal use of a maternal-child handbook as well as universal access to care (both of which is lacking in India). Moreover, most births occur among women between the ages of 25-29, unlike in India where many births occur among adolescents. Lastly, Japanese citizens are highly literate and thus know when to seek out medical advice.

The difference in regions is due to socioeconomic status. We need to address the socioeconomic status differences, provide better education, and have universal access to healthcare in India. Looks at Japan as a model

6. *Debolina Goswami*: This is a very well researched thread. I believe that India is far from achieving the reproductive health related MDGs primarily due to the vast population of the country. Even though the private health organizations do a decent job at maintaining required sanitary conditions and providing various health related facilities, only a small fraction of the population can afford such luxuries. The subsidized pub healthcare facilities are poorly maintained and patients run a high risk of contracting nosocomial infections. The poorest of the poor depend on ill-trained midwives and village elders for prenatal and post-natal care and delivery.

The introduction of mHealth in some countries seem like a great idea, and should

be implemented in India too in various regional languages. Also, the government should make it mandatory for private hospitals to cater to the reproductive needs of the poorest strata of the society at a highly subsidized rates for the retention of their accreditation.

In this tread people are good at pointing out possible solutions. Problem is poverty and unaffordable healthcare. Solution is mHealth and providing government assistance to the poor

7. *Jack Caresini*: Dear Debolina. mHealth initiatives have already been launched in a number of Indian States including Andhra Pradesh and the newly formed Telangana. In both of these cases the program operates only in the local language but generates reports in English which are freely available online. Look here if you want to see the latest updates.

[http://65.19.149.152/mNDCC\\_Andhra/ui\\_layer/NDCCReports\\_PagePublic.aspx](http://65.19.149.152/mNDCC_Andhra/ui_layer/NDCCReports_PagePublic.aspx)

8. *Debolina Goswami*: Thank you for pointing this out to me Mr. Palmieri. I wasn't aware of this.

In that case, this should also be implemented in all other states and the awareness regarding this facility should be more widespread.

Thank you again for this information.

9. *Jack Caresini*: Dear Ms. Goswami. You are more than welcome, had I not been working in Andhra Pradesh currently I am pretty sure I would not know about these initiatives myself! And I agree, scaling these interventions to the whole of India would be a fantastic first step.

10. Hello,

I always find graphics useful illustrating trends in countries as large and diverse as India. To that end, here are a few which may be interesting:

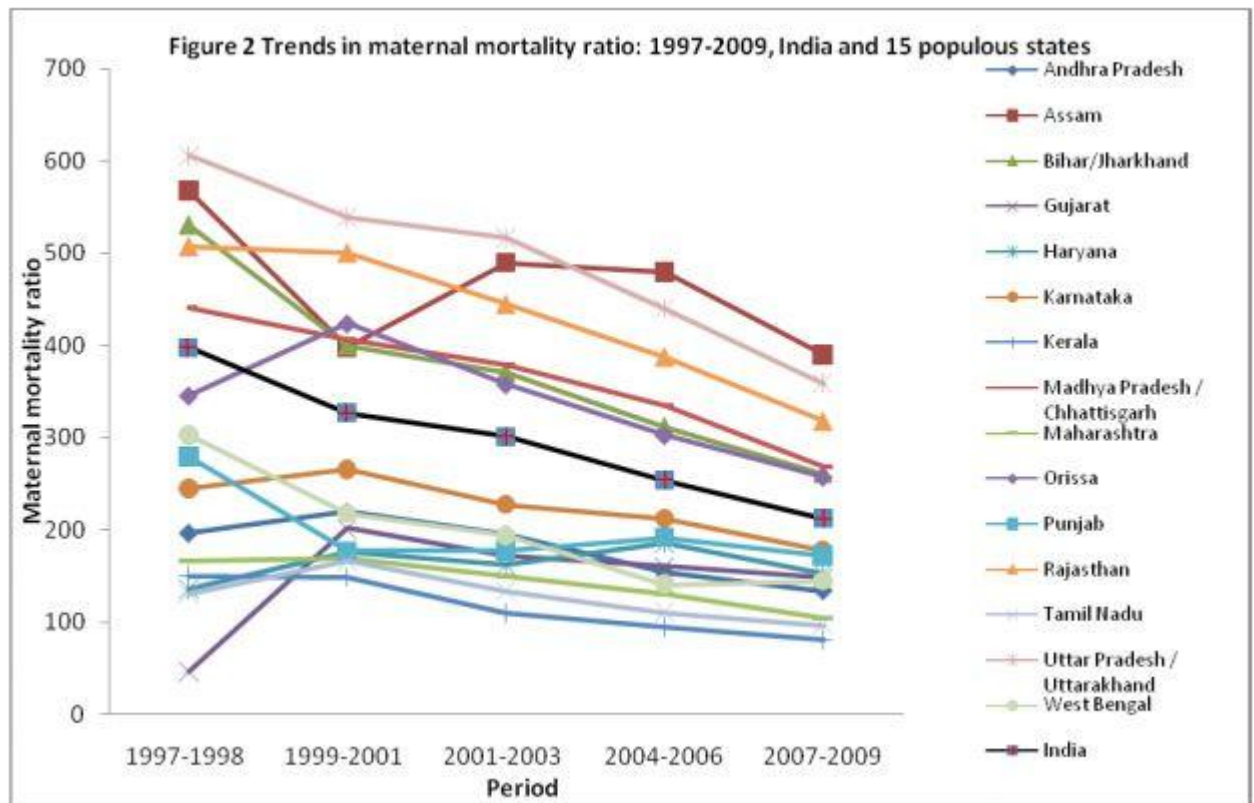
(Christine and Mark, they might give you an overview of the differential rate of progress among the states in India)

Overall, India will not achieve the MDG 4 and 5 targets by 2015, with the extent of potential for each of the sub-goals summarized below:

**Table 14.** Possibilities of achieving the MDGs in India

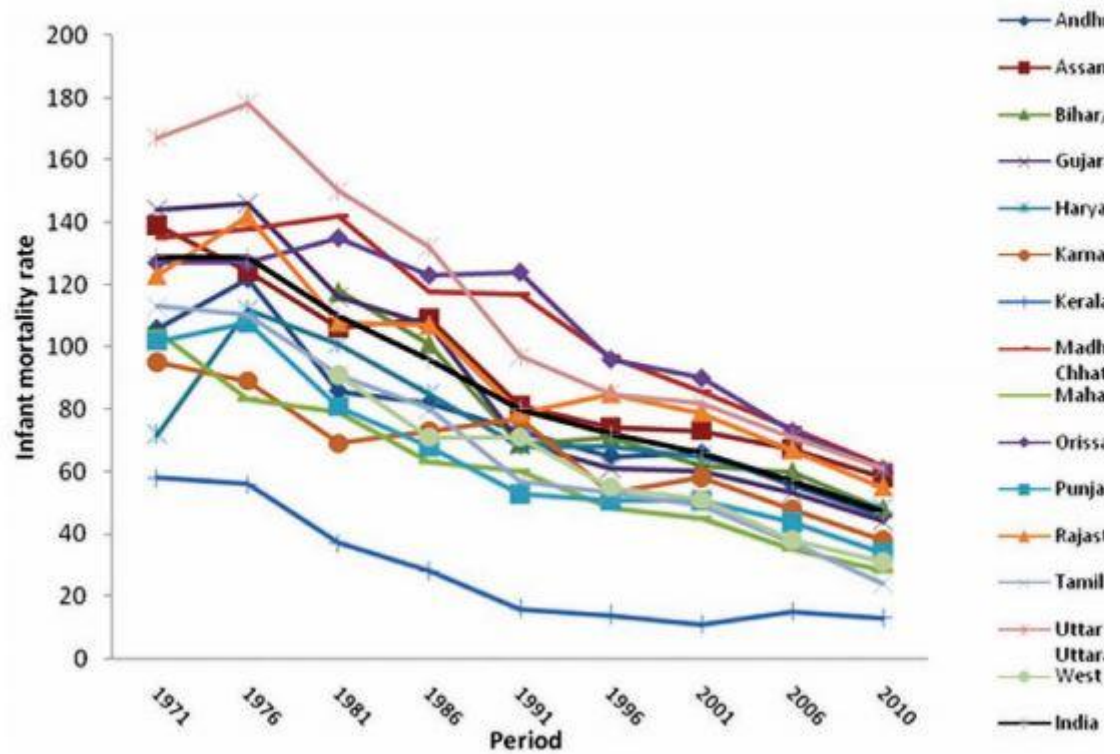
	Unlikely	Potentially	No data
<b>Target 5A: reduce maternal mortality by three-quarters between 1990 and 2015</b>			
Maternal mortality ratio		May be possible	
Proportion of births attended by skilled health personnel		May be possible	
<b>Target 5B: achieve universal access to reproductive health by 2015</b>			
Contraceptive prevalence rate		Possible	
Adolescent birth rate	Unlikely		
Antenatal care coverage (at least one visit and at least four visits)	4 visits unlikely	1 visit possible	
Unmet need or family planning		Possible	
<b>Target 4: reduce child mortality</b>			
Under-5 mortality rate	Doubtful		
Infant mortality rate	Doubtful		
Proportion of 1-year-old children immunised against measles		Possible	

However, the outlook is not completely bleak, with promising results in the reduction of MMR. So far, the estimated annual drop in MMR is 4.9% against the required rate of 5.5% and it is predicted that the MMR may reach 135 per 100 000 live births by 2015, a mere 26 points above the target of 109. Additionally, due to favorable maternal mortality reduction efforts in Bihar/Jharkhand (19%) and Madhya Pradesh/Chhattisgarh (11%), Uttar Pradesh (33%) - India is predicted to attain the MDG-5 target by 2016, assuming the pace of decline observed in MMR during 1997-2009 continues to follow a linear trend.



MDG 4 seems to be more difficult to achieve, and may take until 2023-2024. At the present rate, by 2015 India's IMR will be 46 compared with the target of 26.7 and the under-5 mortality will be 70 per 1000 compared with the target of 42. This is mainly due to low acceleration in IMR drop in Bihar/ Jharkhand, Uttar Pradesh/Uttarakhand and Rajasthan.

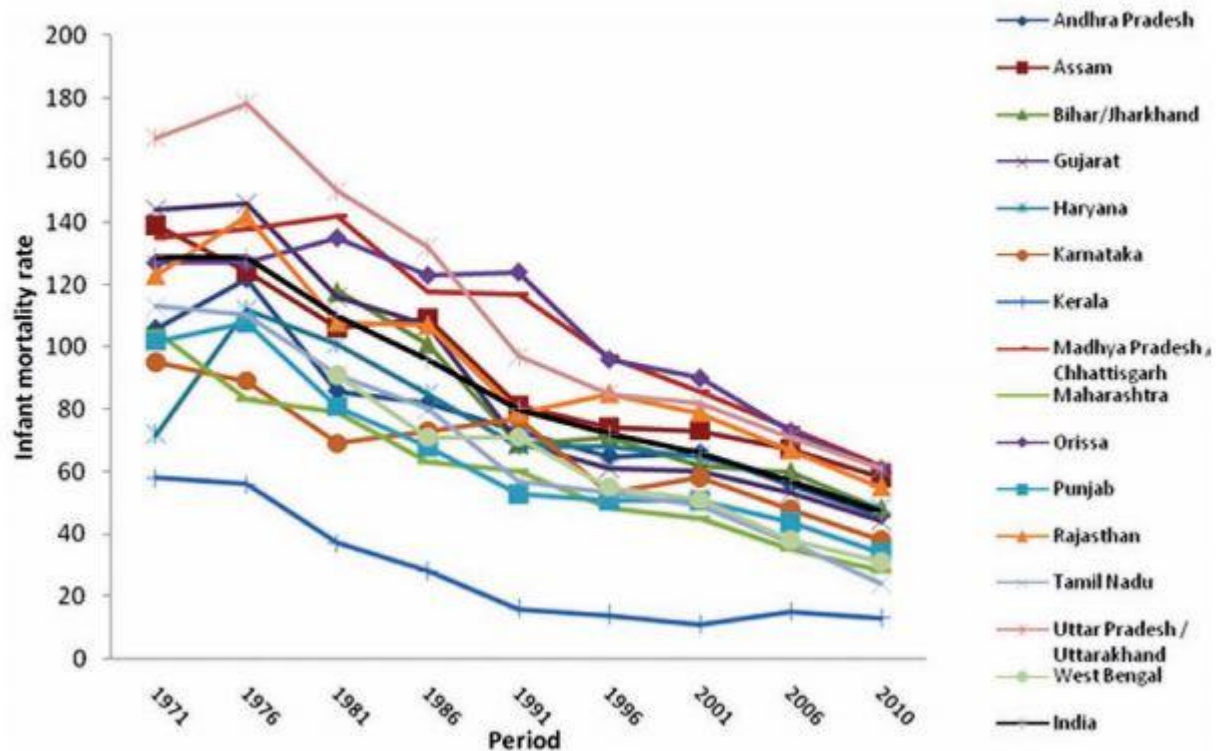
Figure 1 Trends in Infant mortality rate: 1971-2010, India and 15 populous states



Based on these statistics, at least some of the states, if not the nation as a whole, should be on track with MDG 4 and 5 by 2015.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1471-0528.2011.03112.x/pdf>  
<http://www.searo.who.int/publications/journals/seajph/whoseajphv1i3p279.pdf>

Figure 1 Trends in Infant mortality rate: 1971-2010, India and 15 populous states



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<http://www.searo.who.int/publications/journals/seajph/whoseajphv1i3p279.pdf>

11. (same poster as for point 10) As for the reasons for the differences seen among the states, this has to do with a number of factors, including but not limited to:

- \*Extent of involvement of the state governments: For example, in Gujarat, the Chiranjeevi Yojana scheme was set up to encourage institutionalized deliveries among women via financial protection. Not all states come up with such schemes.

- \*Poverty and literacy levels in individual states: Kerala has one of the highest literacy levels in the country, which may in part explain its progress with hygiene and sanitation. Another point of interest may be that Kerala and the eastern states are informally considered to be the "nurse factories" for the entire country, with large numbers of youngsters from these regions developing careers as nurses and healthcare workers. Additionally, the southern states seemingly have lower levels of premarital and adolescent sexual activity (based on survey data, so this may not be completely accurate) which might contribute indirectly to a better picture of maternal and child health.

- \*Cultural beliefs and gender roles: The emphasis on multiple births in a quest for



male children and instances of female infanticide and abortion are more prevalent among the farming communities in the northern states, hence hindering progress towards the MDGs in these regions.

Hence ,the individual profile of each state matters and it is very difficult to generalize in such cases.

Same person identifying and explaining the reasons with detailed support

12. hello

I came across the following in the website of UNDP , under the title India.

India maybe lagging behind on some goals, but we should not concentrate on the negative alone.

For example, india is considered to be on the fast track when it comes to integrating sustainable development solutions and also taking advantage of the technology available.

The most promising fact that I learnt from this report is the rate at which the primary education for both girls and boys alike, is increasing. I am proud of this equality in gender.

Target No.	Target Description	Progress Signs
1.	Halve, between 1990 and 2015, proportion of population below national poverty line	Δ
2.	Halve, between 1990 and 2015, proportion of people who suffer from hunger	Θ
3.	Ensure that by 2015 children everywhere, boys and girls alike, will be able to complete a full course of primary education	ΔΔ
4.	Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015	Δ
5.	Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate	ΘΔ
6.	Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio	ΘΔ
7.	Have halted by 2015 and begun to reverse the spread of HIV/AIDS	Δ
8.	Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases	ΘΔ
9.	Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources	ΔΔ
10.	Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	ΔΘ
11.	By 2020, to have achieved, a significant improvement in the lives of at least 100 million slum dwellers	φ
12.	In cooperation with the private sector, make available the benefits of new technologies, especially information and communication	ΔΔ

Δ : Moderately/almost nearly on track considering all indicators

Θ : Slow/almost off-track considering all indicators

ΔΔ : On-track or fast considering all indicators

Indian, offers another table without explanation. The table isn't very clear.

13. Coupling Maternal Health with Child Health has done a great deal of goodness in achieving some of the MDG targets in India, such strategic planning and implementation can bring forth betterment in other areas and goals as well. Most state governments in India are committed to improve health care and the subsequent governments are giving more priorities to this sector.

Government is doing its part to provide healthcare to children and mothers.  
Optimistic. Indian



## APPENDIX 3.A

### **Thread on Earth's Opportune Position in Our Solar System** MOOC on the Emergence of Life

1. The question of how bio-diversity rises and falls in a cycle is amazing to me. I would not have considered mass extinction events as drivers for bio-diversity. I would like to try a thought experiment of three separate configurations of the solar system. Each of these configurations produce a different rate at which meteors strike the earth. The three configurations are:

1. Earth-Mars Switch
2. Earth-Venus Switch
3. No Asteroid Belt

#### **Earth Mars switch**

Imagine in the first part of question that the earth was positioned where Mars is now, much closer to the asteroid belt. Extinction causing meteor impacts may then occur on the scale of hundreds of thousands of years rather than hundreds of millions of years. Complex eukaryote life would not have time to radiate. For example, [Homo sapiens](#) (Wikipedia) evolved 200,000 years ago. An extinction level meteor impact would have wiped out Homo sapiens before agriculture and civilization developed. The cycle of origination would be interrupted before radiation produced a variety of species.

I speculate that life on earth would remain unicellular. More complex multicellular life would be eradicated by heavy bombardment of meteors.

#### **Earth Venus switch**

Let's imagine Earth orbiting in Venus position, but say the moon impact still happened allowing plate tectonics, and the earth could stabilize the atmosphere at the present lower temperature ([Moon and plate tectonics](#). Space Daily). I assume this would lead to fewer asteroid impacts, and fewer extinction events. Once an ecosystem's fauna have established species, competition will prevent radiation of new orders of species. The most obvious example is the KT meteor impact cleared the earth of the dinosaurs. As the ecosystems recovered, the mammalian orders were able to radiate to fill the space left by the extinct dinosaurs. Mammalian radiation was prohibited while the dinosaurs dominated the planet. I believe it would result in less variety of classes of species, and a smaller taxonomy.

#### **No Asteroid Belt**

Next, let's imagine the solar system formed without an asteroid belt. According to Wikipedia, the asteroid belt formed due to the influence of the nearby large mass of Jupiter which smashed planetesimals, rather than allowing accretion into

planets ([Asteroid Belt](#), Wikipedia). The first consequence of no meteor impacts, perhaps much less water may have deposited to earth if fewer asteroids impacted the earth. The impact in the Phanerozoic would be that instead of three faunas of the Phanerozoic, there would still only be one fauna, the Cambrian. In the cycle of origination, radiation, and no extinction, means the first fauna would continue to radiate on the same themes of the Cambrian. Trilobites and many more descendants may still be swimming the oceans.

I speculate that life would still be invertebrates, as extinction event would not have allowed the vertebrate species to take hold.

As with many other aspects of evolution and the universe, a cycle of origination and diversity often follows a great event of destruction. It seems paradoxical, but tearing down mature systems of equilibrium in a radical event often leads to recovery of completely new forms and ways of doing things, with even more diversity.

#### Citations

Human Evolution, Wikipedia, accessed 9 Aug

2014. <http://www.spacedaily.com/news/life-01x1.html>

Moon and Plate Tectonics, Why we are Alone. Space Daily accessed 9 AUG

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Asteroid Belt. Wikipedia. Accessed 9 AUG

2014. [http://en.wikipedia.org/wiki/Asteroid\\_belt](http://en.wikipedia.org/wiki/Asteroid_belt)

Jacob Leach

2. This post on the correct number of asteroid strikes is a specific example of the Goldilocks phenomenon- not too hot, not too cold...just right... but in this case, just the right amount (and severity) of asteroid strikes....  
And there is some chilling and thought provoking aspects to this general theory... Especially the idea, that man would not exist without an almost incomprehensible number of 'lucky breaks'....  
But an alternative is that there is grave overestimation, of the importance of say, the asteroid strikes.  
Life would have still evolved without the asteroid events (perhaps at a different pace, or in a different way), but eventually there would have been mass extinctions for other reasons (overpredation, solar flares, oxygen depletion, massive red tides)...  
And, suppose that horseshoe crabs became the dominant form of life and there was no further asteroid impacts.... People always assume that we would 'just have a bunch of horseshoe crabs' on earth....  
But wouldn't the crabs have a lot of evolutionary pressure? Maybe they would develop higher intelligence, and learn how to use tools and develop a modern society...  
Then we would all be sitting around with our eight legs, inside our shell, and our copper blood, trying to figure out what life would be like, if only there were MORE asteroid impacts....  
In short, life is probably more resistant to extinction than we think.... And out of the primordial soup, good characteristics (and good evolutionary strategies) were going to likely succeed, whether there were 5 asteroid impacts, or 500.... provided

that there wasn't one catastrophic one (something like a 50 km asteroid, which would have probably set life back to 'square one')...

Your point is well taken that an asteroid strike every hundred year would be catastrophic....But I think life would be okay, just very different, if we never had an asteroid strike at all...

My response to the question of do we need an asteroid belt? Maybe, but I don't think so.... It may speed (or alter) evolution, but it could just as plausibly 'hinder' evolution... Think of the millions of years that it often takes for life to recovery after a strike.

3. Glennon,

Taking this class is the first time I've considered mass extinction events as a force driving evolutionary bio-diversity.

But I do agree with you that "evolutionary pressure" is still at play with or without meteor impacts. In fact, If the K-Pg impact had not happened 65 million years ago, I'd speculate a Sapiens organism will still emerge. Perhaps Avi-Sapiens?

The Birds seem to be waiting for mammals to clear out so that they can radiate. I would not be surprised if an intelligent bird evolved in the same way an intelligent primate evolved.

Jacob Leach

4. Jacob,

True, and great initial post, by the way...

I was mostly trying to take an alternative perspective; I, truly, don't know whether asteroid strikes ultimately 'improve' the evolutionary process... And, of course, no one really knows (but there will be no shortage of opinions), as there has been only one 'experiment' on earth....and we have no alternative to which we can compare it...

It seems we have a narcissistic view on the importance intelligence.... And, understandably so, as it has lead to our recent evolutionary success....

But perhaps strength, or resistance to radiation, will by the next important trait, that will cause the next "Cambrian like explosion"....

The vanity of assuming that intelligence is the top characteristic, is summed up nicely, with a Stephen Jay Gould quote:

"Look in the mirror, and don't be tempted to equate transient domination with either intrinsic superiority or prospects for extended survival."

5. Your proposal for this initial post was very interesting Jacob. The speculations about possible impact of the asteroid belt on the evolutionary process in Earth were logical and really intriguing.

I consider this kind of discussion is important to reflect not only about the impact of these processes on the develop of life on our planet, but to be aware of the geological, chemical, physical conditions that have determined the origination, radiation and extinction processes on Earth. The meteors impact, as you argued, have been historically determinant for evolution. One of the examples of its relevance is that -as you mentioned- , perhaps, mammals would have never radiate without the extinction of dinosaurs.

In addition, it's important to have into account that another characteristics such us Earth's magnetic field, dynamic plate tectonics, the geological crustal

recycling and another factors are esencial for the develop of life in this planet. The organisms that have inhabited the Earth have "faced" these complex geological changes and other extraterrestrial alterations (such as meteors impact) in very different ways, causing the biodiversity we know now.

You predicted -at the end of the post- that the lack of the asteroid belt would have caused the predominance of invertebrate until today, and I would like to think that life might have involved on a whole different way in these conditions. Maybe, this might have caused some different forms of life adapted to these novel environment.

Also, this topic is very exciting for me, specially because of it makes me reflect about how the presence or absence of an asteroid belt or other conditions might "promote" or not the develop of life on a planet similar to Earth. Moreover, the increasing knowledge of the impact of these processes on our planet is motivating the research concerning the possibility of existence of life on exoplanets ( that are similar to ours).

Here is an article concerning how the Earth's atmosphere changes the life and -at the same time- how biosphere affects the atmosphere:

[http://www.amnh.org/learn/pd/earth/pdf/evolution\\_earth\\_atmosphere.pdf](http://www.amnh.org/learn/pd/earth/pdf/evolution_earth_atmosphere.pdf)

6. Hi Jacob,

Your initial post was very thought-provoking. I would like to add a little to your speculations though.

I think, if Earth and Mars switched places, there would certainly be more meteor impacts. However, the distance between Mars and the Sun is also further, hence the Earth would be colder too. We would receive half as much sunlight, and the planet would freeze over. Our days would be up to an hour longer, and we would likely lose some of our atmosphere into space as well. Life would not be sustainable on Earth. Well, assuming life somehow did manage to get a foothold, it would look completely different from present-day. In addition, Mars has 2 moons, Phobos and Deimos. With 2 moons, Earth's tides would be more drastic. There would be a proliferation of amphibians that can survive on land and also in the water when the tide rises. Perhaps there would be very few land animals because there would be much less dry land.

On the other hand, if Earth and Venus switched places, Earth would be much hotter as it would receive much more sunlight. Life would be non-existent. Let's assume, again, that life did manage to get a foothold. As there are no moons orbiting Venus, our oceans would be much calmer. The Sun still has an effect on them (known as solar tides), so the ocean would not be completely devoid of waves. The absence of the moon has a dire effect on life on Earth. Life first formed on Earth in tidal pools, and it was due to the gravitational pull of the Moon that primordial life was able to traverse between different pools and generally spread across the planet. If there were no tides, creatures of the sea would either not have been flung up onto beaches. Tidal pools and slopes within the tidal range were nurseries for such life forms to slowly evolve into air-breathing, sun-resistant creatures. They could then slowly develop suitable limbs, scales and other tools needed to venture further inland. Without tides then, life would have stayed in the oceans. Land animals would be non-existent.

I guess we're glad where we are.

Sources:

<http://www.spaceanswers.com/solar-system/what-would-happen-if-earth-and-mars-switched-places/>

<http://www.spaceanswers.com/solar-system/what-would-happen-if-we-blew-up-the-moon/>

7. I do think the Moon has very positive effects on life in several ways:
  1. Plate Tectonics - the Moon blasted 60 to 70% of the primordial Earth's crust into orbit to form the moon. As a result the earth has a very thin rocky crust for plate tectonics.
  2. Plate tectonics is crucial to recycle crust and deposit life giving minerals like iron, phosphorus, silica and other into the ocean and volcanos.
  3. Plate tectonics creates mountain ranges and continents, otherwise the earth may be a water world.
  4. Plate tectonics isolates different animals like on Australia which causes biodiversity as animals become isolated.
  5. Tidal effects - many effects from the tides. The gravitational effects lock the moon and the earth into a stable alignment where the moon's rotation is the same period as the revolution around the earth. A result is a stable the earth's rotation with little wobbling.
  6. The tidal effect on the oceans is one of the most significant sources for life to create new habitats. If the moon was too close, then the ocean tides may wash across a significant portion of the continents each day. This would make life on land much different.
- Jacob Leach
8. I agree that tides may have played a key factor in the evolution of life itself on Earth. As the proto-nucleic acids were sometimes in or out of sea water, I wonder if the UV radiation of the Sun, which must have been extremely high as there was no ozone and a very different atmosphere back then, would cause mutations in these early strands of nucleic acids. May these mutations be one of the reasons for such diversity as we know today? If we had 2 moons (like Mars), would the evolution of life on Earth be similar?

It seems we were just very lucky to be just at the right place at the right time.

## APPENDIX 3.B

### **Excerpt from a thread on the reasons why the shark outlived the Placoderm** MOOC on the Emergence of Life

1. I think the main reason why some large predatory fish (like shark) survived several mass extinctions and others did not is the higher versatility of the surviving species (to which I'll henceforth refer as sharks for simplicity's sake). By that I mean that sharks exhibited a greater range of adaptive techniques to cover with changing environments. For example, when shallow coastal environments became fewer many species couldn't adapt and became extinct. Sharks, however, were able to adapt to deep-water environments [2] and so became inhabitants of the open oceans like we know them to be today. Also a higher versatility in what food they were able to digest were advantageous for sharks. Even today they are known for basically eating everything they can get to. A species which has a narrower range of food sources may more easily become extinct if the food sources themselves fall away due to changing environments or sudden catastrophic events like asteroid impacts or heavy volcanic activity.  
Another reason for the survival of the sharks may be not of their own making but the fact that some predators which feasted on shark, like the giant placoderms mentioned in the lectures, became extinct. Today large shark species have very few natural enemies, mainly the Orcas (and humans, of course).  
Sharks are around for roughly 450 million years [1] which is an impressively long time scale for any species or group to survive. After the Permian-Triassic mass extinction about 252 million years ago they adapted by changing their favourite environments (from shallow to deep water) and also took advantage of fewer natural enemies in growing larger bodies. So sharks are around about twice as long as mammals are and much longer than the timespan for which e.g. the dinosaurs roamed the earth.  
Citations:  
[1] Shark Savers: "450 million years of sharks":  
<http://www.sharksavers.org/en/education/biology/450-million-years-of-sharks1/>  
[2] ScienceNews for Students: "How sharks survived the 'Great Dying':"  
<https://student.societyforscience.org/article/how-sharks-survived-great-dying>
2. I also think that the adaptability of sharks that you discuss is a key reason to their survival. They were adaptable in where they lived and what they ate. They even had sets of replacement teeth so they were never without!!!  
Although both the shark and the placoderm were cruisers and had streamline bodies, the shark was probably a faster swimmer and was able to maneuver better

due to its smaller size, making it easier for it to capture its prey. Also, due to the smaller size, sharks didn't need as much food to survive; in the time of mass extinctions, this could be a great advantage.

The Devonian period was the "Age of the Fish" and Chondrichthyes as well as Osteichthyes became diverse and played a large role within the seas, during this time. If you look at the evolutionary developments that were occurring during this time, one should consider the developing senses that helped these organisms become better hunters of prey. The Devonian period is when we start to really see the development of eyes and other sophisticated receptors.

I was unable to find the evolutionary history of the ampullae of Lorenzini, the receptors on sharks that pick up electrical signals from the muscle movements of other organisms. I'm not sure if studies have revealed when these receptors did evolve, maybe studying how ampullae of Lorenzini form in developing shark embryos and by comparing these receptors and genes across shark species one can reconstruct when key traits arose. If sharks had ampullae of Lorenzini early in their development, this might have also given them a slight edge over some of the other aquatic carnivores.

<http://www.elasmo-research.org/education/evolution/earliest.htm>

<http://www.sharksavers.org/en/education/biology/the-sixth-and-seventh-sense/>

3. According to this article "Hybrid sharks aren't 'trying' to adapt" ([http://evolution.berkeley.edu/evolibrary/news/120101\\_sharkhybrid](http://evolution.berkeley.edu/evolibrary/news/120101_sharkhybrid)); it appears that sharks may be continuing to evolve through hybridisation. The hybrids are the result of the common blacktip shark and the Australian blacktip shark interbreeding. The putative advantage of the hybridisation is that it allows the hybrids to move further south into cooler waters as a result of an increased body size. There is no definitive answer yet as to whether the hybrids are more suited to their environment than their pure-bred equivalents; but it does indicate that there may have been beneficial hybridisations in the past.

The primary source article is: Morgan, J. A. T., Harry, A. V., Welch, D. J., Street, R., White, J., Geraghty, P. T., ... Ovenden, J. R. (2011) Detection of interspecies hybridisation in Chondrichthyes: hybrids and hybrid offspring between Australian (*Carcharhinus tilstoni*) and common (*C. limbatus*) blacktip shark found in an Australian fishery. *Conservation Genetics*. DOI: 10.1007/s10592-011-0298-6

[Something similar: "Cross-breeding boosted *Homo sapiens*' ability to cope with cool climates, but the hybrids may have had trouble breeding." <http://www.nature.com/news/modern-human-genomes-reveal-our-inner-neanderthal-1.14615>]

4. Sharks are seriously awesome! It's interesting to compare them to placoderms as well since they are both super predators. But while the placoderm was slow and heavy, the shark is fast and sleek. The shark would also have taken advantage of the open ecospace left by the extinction of the placoderm, among others.

<https://en.wikipedia.org/wiki/Placodermi>

<https://en.wikipedia.org/wiki/Shark>

## APPENDIX 3.C

### Thread on the “Pros and Cons of Climate Change” Public Health MOOC

1. From the interesting lectures of climate change. I got the impression that climate change is very harmful . I assume that it will be a problem but still in a later time. Beyond year 2100.  
Actually there are also many advantages of climate change. .
  - 1) More usable lands for agriculture.
  - 2) longer growing seasons.
  - 3) Extra carbon dioxide for plants
  - 4) Northwest passage become reality.
  - 5) Less energy required for heating
  - 6) Warmer weather is healthier and safer in accidents from raining and ice roads.
  - 7) Using the solar energy widely as an alternative energy sources. ....I want to put the link where I got this article. But failed
2. What do you think ?
  - a. Hey Nubia, sorry for joining the discussion so late, and I see many of the answers have already covered the points I wish to make. This is an important issue, however, and one which I feel needs to be addressed. If I can address these points briefly in turn:
    - 1) More usable lands for agriculture
      - This is not the case, rising sea waters and harsher storms are damaging agricultural land through stripping the topsoil and salination of the land making it untenable to grow crops on. Coupled with increasing desertification and acid rain this is actually leading to a decrease in accessible arable land. <http://www.sap43.ucar.edu/documents/Land.pdf>
    - 2) Longer growing seasons
      - In some settings yes this is true. However due to drought and overexposure to heat this can also reduce crop yield and lead to a thriving of weeds which require heavier pesticide use (<http://www.epa.gov/climatechange/impacts-adaptation/agriculture.html>)
    - 3) Extra carbon dioxide for plants
      - This is true, again from the same link as above, however, it is shown that the nutritional value in these plants can also decrease with rising CO<sub>2</sub>, requiring greater consumption to meet the nutritional needs
    - 4) Northwest passage becomes a reality
      - Yes, but at what cost?
    - 5) Less energy required for heating.



- Climate change indicated global averages, not specific warmer climates. The truth is climate change disrupts the global weather systems, leading to more intense storms and natural disasters.

[http://www.agci.org/dB/PDFs/05S2\\_GMeehl\\_BAMS3.pdf](http://www.agci.org/dB/PDFs/05S2_GMeehl_BAMS3.pdf)

6) Warmer weather is healthier

- see the above point

7) Solar energy

- Climate change does not necessarily mean more sunlight, and that is what Solar energy runs off. We do need to look at these alternatives, however, in order to find a future which does minimise our impact on the climate.

I appreciate this discussion, but I find it difficult to find any positives to a man-made phenomenon which is ruining the global weather systems and endangering lives and livelihoods all over the world.

3. I believe that you didn't take into account the major problems climate change will cause. Plant and animal species will be extinct, the rise in temperature will have unpredictable impact on land and water, many areas may become inhabitable.

a. (Nubia) No, I know, but I guess there are still hundreds of years for this..

By year 2100, there will be only 3 degrees rise in temperature

We do not have to be that afraid. Climate change still have hundreds of years to produce that harmful events mentioned above

4. Nubia, the climate has already changed and the [5th Assessment Report](#) from the Intergovernmental Panel on Climate Change (IPCC) attributes the majority of the change over recent decades to human emissions of greenhouse gases. It is also worth acknowledging that climate change is already damaging the health of many vulnerable populations, so the harmful effects are occurring now and not at some distant time in the future.

The ideas you present sound appealing though I'm unsure of any national science body that would strongly support such claims.

1) More usable lands for agriculture. - Here in Australia we are entering another severe period of drought, with massive areas of agricultural land in decline

2) longer growing seasons. - This holds for some cold and cool-temperate regions, which is not where most of the majority of impoverished people in the world live.

3) Extra carbon dioxide for plants - Controversial and the some of the research to support this used CO2 concentrations of close to 1000ppm, which is more than twice current atmospheric concentrations.

4) Northwest passage become reality.

5) Less energy required for heating - this suggests a misunderstanding of the physics, the term global warming is misleading in that people believe there will be an even warming of the planet. This actually refers to an increase in the global average temperature, which drives increased evaporation from the oceans and heavier precipitation events. These precipitation events may actually be reflected in more severe snow storms.

6) Warmer weather is healthier and safer in accidents from raining and ice roads. - warmer weather may support the spread of vectors for disease, such as mosquitoes.

7) Using the solar energy widely as an alternative energy sources. ....I want to put the link where I got this article. But failed. - It is important to find the source of such information

The World Health Organisation have put together a short general summary of the present and projected health consequences, which is much easier to read than some of the more in depth IPCC

materials. <http://www.who.int/mediacentre/factsheets/fs266/en/>

As you suggest we should not respond to climate change out of fear, instead from a proactive position where we seek to improve the lives and health of others, and there are many opportunities to do this.

For a safe climate future,

Nick T

5. (Nubia) <https://www.google.com.eg/url?sa=t&source=web&rct=j&ei=PjeGVKuKNYL1UKqOgpAG&url=http://geography.abo...>

Please check this article about advantages and disadvantages of climate change (initial poster)

- a. The article is an opinion piece that gives no consideration to the likelihood of different consequences or the severity or level of benefit. Quite clearly the author states, "First, we will look at the many disadvantages of global warming and then follow with the very small number of advantages of global warming." implying that the disadvantages outweigh the advantages. In fact some of the latter advantages are probably spoof suggestions such as "Boundary disputes between countries over low-lying islands will disappear." Yes! losing an island to sea level rise is one way to address such disputes. There is no suggestion that we should ignore climate change or delay taking effective action to reduce greenhouse gas emissions.

The scientific evidence within the 2007 IPCC report that the author refers to suggests that urgent action is needed to avoid the worst consequences of climate change. The original IPCC reference contradicts the claim that climate change will not be a problem until "Beyond year 2100."

As far back as 2009 it was realised that climate change threatens the achievement of the MDGs. The report can be accessed from

here [http://www.un-](http://www.un-ngls.org/spip.php?page=article_s&id_article=3004)

[ngls.org/spip.php?page=article\\_s&id\\_article=3004](http://www.un-ngls.org/spip.php?page=article_s&id_article=3004) and within the report there are calls to limit warming to 1.5 C and not the politically negotiated target of 2 C.

6. (Nubia) And also I can't understand why you send a flag for inappropriate content. It is not my opinion . This is a point of dilemma as anything must have pros and cons, like globaliztion and industrialization. ...etc, waiting for your explanation thanks
7. Let me touch one point that Nubia posted... more land for agriculture.... agriculture presently uses 75% of fresh water.... and more agriculture land will devastate the earth recycling of water through reduction of woods and jungles... The Amazons in one example of how reduction of the environment to farming

lands deteriorates the climate and makes land more arid. Messes with rain cycle – evaporation in jungles, ok.

8. (Nubia) I am totally Convinced, Ernesto, what is true that this is taking place slowly, that is my point , best regards
9. Even polar bears are thriving so far. It's worth noting that the three years with the lowest polar bear cub survival in the western Hudson Bay (1974, 1984 and 1992) were the years when the sea ice was too thick for ringed seals to appear in good numbers in spring. Bears need broken ice. Support comes from a different person. No references.
10. Jingfei, There is no good evidence to suggest polar bear numbers are thriving. The data is incomplete, an analysis of several subpopulations shows a decline in numbers. A more scientific analysis can be found on the skeptical science website, <http://www.skepticalscience.com/polar-bears-global-warming.htm> It is useful to be skeptical of the science of climate deniers.
11. There are other threats related to climate change. Virus change their behavior with a climate change of 3°, vector borne disease increase with global warming, specially in Europe, and climate is a major factor in determining the geographic and temporal distribution of arthropods, the characteristics of arthropod life cycles, the consequent dispersal patterns of associated arboviruses, the evolution of arboviruses; and the efficiency with which they are transmitted from arthropods to vertebrate hosts.  
Kendrick BJ, et al. PLoS One. 2014 Nov 18;9(11):e112134. doi: 10.1371/journal.pone.0112134. eCollection 2014  
Rossati BA, et al. Infez Med. 2014 Sep;22(3):179-92  
Dash AP, et al. [J Vector Borne Dis.](#) 2013 Apr-Jun;50(2):77-84

## APPENDIX 3.D

### **Thread on Suicide in Syria** MOOC on Public Health

1. Suicide in my country (Syria) is extremely rare, and if it is detected, it will be among a mental patients mostly, this may be thanks to the still strong family relations, where every member of the -big- family has the support and encouragement whenever he meet any difficulty or misfortune.
2. Hi Mohamad,  
I was quite surprised by your post. Has there been conducted research into this? Is there a taboo on suicide in your country?  
Thanks!
  1. Hi Annemieke  
I have really spend much time searching for official statistic about Suicide in my country but I didn't find, except little information which showed that the percentage of death caused by mental disorders is 0,2% while globally it's 0,89% from the total number of death. however I have been working in health sector for more than 15 years and I tell you the suicide is really rare.
  2. I agree with Anniemieke. You do not have any documentation to tell.  
Many deaths are not registered
3. Suicide in Slovenia is very high. We're one of the countries with the highest rate of suicide. In the past there wasn't much talk in the public. In recent years though there has been improvement when it comes to talking about it.  
<http://www.ce-review.org/00/20/pozun20.html>  
<http://informahealthcare.com/doi/abs/10.1080/09540269974393>  
<http://www.iam.upr.si/en/units/suicide-research/>
4. That information it's quite amazing, i was thinking if your country it's very religious or dying by suicide will have a punishment by god in the other life, it's only a guess.
5. Yes ,may be you are right, our main religions are Islam and Christian, and most of people's notions and convictions are deeply rooted to them.
6. I will agree to disagree. I lived and worked in the mental health field in Swaziland for two years. Swaziland is a country that is deeply rooted into cultural taboos and practices. In this country, no one talks about suicide even though the rates seem to be high, given the numerous stories you here from people. Surprisingly enough, there are no records on deaths by suicide from any relevant persons in Swaziland even though the risk factors linked to suicide remain on the rise, such as, male chauvinism, high sexual abuse rates (2 in 3 women have been sexually abused), violence against women and children, gender inequality, highest prevalence of

HIV/AIDS in the world (there is a vicious cycle between HIV/AIDS and mental illness-over 90% of suicides are due to untreated mental illnesses) among others. So Mohamed, I cannot yet agree with you on that fact given the current political situation in Syria as well as the cultural and religious factors involved (I hope this is not discriminative).

I agree with you that the numbers may just as well be that low because, I think that in countries where killing yourself is socially not acceptable, such practices are likely to be minimal.

And yes, there are no specific information on suicides in your country, however, we cannot make any conclusion as there is no (in any) extensive research or information in regards to this subject (just as in Swaziland). Therefore, with regards to this issue, the argument is inconclusive.

Maybe this is an opportunity for you or any interested party to research on.

1. Hi Margaret

I just posted my personal opinion from my personal experience, but after your and others comment I started to think may be I'm wrong, so I called up my colleges and friends who work in field of healthcare in different regions of the country (personally I believe that their information is much more reliable than official data) , and the answers were,( rare, relatively rare, extremely rare), so this is the real situation ( we of course speak about situation before the beginning of the crisis, I mean before 2010) ). Providing this data I'm not intending to blackout any facts, and I would like to say that, this doesn't mean that our social well being is on high level.

I consider that one of the objectives of this course is to exchange views away from the official data and statistics, which may sometimes be distorted or biased.

Anyway, more work and researches are needed to clarify the picture. Unfortunately this will not happen soon due to current situation in the country.

2. I totally agree with you. For now, we can only use what is known and what we have. This is also an opportunity for further research- I know that the findings could go either way. The current situation in your country doesn't necessarily mean that the entire country may decide to jump off a bridge, it may actually have even more positive effects on people than negative i. e bring people together for the good of the country.

For instance, from my narrow research on suicides, it seems like the so-called rich and 'stable' countries have very high rates of suicides, despite having better and informed health systems and the necessary help, why? I tend to think because many people live solitary lives compared to low and middle income countries. I wonder what would happen if a strange war would break in such countries, I don't see many people surviving, given their kind of lifestyle. So maybe the community culture is sort of a good thing when conflict arise. ...atleast you have a place to go to.

Anyways, perhaps this could be a project to pursue if it's of interest to you.

3. Sure, I will go deeply to find out more about this problem from more reliable sources.
7. Absence of statistical facts does not mean there is no prevalence of suicide in a geographical area. Unfortunately, in most Arab countries it is either they do not conduct research or they did at some point in time but did not keep up. For instance, cancer incidence in Lebanon was defected in the mid 90's where statistics showed 100 people will get cancer in every 100,000. They kept track of this till 2008 where the number doubled. So far there has not been any studies to find out why the number doubles or what cancer prevalence is now. So lack of numbers is not necessarily a good sign but rather an institutional failure to serve people.  
I forgot to add in the previous post, that many female suicides in Syria happened in the mid of the 20th century where we know about it through novels, poetry, and t.v. shows. Nizar Qabbani, is a Syrian poet who addressed women's oppression in Syria and the Arab world. He rebelled against patriarchy and violence against women especially after his sister committed suicide because she was forced to marry someone. It is true that Arabic societies are collective and extended family support is a great characteristic but we need to shed light on the negative aspects as well. Arabs have a lot of taboos and they like to "sweep things under the carpet" instead of facing the reality. How can we know about the prevalence of suicide in Syria if it is considered scandalous (haram: religiously forbidden). I think the current Syrian political situation has a huge impact on the well-being of Syrians and mainly females in the refugee camps.
  1. Dear Maissa ,I think you are right, I just wanted to share my personal experience. I have finished my postgraduate study in Europe and I've lived there for 10 years, believe me, I noticed the difference, however, more researches are required to illustrate the truth, but as you say " Arab like to sweep things under the carpet" which is totally true, so we need independent study to find out the real facts.
8. This is very interesting about Syria. Has there been an increase since the war though? I know many are fleeing to places such as Jordan but many can not get out due to family responsibilities and such.
  1. Just I would like to mention that the information I've given about the situation before beginning of the crisis ( before 2010), nowadays it is very difficult to guess why people are dying?
9. Maybe there are religious or cultural reasons, but I think too that family is a protective factor against suicide. One of the most painful and disabling social "symptoms" of mental disease currently is stigma. Stigma closes doors, it leaves you not only with a disabling disease but with no alternatives for the future, no work, no social life, not being useful to society, no purpose. The family opens up social and emotional life, that is to say, the person is not socially dead. Maybe she's wounded, but still able to cope. Besides, if there is a family showing you love and affection you don't want to hurt them by killing yourself. I'm sure warm big families would be a good remedy in northern countries.

1. Yes, stigma plays very important role especially in childhood, it kills creativity and ambitions, of course family and good family relations could play a crucial role in avoiding the negative impacts.
10. That may seem to be the case, however due to lack of awareness and social stigma, suicide could be more of a hidden and not very treated problem, than a nonexistent one
11. Show me some peer reviewed evidence based literature on this? I have been working in the middle east for several years and I can tell you first hand from being in many of their health systems that the mental health system here is broken. For example in most of the GCC, its illegal to try and kill yourself or harm yourself, you are arrested by the police if you do so, that is the mental health treatment you receive. Furthermore, any statistics collected on such matters should be analyzed closely as they are often not collected and reported to health authorities by the police. I deal with suicide attempts and successful suicides every week as a health care provider in UAE, and Saudi, including many Syrian expatriates. Although this information is anecdotal, I just thought I would chime in with my personal experience in the issue.
12. All islamic states have less suicidal rate than other states.  
Anonymous
  1. What evidence do you have to back your claims?
13. Stigma plays most important role in case of mental health.  
So that's why there is less suicide? Anonymous
  1. Very true. I can attest to this from my mental health experience in both Swaziland and kenya. It is is one of the reasons why people do not seek treatment in the first place. During a mental health needs assessment we carried out in Swaziland, one of our key informants told us that people fear going to the mental health hospital for fear of losing their jobs (if spotted by a familiar face). This is truly very sad.
14. Anonymous. .. you said that suicidal rates are less in Islamic world. Iam a Muslim. Yes. We have much faith in God. And suicide is forbidden in Islam, but still to be scientific, you have to offer facts and data, do you have any statistical references. .In the few last years, due to frustration, unemployment among youth , I have repeatedly followed suicidal news in some arabic countries, My best regards. ..
15. I do wonder whether suicide is an issue in very religious countries but is suppressed due to taboo. This would make it even more of a problem as there may be even more of a stigma associated with mental health conditions so people would not seek help.

## APPENDIX 3.E

### Class and Healthy Diet Public Health MOOC

1. The University of Leicester has concluded in its recent study that: "Diabetes and obesity rates in inner cities can be linked to the number of fast-food outlets near people's homes." Does this amount to exploitation of the vulnerable?  
Read today's guardian article for more information:  
<http://www.theguardian.com/society/2014/nov/11/diabetes-obesity-fast-food-outlets-study>
2. Thank you for sharing. Fast food is usually less expensive and more available, I live in a community where there is a project to help corner stores in low income neighborhoods become "healthy" corner stores.
  - a. <http://www.nih.gov/news/pr/dec2004/nhlbi-30.htm>  
**Eating at Fast-food Restaurants More than Twice Per Week is Associated with More Weight Gain and Insulin Resistance in Otherwise Healthy Young Adults**  
We need to promote healthy food choices. It would be helpful to have home economics taught in schools again. Healthy food options and how to prepare and cook nutritious and great tasting meals. This with physical education would give young adults the tools and means to live a healthy lifestyle.
  - b. i believe that home economics is still been taught in schools, though as an elective course..... I really think that people should have have a diet discipline and make healthy diet choices especially people living in urban areas, because of the awareness of fast food being unhealthy. People living in poor rural areas do not have as much fast food outlets like it is in the cities, so their eating lifestyle is a bit healthy since most of it is prepared at home.
  - c. This was extremely insightful!
  - d. Sugar consumption has tripled over the last 50 years. Robert Lustig, the UCSF paediatrician and a leading campaigner against sugar additives in processed foods estimates that 25% of all cases of type II diabetes worldwide are due to the consumption of **soft drinks**. (Cf links below). A WHO recommendation over 10 years ago, based on sound scientific evidence, proposing that sugar intake be limited to no more than 10% of daily calories was suppressed when the US Dept. of Health - under pressure from the US Sugar Association and its partners (Coca Cola, Pepsico *et al*), - threatened to withdraw its \$406 m of WHO funding.



At present some 8.3% of the global population is diabetic - not only in North America. (This figure excludes those who have T2DM but have yet to be diagnosed, so may be even higher.) The highest *incidence* (annual cases per 100 000) is in the Middle East and Malaysia, (hot, thirsty, alcohol-free countries), whilst Brazil records the highest *increase* in the rate of T2DM.

In the US alone treatment for diabetics is adding \$245 bn to the annual health care bill. At the same time the food industry spends an annual **\$36 billion on marketing** alone - and \$10 billion targeting children. (Figures from UC Berkeley food campaigner and writer, Marion Nestle, "*What to Eat*"). Public funds for promoting real food or healthy eating pale into insignificance by comparison.

See my posts here:

[https://class.coursera.org/globalhealthintro-003/forum/thread?thread\\_id=871#post-2955](https://class.coursera.org/globalhealthintro-003/forum/thread?thread_id=871#post-2955)

[https://class.coursera.org/globalhealthintro-003/forum/thread?thread\\_id=164#post-850](https://class.coursera.org/globalhealthintro-003/forum/thread?thread_id=164#post-850)

Population study on global diabetes:

<http://www.plosone.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0057873&representation=PDF>

Video (Lustig) - Sugar: the bitter truth / Fructose 2.0

<https://www.youtube.com/watch?v=dBnniua6-oM>

<https://www.youtube.com/watch?v=ceFyF9px20Y>

Ten cokes a day

<http://www.10cokesaday.com/>

- e. Most of the fast food outlets in the paper from Leicester sell high carbohydrate usually fried food and portion sizes are massive. Coupled with sedentary lifestyles and possibly cultural/ethnic/genetic vulnerability to developing T2D in people of Indian origin, this is a high risk scenario. Education and prevention are key and temptations of these fast food outlets should be restricted by the local council not issuing licences for them to open in these areas.
- f. <https://www.google.com/eg/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0CC4QFjAD&url=...>  
An interesting study showing that obesity is inversely proportionate to the level of education even in highly developed countries
- g. Amira, thank you for the link to this excellent interesting paper. It also highlights the increasing trend in obesity across all education groups which is worrying and highlights the difficulty in sustained pursuit of healthy eating and exercise. I think some people somehow become indifferent to the consequences of obesity and NCDs, particularly with increasing age and sustaining motivation for the lifestyle interventions is an uphill struggle. The beneficial effects of regular exercise are important for all of us, even if we are not overweight or obese or have NCDs or have unfortunately developed these conditions.
- h. i agree

- i. Thank you for sharing. It is very interesting. Fast food is easy to buy and tasty, but also has a risk.
  - j. Here is a healthy man who tried an experiment drinking ten cans of Coke daily for a month:  
<http://www.dailymail.co.uk/health/article-2855778/Man-drank-10-cans-Coke-day-month-gains-TWO-STONE-s...>  
 It seems quite extreme, but seeing that this man eats an otherwise healthy paleo diet it might not be all that far fetched from a sugary and greasy fast food/processed food diet. It is very interesting to see how the sugar rapidly changes his physical condition from healthy to unhealthy and his continued craving for more sugar.
  - k. Fast food definitely the culprit
3. In urban settings, it has been shown that the building of a grocery store in a low-income area has a positive effect on the neighbourhood.  
 A similar phenomenon can be seen in isolated communities that for various reasons no longer rely on subsistence farming or hunting and rather on the import of food. Unfortunately due to distances, time gaps and likely demand, stores are stocked with unhealthy foods full of sugar, salt and chemicals. Fresh foods don't hold up well to the very long supply chain and those that are in the stores tend to be much more expensive.
  4. of course it does, it is a sad situation, a good yet sick way for population control. Weed out the poor by providing them the least healthy food at the most affordable cost and provide the healthiest freshest foods to the affluent who have no problem affording them :(
    - a. So true. I wish there were health 'fast foods' with drive-throughs even, where one could order fresh vegetable juices, salads, and healthy snacks instead. Also fast food restaurants tend to be environmentally unsustainable with all that packaging. I wish there was an incentive that encouraged people to bring their own cup from home, in a similar fashion to bringing your own bags.
  5. I believe that the increasing incidence of obesity and diabetes in the world besides being related to risk alimentary habits also involves sedentariness, the stress of everyday life, as a result of the hectic pace of life today.  
 Thank you!
  6. Decreasing the intake of fast food will certainly lead to decrease of NCDs.
  7. Malnutrition is a burden for all the countries of the world:
    - undernourishment in the poor countries
    - "bad nutrition" by excess of fat and carbohydrates in the developed countries causing cardiovascular diseases. This type of "food" has a tendency to invade the poor countries by the mean of the international fast-food chains. These countries won't be saved with this type of food. An excess of non well balanced nutrients after a lack kills also! (see what happened after the liberation of the concentration camps in the late 40's)
  8. I found this interesting article on The Guardian: <http://www.theguardian.com/us-news/2014/nov/06/could-berkeleys-soda-tax-be-a-model-for-tackling-obes...>  
 In Berkeley, California a new "soda tax" has been introduced to discourage the

consumption of sugary beverages. Would this work in your opinion? Should the rest of the USA implement the same tax? And in Europe?

- a. Taxing unhealthy food and drinks to improve health? That could partially work in low-income countries because it affects affordability, but education is still the main intervention to encourage people to make the required changes in their life habits.

## APPENDIX 3.F

### **Excerpt from Thread on Reproductive Health and Rights Public Health MOOC**

1. I think for you to be able to have sexual and reproductive health, you first have to have sexual and reproductive freedom and rights. There are too many countries where there is virtually no sexual or reproductive freedom and no rights, which makes it extremely difficult to ensure their health.
2. Hi Cindi, I agree. I don't know from where are you talking about, but here in Latin America there is a bog discussion in many countries about the sexual and reproductive rights. Many places have a sexual reproduction law and it's a issue that even schools are trying to speak with their students. The most controversial topic is the abortion that some countries are trying to discuss in their Congresses. Here is not legal.
  - a. Sebastian, I did not list a specific country, because there are unfortunately so many. Afganistan was one of the first to pop into my mind, but that is just the beginning of a very long list.
3. In many countries including Bangladesh sexual and reproductive health is a challenge. It is even more sensitive for adolescents who are facing enormous challenges to meeting their sexual and reproductive health needs. Inadequate access to health information and services, social culture as well as inequitable gender norms are important contributing factors for dearth of awareness about puberty, sexuality, and basic human rights. It may have significant effects on their health throughout the remaining of their lives.
4. Yes - freedom and rights! The right of women to decide who they want ot have sex with and whether or not they want to bear children, how many children and when. Combine that freedom with access to good health care during childbearing and we will be a long step further.
5. The sexual and reproductive health requires many fronts of action, not only medical, but mainly social and cultural aspects. For instance, in my country, the abortion is viewed by some as a method of birth control (abortion is illegal, except in case of rape, anencephaly or danger to the mother's life). This happens in a context in which distribution of condoms and oral contraceptives are freely available through health centers. It is not uncommon to see pregnant adolescent women with a high probability of becoming a single mother. This happens even with the efforts to include sexual education in most schools. Many women do not test for cervical cancer (papanicolaou) and most men do not test for prostate cancer. Many men refuses to use condom on grounds that the sensibility may be reduced (this problem now affects

- older men also, because of products such as sildenafil citrate. It seems that significant changes in the minds of people are needed...
6. I want to chime in here and just bring up the fact that countries from every range of the spectrum are struggling with this issue. While some more seriously than others, (at least you don't get killed in the U.S) I think that safe spaces and education world wide is key in this stage of the issue. Especially for example the number of rape cases rising in the CAR, these women need help right now.
    - a. i agree
  7. This is one very touching issue of Sexual Reproductive Health and Rights. I do agree with Zaman that Sexual Reproductive Health issues is still a challenge in many countries especially African countries where culture is still dominant and inhibits freedom , choice and rights especially for women to make choices about their health which relates to sexual health. I come from one of the African countries where women's sexual health is being determined by the husband as the so called man of the house which has resulted in many women being exposed to HIV/AIDS because they can't negotiate for condom usage even when they are fully aware of the promiscuous way of their husband. unfortunately this is cascading down to our young girls and hence raises critical issues of gender equity and rights.
  8. Still, it is very sad that sexual and reproductive rights are still being debated in the United States, which is an otherwise developed country. And, this country is still one of the biggest customers for trafficked females....
  9. I work in a Swiss hospital and have noticed a rise in the incidence of STD. Interestingly, most of my patients with STDs are completely aware of the cause of the disease (unprotected sex) but simply do not care. The sexual pleasure is more important to them than their health and the health of others.
    - a. true in rural Cameroon where some youths say they can not wear sucks to play football hece prefer to have unprotected sex.

## APPENDIX 3.G

### Thread on the Different Problems and Consequences of Climate Change in Latin America

#### MOOC on Climate Change

1. Buenas tardes compañeros interesados en contribuir a mejorar el medio ambiente. Escribo desde Caracas, Venezuela. Estoy muy preocupada por la situación del país, donde vivimos en un gobierno que se ha encargo de talar arboles, contaminar ríos, no se preocupa por el mantenimiento de las playas, ni nada relacionado con estos temas. Espero sacar el mejor provecho de este curso online. Saludos.

The government in Venezuela is polluting the environment and condoning deforestation, river contamination, pollution of the beaches. I am very worried about the situation of this country.

2. Las variaciones en el clima de Medellín son muy notorias, se pueden en el día con los cambios bruscos del clima que en parte se debe a su geografía, geografía que esta siendo alterada por el humano, el crecimiento desbordado urbanístico (restando espacio a zonas verde), incremento del parque automotor y la industrialización. Se registra que desde 1967 ha aumentado la temperatura 2,5 grados. Y no se han tomado medidas significativas para controlar este fenómeno, entre varias medidas que se deben tomar creo debemos empezar por una educación ambiental

In Medellin, Colombia, we are experiencing strong climate fluctuations, which are partly due to its geography, and partly human-caused. Since 1967, the temperature has increased by 2.5 degrees Celsius. Nothing is being done about it, but among the many things that need to happen, environmental education is first.

3. Las variaciones del clima son muchas notorias en todas partes, yo vivo en una ciudad llamada Loja de Ecuador, aquí tenemos variaciones muy bruscas de la temperatura, o son unos soles incandescentes o unas lluvias torrenciales con temperaturas muy bajas. Si les comento de hace unos diez años ha cambiado mucho antes gozabamos de un clima templado en donde existian dos estaciones verano, e invierno. Esto afecta mucho a la agricultura ya que no hay estaciones, la gente no sabe cuando sembrar, lo que esta ocasionando grandes pérdidas económicas.

Yes, the temperature fluctuations are notorious.. I live in Loja, Ecuador, , and here we have great variations in temperature, such as unbearable sunshine, tormenting rains with low temperatures. For the last ten years, the climate has changed. We used to have a temperate climate with more distinct summer and winter seasons. This affects our agricultures, since farmers don't know when to sow. This poses great economic losses.

4. Hola, resido en Coro estado Falcón-Venezuela. Es Maravilloso cuando un grupo de personas de todas las partes del Mundo nos unimos en un mismo sentir. Espero que con este curso podamos no solo aprender y compartir experiencias, sino ser entes multiplicadores para poder sensibilizar a la humanidad en cuanto al uso de los recursos del cual dispone el planeta, para que se realice de una forma eficiente. No solo el planeta lo esta pidiendo.. es un mandato bíblico. Bendiciones  
Hello, I live in Coro, Falcon State in Venezuela. It is terrific when we unite as a group of people from all across the world through our shared feelings. I hope that through this course we won't just learn and share our experiences but become mouthpieces to create more awareness for humanity about our use of the planet's resources so that we can realize more efficient extraction. Not just the planet cries for it, but it is a biblical mandate. Blessings.
5. Buenas tardes a todos. Soy brasileno y resido en Itajaí, estado de Santa Catarina. Mi país tiene una legislacion bien desarrollada en questiones ambientales pero pienso que no es suficiente. Es necessario que todos los paises tengan retos comunes y relaccionados con la question de lo cambio climatico. Creo que lo derecho internacionale deberia ser mas contundente en relaccion a los retos de una disminuicion de las emisiones de gases inverneiros.  
Good evening. I'm Brazilian from Itajai, State of St. Catherine. My country has a very developed environmental legislation, but it is still insufficient. We can only reach our goals with the collaboration of other countries. We must work toward international legislation and rights to accomplish a diminution of carbon dioxide.
6. Hola tod@s: en Uruguay estamos en pleno invierno con temperaturas de primavera y una sequia de varios meses.  
Hi all, in Uruguay we are experiencing a winter with spring temperatures and a drought that has lasted months.
7. Lindsay escribes tu preocupación acerca de Venezuela, pero creo es la de todos, ya que ojalá que pudiéramos simplemente pensar que es un tema del gobierno, pues en ese caso, cuando cambia el gobierno se soluciona todo. Creo el tema es mas profundo tiene que ver con un modelo extractivo que deteriora el medio ambiente y con un modelo energético que prioriza el combustible fósil. Y en esto debemos ser cuidadosos porque una cosa es lo que se proclama, tanto a nivel individual como gubernamental y de organismos internacionales, y otra cosa es lo que efectivamente se hace.  
Saludos  
Lindsay, we all share your concern in relation to Venezuela. But change in government is not going to help. We are struggling with an exploitative model that deteriorates the environment and an energy model that prioritizes fossil fuel. We need to make a difference between who what is said and what is done.
8. Buenos días, soy boliviana de La Paz. En esta ciudad también son visibles los efectos del cambio climático, la cadena de montañas que rodea a la ciudad muestra el deshielo de los glaciares que pone en peligro el suministro de agua a esta ciudad. Sin embargo al caminar por las calles uno observa que la cantidad de vehículos aumenta y la contaminación del aire es notoria, sin mencionar la contaminación por falta de tratamiento de aguas residuales. Pienso que un número reducida de personas son concientes de esto que a simple vista se observa. Por eso

pienso que es fundamental fomentar la educación ambiental y sensibilizar a la población.

In La Paz, Bolivia, we are also witnessing the effects of climate change. The mountain range that surrounds the city does not have ice glaciers anymore. Too many cars are polluting the city. We need to start with environmental education so as to expose people to the problems.

9. Buen día, soy Carlos Calviño de Buenos Aires, Argentina, les apporto un lugar para ver los impactos del cambio climático en Argentina, el lugar es este: <http://www.ambiente.gov.ar/?idseccion=211> aquí podrán ver estadísticas ambientales de nuestro país, son de la Secretaría de Ambiente y Desarrollo Sustentable de la Nación.

Hi, Climate change is also evident in Argentina. Here are some statistics from the Department of the Environment and Sustainable Development, that track the changes. From Argentina

10. Hola, soy uruguay, que bueno poder compartir experiencias con todos los integrantes del curso. Es muy interesante que seamos de diferentes países de América para poder interiorizarnos en lo que pasa en nuestro continente. Me alegra también encontrar una coterránea. Estoy sumamente de acuerdo con lo que ella plantea a cerca del clima en Uruguay, estamos atravesando un clima rarísimo, desde mediados de enero que no llueve y la temperatura sigue elevada, quizás tengamos algunos días mas fríos pero la diferencia con años anteriores se hace sentir. No se cuando va a terminar esto pero me preocupa mucho el futuro de los alimentos, sobre todo las frutas y verduras imprescindibles para el desarrollo. No se cual es la solución, no creo y en esto también coincido con ella que se arregle con medidas gubernamentales, esto es un problema global en el cual estamos todos involucrados.

I completely agree with my compatriot from Uruguay. Our climate has been so strange, it hasn't rained since mid January, and the temperature continues to rise. I am very worried about the future of food, especially fruits and vegetables. I also agree that this is not a governmental problem but a global one, in which we all share a part.

11. Buenos días, soy Jorge Jara de Santiago de Chile, aquí los esfuerzos del gobierno, como en muchos otros temas son más bien reactivos, por lo que el actual desarrollo de los Planes de Adaptación al Cambio Climático son una buena señal respecto de su gestión, sin embargo falta mucho por hacer, sobre todo en la concreción de tales planes y sus respectivas líneas estratégicas. Lo anterior, sumado a una intensa sequía en la zona norte y centro del país. Espero podamos compartir experiencias y conocimientos para aprovechar al máximo este tipo de instancias  
Saludos.

Hi. In Chile the government is mostly reactive, there is much more that needs to be done. We need more concrete plans and strategies. We are experiencing intense drought in the North and Central parts of Chile. I hope to take advantages of this course.

12. Hola buen día a todos, soy peruano y estoy muy interesado en compartir experiencias y aprender mucho más de este gran problema que engloba al mundo



entero y que aun no somos conscientes del gran impacto que tendrá sobre el desarrollo y crecimiento de nuestra sociedad, sino hacemos algo al respecto. Buen aprendizaje para todos.

Hi I'm from Peru and I am interested in sharing experiences and gain understanding in this MOOC. We must act.

13. Hola soy Ramon Santos de Honduras que lastima que nuestro planeta se esté destruyendo por las manos de nosotros mismos dan ganas de llorar pero lo mejor es presentar alternativas para salvarlo

Hello, I'm Ramon from Honduras what a pity that our planet is destroying itself by our human hands I feel like crying but it's better to find alternatives to save it.

14. Buenas tardes colegas y compañeros a fines el problema no es definir el cambio climatico como un problema de todos!!!

It shouldn't be our goal to define climate change as a problem of us all

15. Saludos a todos y todas, lamentablemente nuestros países y toda América estamos sufriendo los efectos del cambio climático pese a que somos corresponsables, pero debemos aclarar que existen responsabilidades compartidas pero diferenciadas, jamás podrán ser las mismas responsabilidades de los países que son grandes emisores de GEI que nuestros países, tenemos que alinear la lucha para que los fondos "verdes" lleguen a los paisas más vulnerables para que desarrollemos políticas de mitigación y adaptación al CC.

Climate change is a problem of us all, but there exist differences in our share of responsibility. It could never be the same responsibility of the countries that emit a lot of CO2 and our countries.

16. Hola a todos. Qué bueno encontrarnos preocupados por el cambio climático. En la medida que tomemos conciencia y **eduquemos** en este sentido, creo que hay alguna esperanza de cambio.

I'ms so glad that we are so many who re concerned with climate change. Once we are aware and educated, I have hope that we can make changes.

17. Hola a todos. Soy de Buenos Aires, Argentina y quería compartir con ustedes la situación en mi localidad. Estamos en otoño casi llegando al invierno y las temperaturas medias no bajan de 20° C y hay un déficit hídrico muy notable, es increíble ver como año a año el cambio climático es cada vez mayor. Espero aprender de todos ustedes. Saludos

In Argentina, we have almost winter, and the temperatures have not fallen below 20 degrees Celsius. Also, there is a notable moisture deficit. Every year it seems to get worse. I hope to learn from everybody.

18. Hola a todos. Saludos desde Colombia.

Es bastante notorio que en todo el mundo se ha presentado en los últimos años no sólo un aumento de la temperatura increíble sino también una calidad del aire terrible. De ese aire respiramos, de ese aire respiran nuestras familias. Estamos enfermos! Pero no entendemos que somos los causantes de eso. Que es nuestra responsabilidad estar a cargo de las consecuencias de nuestros actos.

Ya en Colombia no podemos decir que hay tierras templadas, frías, cálidas. Ahora todo está al extremo! Incluso en muchas regiones del país, los medios de agricultura y los cultivos que se han sembrado durante generaciones han tenido que cambiar.

All across the world we are witnessing temperature increase, and deterioration of air quality. We are sick, and we don't understand that it's our fault. In Colombia, we cannot even say that we have moderate climate anymore, everything has gotten so extreme. In many parts of the country, agriculture has had to change.

19. El Gobierno Nacional ha dejado morir cantidades exorbitantes de personas en las costas por falta de abastecimiento de agua pero tiene multinacionales (muchas) haciendo hidroeléctricas para sacar energía. Desvían los ríos, matan ecosistemas, matan.

The government has let people die on the coast due to lack of water, but it has multinational companies making hydroelectric energy! They pollute the rivers, they kill ecosystems. They kill!

20. Hola amigos q tal saludos desde Ecuador, mi nombre es Josué Erazo, podemos darnos cuenta a simple vista que el clima esta distorsionado , debido a las actividades antropicas, este problema en mayor proporcion se debe al desarrollo insostenible enfocando en el consumismo que han llevado los paises desarrollados, (mal ejemplo q estamos copiando), los cuales expulsan gases de efecto invernadero en mayor proporción que nuestros países latinoamericanos, pero los problemas de dichas actividades se extienden a nivel global y nos afectan a todos. El calentamiento global es un problema muy serio en el cual debemos de enfocarnos todos, pero el principal objetivo pienso que seria logra de alguna manera q los paises q tienen mayor indices de contaminación disminuyan estos, por q de nada serviria q nosotros hagamos todo lo posible por contrarrestar este fenomeno, si ellos no hacen nada.

Hi, greetings from Ecuador. We are all witnessing climate change, which is a human charge, due to our consumption habits, which we have inherited from the developed countries, and we shouldn't imitate them. The developed countries emit greenhouse gases in greater proportion. However, the problems are global and affect all of us. We should all do our part, but we would be all better off if the countries of the greatest contamination would diminish their greenhouse gas levels.

21. Hola a todos (as)

Actualmente en Venezuela hay olas de calor. Una medida para contrarrestar a nivel mediático es "el ahorro de energía" en lugar de replantarse la economía fósil.

En las escuelas se insiste con el reciclaje y conservación pero con lo visto en los vídeos del cursos esto no tiene un peso importante si vemos que es la acción humana. ¿Qué hacer más allá del reciclaje y conservación? Evidentemente más políticas ambientales

In Venezuela we are currently experiencing heat waves. We need to save energy. In schools, we need to recycle and conserve. Beyond conservation and recycling, what can we do? We need governmental policy.

22. Hola soy Sonia Armijo C., de Santiago de Chile , el gobierno aunque hace muchos intentos todos aun son fallidos en nuestro país el interés económico prima sobre cualquier otro así es como lugares como la quinta región tiene zonas de sacrificio que se enfrentan a actividades mineras y derivados son devastadoras para el medio ambiente y salud humana , han cambiado la temperatura del mar en

los alrededores, sus emisiones dejan polvillo sobre cualquier superficie corrosivo, derrames de petróleo gigantescos medianamente controlados para liberar después de 10 o 15 días las actividades de pesca artesanal sabiendo que el agua aun permanece con tóxicos, poblaciones enfermas con cuadros bronquiales, cáncer , alergias entre otros, hacia el sur el escenario no es distinto en paisajes majestuosos como la patagonia chilena la calefacción aun es a leña sin invertir en ello solo decretan alerta roja en la ciudad de Coyhaique y no dejan que los niños hagan clases de educación física , pero que más, proyectos de tala de bosques, centrales hidroelectricas y termoelectricas aun son evaluados, explotan ventisqueros y la salmonicultura roba el oxigeno de las aguas, Chile aún no considera la sustentabilidad como parte de su desarrollo solo porque los grandes poderes politicos no lo permiten.

All of government's actions are in vain because the economic interest prevails in the end: mineral extractions, petrol industry hurts local fishing in toxic waters, illnesses, destruction of beautiful landscapes like Patagonia, Chile has no sustainable development.

23. HOLA SOY DE PERU-PUNO, en mi ciudad se encuentra el lago titicaca , y la bahía esta totalmente contaminada , no por culpa de los pobladores sino por que el estado hasta ahora no puede construir una planta de tratamiento de aguas servidas , pues todos los excrementos llega a una alguna de oxidación que se encuentra en el mismo lago , el olor para los pobladores q viven cerca del algo es muy fetido e insoportable algunas investigaciones dicen que si no se hace nada este lago podría terminar completamente contaminado en unos 20 años ya que los relaves mineros tambien contribuyen en su contaminacio .

I'm from Peru, Puno, and in my city is the great lake of Titikaka. Unfortunately the bay is completely contaminated because the state has until today not been able to construct a water filtering plant. The odor is intolerable. If nothing is done, this lake will be completely polluted in 20 years.

24. Hola a todos.

El cambio climático es una realidad. Normalmente en Lima Perú, tenemos un periodo de frío (invierno) que comienza aproximadamente a partir del mes de mayo hasta octubre, siendo los meses más fríos entre mayo - agosto, sin embargo estamos casi en la 15 de junio y todavía tenemos temperaturas por encima de los 23° C.

Hello everyone. Climate change is real. In Lima, Peru, we have used to have a winter, but we are in June and the temperatures are still above 23 degrees Celsius.

25. El cambio climático es un tema evidente a nivel mundial, razón por la que en mi país Ecuador también se han sentido los efectos del aumento de temperatura ya que día a día se sienten raras variaciones en el clima, además en las regiones Sierra y Amazonía se han visto más vulnerables a deslizamientos, en tanto que en la región Costa se presentan más inundaciones y el nivel del mar se ha incrementado.

Además como se sabe los países desarrollados son quienes mayor responsabilidad tienen, pero sin quitar culpa a países de América Latina que están en vías de desarrollo ya que este es un problema que involucra al mundo de modo que cada

uno debemos aportar con ideas y acciones evitando que esto se vaya agravando cada día más.

Climate change is evident around the world. In Ecuador, we are seeing an increase in temperature, strange temperature variation on a daily basis, in the regions of Amazonia and Sierra, we are seeing more glides, and more inundations in the zone Costa, and the sea levels have risen. We all know that the developed countries are mainly responsible, but we here in Latin America are also developing and so it is each of us who need to come up with ideas to avoid further deterioration.

26. Hola a todos/as. Quiero comentarles algo que escuché esta mañana. Soy de Córdoba, Argentina y acá el año pasado se pudo evitar la instalación de una planta de Monsanto en la localidad de Malvinas Argentinas, porque no pudieron presentar un estudio ambiental aceptable y el gobierno local, por la presión popular les tuvo que impedir que siguieran con la obra.

En estos días se anunció la instalación de la panificadora internacional Bimbo en los mismos predios de Malvinas Argentinas. También se han negado a presentar un estudio de impacto ambiental porque dicen que sólo fabricarán pan. Se olvidan de, por ejemplo, la cantidad de agua que van a utilizar de la zona (de por sí escasa) y su posterior tratamiento. Veremos que sucede en los próximos días.

Here in Cordova, Argentina, we have been able to resist the installation of a Monsanto plant in the Falkland Islands because they couldn't present environmental studies to verify their sustainability. We have also been able to stop the multinational Bimbo bread factory from establishment. Bimbo Corporation could not present an environmental study either, saying they only make bread. They don't consider the quantity of water they will use in this zone, which is already short.

27. Hola a todos!!!

Soy Hugo de Paraguay, mi país no escapa a todos los problemas causados por el cambio climático, ya que el comportamiento adverso del clima que actualmente tenemos en nuestro país es en gran parte por consecuencia de los gases invernaderos y que repercuten en especial para la producción agrícola. Paraguay, al ser un país altamente dependiente de la agricultura presenta un crecimiento económico bastante volátil ya que el clima dicta los resultados finales.

La necesidad de manejar nuestro ambiente de forma responsable es evidente para toda la humanidad, dentro del cual todos los ciudadanos estamos incluidos, pero solo las medidas radicales nos ayudarán a lograrlo. Para ello es muy importante el aporte de conocimiento e ideas y así evitar el agravamiento de este flagelo que hoy nos ocupa.

In Paraguay, we don't escape the effects of climate change, either. The emission of greenhouse gases disrupts our agricultural production. Paraguay is a country that is very dependent on the agricultural sector and its economic growth is very volatile with respect to the climate. Humanity is responsible, within which all of us citizens have to take radical measures. To that end, knowledge and innovation is essential.

28. Buenos días compañeros, la verdad que estoy muy interesada y preocupada por este tema del cambio climático, mientras algunos hablan de que esta teoría es solo

un mito, sinceramente este cambio se puede comprobar a simple vista con el comportamiento que esta teniendo la naturaleza, los mares y las barreras de coral lo sufren, las zonas que poseen climas semiáridos y que sufrían por escases de agua, están inundándose y así muchos casos de cambio drásticos en la temperatura que podría nombrar.

Creo que no admitir que la naturaleza esta dando señales que las condiciones climáticas están cambiando, es querer escapar del problema y no asumir que debemos cambiar hacia formas mas sustentables de uso en la naturaleza.

Those who think climate change is a myth are proven wrong by all the signs that nature is showing: choral reeves are suffering, traditionally dry regions are flooding, etc. We cannot deny climate change any longer, and need to assume responsibility to change to more sustainable uses of our natural resources.

29. HOLA queridos amigos hoy quiero darles a conocer una de las situaciones mas preocupantes y dolorosas que esta pasando en mi amada ciudad San Pedro Sula se esta deforestando la cordillera del Merendó que es el pulmón de todo Cortes y nadie esta asiendo nada por parte de las autoridades para frenarlo. entonces nosotros las fuerzas vivas vamos a tener que actuar.

Hello, dear friends, I want to let you know that the situation in my beloved town San Pedro Sula is concerning and painful. They are deforesting the mountain range of Merendo, which are the lungs of all of Cortes, and nobody is doing anything about it. We must resist!

30. Compañeros por favor tengan presente que estamos en Niño y muchas de las cosas que ocurren son consecuencia de ello, ademas hay muchos medios de comunicacion (mas que antes y mundiales) asi que los desastres y tormentas venden mas no importa donde, tengamos cuidado, no confundamos presunciones con datos científicos, que son los que seguramente nos enseñaran. Les mando un saludo porteño (de Bs As Argentina)

Peers, please take into consideration that we are currently in the season fo El Nino, and we are living its consequences. Also, the mass media show natural catastrophes from everywhere, which makes it seem like there are more. We need to be careful and not confuse our presumptions with scientific evidence. Greetings from Argentina.

31. Estimadas/estimados,

Si quieren saber más sobre los impactos del cambio climático en América Latina y el Caribe les recomiendo las lecturas siguientes:

\_ Este artículo del Banco Mundial titulado “Impacto del Cambio Climático en América Latina y el Caribe: cómo hacer frente a la nueva realidad climática”

\_ Este informe de la CEPAL titulado “Cambio climático y desarrollo en América Latina y el Caribe: una reseña”

\_ Este informe de la CEPAL titulado “Efectos del cambio climático en la costa de América Latina y el Caribe: vulnerabilidad y exposición”

Dear all, if you want to know about the impacts of climate change in Latin America and the Caribbean, I recommend the following sources by the World Bank, the Economic Commission for Latin America and the Carribbean.

32. Hola estimados compañeros, les saludo de Guatemala City, el país de la Eterna Primavera, mi país por estar en Centroamérica goza de un clima excepcional, solo

se marcan dos estaciones la seca y la lluviosa, cada año vemos con preocupación que la época seca se ha incrementado en días, antes la lluvia la esperábamos en mayo, este año hasta junio se presento y hay lugares en donde llueve mucho y en tan poco tiempo que lleva de llover ya han habido inundaciones y deslaves de tierra, llueve intensamente en cuestión de minutos y otros veces no para de llover en toda la noche. Aquí se marcaba la época de lluvia cuando en las primeras lluvias salían unos sompopos con alas de gran tamaño y les llamábamos sompopos de mayo, ahora con el atraso de la lluvia, salieron hasta junio, entonces toda la naturaleza sale afectada por estos cambios tan bruscos del clima y todo es por el avance de la frontera agrícola y el aumento de poteros para ganado, una gran deforestación y el uso no sostenible de los recursos naturales. Saludos

Hello, dear peers, greetings from Guatemala City, the land of eternal spring. Due to its location, my country has an exceptional climate, but now we are only seeing drought and rain, which we are very worried about. We used to expect rains in May, but this year rain has not come until June, and there are places where it rains so little that there are floods and glides of soil. In a matter of a few minutes it rains the quantity it used to rain over an entire night. We used to call the May rain “sompobos de mayo”, but now with the delay of rain, nature and the agricultural sector are affected. Greetings.

33. Hola, buen día para todos, escribo desde Colombia. Les quiero compartir que el tema del cambio climático en mi país, es dramático en uno de nuestros departamentos, como es el caso de la Guajira donde se tienen 20.848 kilómetros cuadrados que tiene en extensión (área), un 41% esta clasificado como matorral desértico subtropical, cuya zona está ubicada en el municipio de Uribia. Donde en los últimos cuatro años las olas de calor se han intensificado progresivamente, al punto de perder; grandes lotes de ganado, extensiones de cultivos, quebradas y afluentes drenantes hasta el punto en el que muchas comunidades se ven obligadas a emigrar a partes del interior del país.

*"En Colombia suben las temperaturas, al punto en el que los fenómenos de islas de calor - hacen que lugares, donde por años se utilizaban grandes abrigos hoy en día se usen gafas de sol y pantalones cortos"*

Saludos Cordiales

Hi I'm writing from Colombia. I want to share with you that the topic of climate change worries many people here in my country, and it has dramatic effects here, too. For example, the region of Guajira, where forty-one percent is classified as subtropic desertland. In the last four years, the heat waves have gotten progressively worse, and we are losing great produce, and a lot of people see themselves in need of moving into the interior of the nation.

34. En el valle del chota (Imbabura, Ecuador), se evidencian cambios bruscos de clima, nosotros vivimos en un sector de clima cálido seco y es casi desértico, es decir tiene poca vegetación pero por lo general el clima era homogéneo, se comportaba como se esperaba y en estos días esa ya no es más una constante
- In the valle of Chota in Ecuador we are seeing drastic changes. We live in desert-like climate, poor vegetation, but in general the climate was homogeneous. It was more consistent, but these days there are no constants.



35. El cambio climático es notorio en todos lados, uno de los sectores afectados y sensibles es el agropecuario, si los gobiernos, nosotros como ciudadanos no tomamos consciencia de lo que esta pasando esto va empeorar; que bueno que este curso se de para fortalecer conocimiento y conocer más de cerca los estudios y se están dando con el fin de evitar que el cambio climático empeore. Saludos a todos desde el departamento de Huánuco Perú.

One of the sectors most affected is the fishery. If the governments and us as citizens are not becoming more aware of what is happening, this is going to get worse. I'm glad this course is available to enhance understanding and know of the important studies that have been taken with the goal to avoid deterioration.  
Greetings from Huanuco, Peru.

36. En el Departamento del Meta, Colombia, las lluvias y/o sequías presentadas se han intensificado e incluso las épocas de verano e invierno en algunas ocasiones se han extendido por un lapso mayor al esperado, por esa razón los agricultores han tenido que planificar muy bien los épocas del año para cultivar sus alimentos y tomar medidas adecuadas que conlleven al éxito de sus proyectos. El cambio climático es una realidad alarmante. En países como Colombia en los que la población aún no es realmente consciente de la problemática, pues pese a que se habla del tema nadie empieza a tomar medidas para así evitarlo, siento que todo debe empezar por la Educación Ambiental, y es así, como el Gobierno Nacional a través del Ministerio de Educación y sus correspondientes secretarías, deberán institucionalizar una cátedra obligatoria sobre Educación Ambiental, pues resulta mucho más fácil empezar a crear en los niños y adolescentes un apego y lazos más estrechos con el medio ambiente, que tratar de cambiar a los adultos a quienes pareciera no importarles este fenómeno.

In Meta, Colombia, the rains and droughts have become more intense, and the seasons of summer and winter have grown. Farmers used to be able to plan their sowing and finish their projects. Climate change is an alarming reality. In countries like Colombia, where the population is not aware of the problem, nobody is taking measures. Everything has to start with an environmental education. It is easier to start with the children and teenagers than teach adults, who seem not to care.

37. Buenas tardes, hoy en día mas allá de la evidencia empírica y científica que proveen los distintos indicadores, tanto del Banco Mundial como de los diversos gobiernos, es cada vez mas notorio el impacto que se ha generado al medio ambiente, dado que las personas ya sienten como las olas de calor o las intensas lluvias e inundaciones afectan de una manera mas severa y frecuente, las perdidas económicas derivadas son cada vez mayores, si creo que los esfuerzos por concientizar a la sociedad han tenido cierto progreso e impacto, cuestión que iniciativas como estos cursos impulsan a generar cambios positivos, el gran problema es que ya puede ser demasiado tarde para evitar todo el cambio aunque todos los esfuerzos pueden ayudar a que la situación no sea mucho peor en el futuro, ese debe ser la principal prioridad en la que se debe trabajar.

Beyond all the studies of the World Bank and other governmental bodies, the impacts of climate change are increasingly notorious. Economic loss seems to get worse. I believe the efforts to educate society have had positive effects, because

they inspire more positive initiatives. The problem is that it could already be too late to avoid all these changes, although all efforts could help that the situation doesn't get too much worse in the future. This should be the main goal.

38. Buenas tardes, soy de Ecuador-Macas, esta ciudad pertenece a la Amazonía y aquí se puede palpar los efectos del cambio climático, como por ejemplo el mes de abril fue todo lluvia, los meses de enero también fueron lluviosos aunque con pocos días de sol, y bueno lo cierto es que el clima no era así, era variado e impredecible como lo es en la Amazonía pero no había meses prolongados de lluvias. Las personas acá tienen muy poca conciencia ambiental, piensan y pensamos que los recursos naturales son inagotables, ya que vemos montañas verdes, ríos repletos de agua, lo cierto es que no es así, los recursos se acaban y no estamos haciendo nada para ayudar a la tierra; es por esto que he decidido inscribirme en este curso para aprender más sobre el tema.

I'm from Ecuador the city that belongs to the Amazonas, and here we are feeling the effects of climate change, such as the month of April was all rain, and January also was rainy, with a few sunny days. The truth is that the weather used to not be that way. It was changing and unpredictable as it is typical for the Amazonas, but there weren't extended periods of rain. People here have a very low environmental consciousness, we think that natural resources are inexhaustible, as we see green mountains, rivers filled with water. The truth is that the resources are running thin. That's why I have enrolled in this course, to learn more about environmental changes.

39. Saludos desde Caracas, Venezuela. El cambio climático en mi ciudad ha sido importante, anteriormente las épocas de sequía y lluvia estaban determinadas en unos meses específicos del año, no obstante, se ha notado cambios bruscos del clima, como lluvias dispersas o copiosas en una época distinta a la que se esperaba, al igual que el incremento del calor cada año en épocas de sequía. Como en otras regiones del Sur, en Venezuela en los últimos años se ha presentado el Fenómeno El Niño y La Niña mostrando sus efectos, así como también los distintos factores de deforestación, construcción de edificaciones, remoción de tierras, entre otros, han desencadenado cambios en el comportamiento del clima.

Greetings from Caracas, Venezuela. The climate change in my city has been important. We used to have distinct raining and drought seasons, marked by months. Now we are seeing drastic changes, like dispersed rains, heavy rains in times when you don't expect it. In other regions, in the South of Venezuela, we are living effects of El Niño and La Niña, as well as the harms of deforestation, construction, and land removal.

40. Si bien hoy en día ha aumentado el conocimiento respecto a los efectos del cambio climático en la sociedad en general, todavía la mayoría no es consciente de la gravedad de sus efectos, de ahí que se tiene un arduo trabajo de sensibilización empezando por nosotros mismos, nuestras familias y la gente que nos rodea.

Yes, today knowledge of climate change has increased in society, generally. However, the majority is still not aware of its severe effects. We have work to do in raising awareness, starting with ourselves, our families, and our communities.



## APPENDIX 3.H

### **Excerpt from Thread on Physical Activity in Urban Areas around the Globe MOOC on Public Health**

1. As one of the most important risk factors of NCDs is lack of exercise and sedentary life style, i think that we must encourage people for regular activity. Here in Egypt, we have " Cairo Runners " which is a public event which takes place every friday and many people share in it. I think that it is a very useful tool.
2. I agree with you that if people engage in physical exercises is will help to reduce thr risk of NCDs. some Organizations in my country Nigeria now engage in Fitness actvitirty for their employee once a week. I feel if every one can do tht it will help a lot of people healthwise.
3. In order to promote cycling, the Mayor of São Paulo City introduced several bike lanes. For the moment, there have been some traffic accidents and complaints by store owners that lost clients due to car parking difficulties. However, it is expected with time, all parties will become used to the bike lanes. Japanese name writing from Brazil
4. Physical exercise is the cheapest and easiest way to prevent NCDs. However, it is worthy noticing that people in many developing countries simply do no have the energy and spare time to go running, swimming or go to gym. The daily work has taken up too much of their lives.
5. Exercise is extremely important to maintain a good health. Relating to "Cairo Runners", in Mexico there are certain days of the week when roads are closed for cars, but open as a means of exercise for the public. Many run, bike, or simply run.
6. I also think that it´s important promote heart-healthy physical activity. This is around 60-70% of maximum heart rate (220-age) for about 30 minutes 5 times a week. Physical activity is a fantastic way to prevent NCDs.
7. Its very true that Physical activity is important for reducing burden from Non Communicable Diseases. What I personally think is that no matter how one individual tries to make change in his or her lifestyle especially in terms of physical exercise if there is inactive environment (structural barriers) then one's way of looking at things changes and perception to physical exercise changes. I am originally from Nepal and right now studying in Copenhagen. I am really fascinated by the biking system here in Copenhagen, I jealous in good way and wish to have similar system in my home country. Biking lanes are all over in Copenhagen city and people really enjoy biking and I have talked to many of friends and they tend to look at biking in terms of health as well as transportation

cost.

In my home country, if anyone is seen biking in busiest street of Kathmandu then people would look at the person riding bicycle in a negative way (he/she would be taken as a poor man/women, from lower economic class) and people fear of being hit by high speeding vehicles (Motorcycle, buses, cars). But here, people do not have to fear as biking lanes are different and promotes physical exercise. In addition, there are parks, playgrounds all over Copenhagen which promotes physically active environment and motivates people to be active. Its very hard to find open spaces in Kathmandu.

Hence, physical activity promotion from all sectors of the society is necessary which will change the increasing burden of non communicable diseases.

## APPENDIX 3.I

### Thread on Solutions about What We Do about Climate Change Climate Change MOOC

1. Aquí hago mención a mi opinión personal y que actualmente los cambios que surgen en el clima es debido al abuso de los recursos existentes en el planeta y que si mitigamos sus efectos, empezamos a utilizar energías limpias, reciclamos, reducimos, reutilizamos es decir hacemos usos de las mencionadas 3 R podríamos lograr tener un uso sustentable de los recursos vitales.

by Lizbeth Moreno Jurado

**We can use the 3 R's: Recycle, Reduce, Re-use. What else can we do about climate change?**

2. en mi opinión los efectos del cambio climático están dados por la sobre explotación de los recursos renovables , ejemplo claro en chiapas , México la devastación de la selva lacandona, así mismo el efecto del cambio climático en las enfermedades emergentes como chinkungunya y zika. parte del cambio climático

**Presents reasons for climate change, such as exploitation of resources, such as in Chiapas, Mexico, the devastation of the mountains, and also the effects of climate change in the increase of vector mosquitos that carry Chinkungunya and Zika.**

3. Cordial Saludo

Desde Medellin. Colombia .Sa

Cambio Climatico

humanos agresivos,prepotentes .que en cualquier punto y lugar sacan ,montan ,hacen cualquier cantidad de experimentos (incluyendo a nuestros ejercitos y sus practicas ),minería ,paneles y aparatos solares (aun pareciendo lo ultimo en tecnologia ..distribuye y aparentemente es un gran beneficio disminuye totalmente costos ...Pensamos donde se acumula ese calor .extra ..... Energía Eólica abrimos para inyectar el aparato y curso de vientos a baja escala .....Y sin mas por el momento abrazos

**Humans are exploirative.**

4. El cambio climático se debe en gran medida al crecimiento población, ya que cada vez mas necesitamos de mayor cantidad de recursos muchas veces incrementamos nuestro numero de necesidades adquirimos mas de lo que necesitamos y esto implica que la industria siga creciendo y aumentando su producción,, cabe señalar que algunas empresas no cuentan con parámetros ambientales no respetan las normativas ambientales tanto para vertidos de agua y aire.

El incremento de automóviles es otro problema que aporta al cambio climatico.

Climate change has to do with population increase. We need more and more resources, we acquire more than we use, industries are growing, increasing their production, and most companies don't respect environmental limitations.

5. Es algo muy complejo puesto que se ven muchos "pro" en este campo tan importante, ya que prácticamente todos los seres humanos hasta los animales alteramos el efecto invernadero, por lo cual generamos un cambio climático, entonces debemos de tener en cuenta los estudios, a ver que es lo que mas alteran los gases de efecto invernadero y allí darles un buen manejo, para reducirlos, y aparte de todo esto generar conciencia a las personas que por ignorancia alteran estos gases de una forma directa por ejemplo: queman basuras.

We need to be educated about what contributes to the greenhouse effect so we can avoid harmful practices, such as burning trash.

6. Pienso que lo principal es concientizar a todas y todos dentro de nuestras comunidades . Creo se puede empezar individualmente, por ejemplo a consumir productos locales, evitar el uso de envases al momento de comprar. Reducir el consumo. Utilizar con más frecuencia el transporte público, etc. Además de lo que ya se mencionó anteriormente.

The main think is to increase awareness across communities, and start with individual choices, such as buying local, buy less packaged products, reduce consumption, and use public transportation.

7. Hola Xenia, considero importante tu aporte desde lo personal. La información en el mundo se mueve a velocidades sorprendentes, así como los modelos y apuestas desde el sector productivo que tratan de incorporar una nueva tendencia de pasar de los riesgos a las oportunidades " Economía Climática"; que sugiere implementar modelos como la economía circular para la elaboración de productos y servicios con mayor responsabilidad en la sostenibilidad.

Use the speed of communication as an opportunity. And we need to see climate change as an opportunity, such as "Climate economy," which includes sustainable growth and output.

8. En mi opinión, pienso que actualmente casi todo lo que utilizamos esta compuesto por un elemento principal no renovable: el petroleo. Cuando este se acabe, ¿con que se fabricara los materiales plásticos? ¿y los sintéticos? dependemos mucho de los combustibles fósiles y energías no renovables. En referente a las energías renovables, todos los materiales de los que están fabricados los aparatos para captar energía ( paneles solares, campos eólicos....etc) están compuestos principalmente de petroleo como materia prima. Cuando este se acabe ¿como fabricamos esos aparatos y artilugios? Como conclusión a todo esto, pienso que deberíamos dar un paso atrás, optar por políticas muy duras y rechazar muchas de las comodidades que tenemos actualmente. No olvidemos que somos animales y que nos hemos llevado muchísimos años viviendo sin dichas comodidades, no tenemos derecho a tratar al mundo como lo estamos tratando, debemos involucionar para poder evolucionar.

Even the production of renewable energy makes use of nonrenewable energy It would be better to take a big step back in our progress and do without so many luxuries that we today take for granted.

9. Creo que lo primero que se debe hacer es educar a la población, porque si es verdad que el petróleo y los combustibles fósiles son gran parte del problema, es muy difícil hacer llegar un mensaje a millones de personas que no saben nada del cambio climático. Una También podríamos pensar en políticas de reciclaje conjuntas, en las que las corporaciones y la comunidad trabajen mutuamente para tratar responsablemente nuestros desechos. Mientras tanto la comunidad internacional y los gobiernos deben presionar a las empresas petroleras y disminuir el subsidio que reciben e invertir en energías renovables.  
**We need to invest in renewable energy and education. We need to recycle, practice corporate stewardship and community engagement, and governments need to pressure industries to reduce their emissions and diminish the subsidies they receive and instead invest in renewable energy.**
10. hola compañera podemos ser pareja para la segunda semana?  
**(homework-related)**
11. Se puede intervenir de manera sustentable, creando primero conciencia en las personas para que así se disminuya los efectos causantes de cambio climático. El gobierno debe apoyar a la utilización de energías renovables, también se podría pensar en que las casas que van a ser construidas, deberán tener una energía no contaminante la cual satisfaga las necesidades del propietario. Así habrá una enorme disminución de energía no renovable que proviene de combustibles fósiles, los cuales son los grandes causantes del aumento de temperatura.  
**We need to increase consciousness, and government should invest in renewable energy. We should also consider ecological construction and architecture.**
12. Definitivamente que crear conciencia es lo principal que debemos realizar solo así podremos disminuir los efectos negativos que hoy vemos en nuestro medio ambiente, tenemos que tener en cuenta que no solo debemos buscar el disminuir los efectos sino también el hecho de adaptarnos a lo que ya está dado es decir adaptarnos al cambio climático y buscar como amortiguar esos efectos.  
**We need to increase awareness. We need to think about protective measures against natural catastrophes.**
13. Las grandes empresas son aquellas que abusan de los recursos para su enriquecimiento. Estas empresas en el sistema en el que vivimos están por encima de los gobiernos. La palabra corrupción y soborno están a la orden del día. El foco del problema reside ahí.  
**We need to stop corruption and the power that corporations have over legislature.**
14. Todo gran cambio debe sustentarse desde una base potente, en este caso el tema al ser de importancia directa e indirecta sobre todos los actores de la sociedad debiera comenzar por el **reconocimiento de los efectos del Cambio Climático por parte de los gobiernos**, con tal de evaluar, desarrollar e implementar estrategias sustentables tanto en el consumo de recursos como en las proyecciones de crecimiento y desarrollo de los mismos. Una vez elaborado estos planes, es necesario concientizar a la población a través de la educación y campañas informativas que aterricen temas complejos a un entendimiento común, con el fin de posibilitar la convergencia de una participación conjunta y proactiva desde todos los sectores involucrados.

First hold government accountable for developing sustainable strategies for consumption and development projects, second educate the people to raise awareness. Then facilitate joint participation from different sectors.

15. Considero que la base principal es la educación, pero educar responsablemente, implementando políticas educativas con respecto a la temática en todos los sectores sociales, ya que de nada sirve tener estrategias de cambio climático si nadie las conoce o no se ponen en práctica, siempre hablamos de CC o ACC, conocen realmente que es CC o cuales son los impactos al CC? que están haciendo nuestro productores para adaptarse al cambio climático o que hacen para no contribuir al cambio climático? nuestra mentalidad está dada a que tenemos que producir y generar ingresos, pero no pensamos a futuro, no nos detenemos a pensar en los impactos del CC.  
Se deben crear políticas amigables con los distintos sectores, no políticas que solamente prohíben y no dan alternativas.

We need to raise awareness. We need policies that offer productive alternatives, not just policy that prohibit and restrict.

16. La mentalidad también es un factor importante. Muchas personas no quieren creer lo del cambio climático o lo creen pero les da igual (cuando digo muchas es muchiiiiisimas) porque su lema es: "tengo una vida y voy a aprovecharla, voy a consumir como un becerro sin importarme nada lo demás" y les da igual el suelo por donde pisan.

Many people are in disbelief about climate change, or they believe it and theyn they still don't care. They only care about their own lives.

17. En mi opinión se sabe que el cambio climático es un proceso natural del planeta, pero que se ha visto alterado a causa del hombre debido a las diferentes actividades industriales que se realizan en todo el mundo, provocando el aumento de las emisiones de gases de efecto invernadero, debido a este aumento de las emisiones sean generados una gran variedad de estrategias con el fin de mitigarlo como son el uso de las energías alternativas, pero para la implementación de estas energías alternativas se necesita de una gran inversión económica la cual debe venir principalmente del gobierno, pero estos no realizan estas inversiones debido a que lo único que les importa es generar ingresos al país con el fin de llegar a hacer una potencia a nivel mundial y muchas personas tienen esta misma mentalidad de solo generar ingresos para sí mismos sin importar lo que pase con las demás personas y con el medio ambiente, hasta que no podamos cambiar esta mentalidad de las personas y principalmente de los gobernantes todas las estrategias que se implementen para mitigar los efectos del cambio climático no van a llegar a tener ningún efecto positivo.

Change needs to come mainly from the governments. Unfortunately, governments are corrupt, and only have as their goal to boost national productivity, and so is everybody else. We need to stop being so competitive.

18. Muchos de los comentarios están apuntando bien al foco del problema, pero no muy bien al eje de como este se mantiene. Es claro que el mayor productor del cambio climático son los gases de efecto invernadero, y de estos, el mayor productor es la quema de combustibles fósiles. Por ende, y por la masificación que tienen, el automóvil es el emisor por excelencia.

Por encadenamiento, modificar el uso de vehículos que consumen combustibles fósiles debería ser una prioridad y en poco tiempo, esto influiría en el cambio climático.

Tecnologías existen (autos eléctricos), políticas pueden ser promulgadas (ciclovías, anillos de contención vehicular), y la voluntad colectiva puede estar en sintonía ambiental (la gente conoce el problema), pero las verdaderas decisiones están secuestradas en los fabricantes de los vehículos y las compañías petroleras, que manejan la política de los países del primer mundo, sesgan las decisiones y por intereses económicos no van a cambiar la situación actual de su mercado, signifique esto o no la debacle ambiental.

**We need to produce electric cars, since cars are major polluters.**

**As much as the public wants this change, it won't happen as long as the governments continue to only pursue economic interests.**

19. Entonces esta claro cual es el foco del problema compañer@s. Son esas compañías, esas empresas y esas fabricas las que tienen el poder de decidir (lo cual lo veo injusto pero en fin...). Yo digo que en algún momento habrá que mover ficha en extrema urgencia contra ese grupo y propongo que ideemos planes.

**"So it is clear that it is the companies, businesses, and plants that are in power"**

**We need to make plans for overturning the system.**

20. Pienso que una forma sustentable de intervenir en el cambio climático es pensándose una nueva forma de economía, con empresas que cumplan leyes (obligatorias) de calidad ambiental. Hay que crear un equilibrio entre esa economía y la toma de los recursos que la naturaleza nos brinda.

**We need a new economic system with businesses that abide by sustainability laws, one that is in equilibrium with nature and its resources.**

21. Y la permacultura! :D

**... such as Permaculture (should explain!)**

22. Esta claro que la protección del planeta y evitar el incremento en las temperaturas globales es la única manera de garantizar la continuidad de los seres humanos pero, muchas veces esas practicas requieren que a corto plaza se ejecuten medidas que si no se tiene el suficiente conocimiento se puede confundir con acciones de privación y negación del uso de los recursos naturales y no como medidas de conservación y garantía de continuidad en el uso de los mismo. Pienso que se puede intervenir de manera sustentable aplicando los avances en tecnología, información y conocimientos de la economía moderna para desarrollar proyectos que garanticen la calidad de vida y desarrollo de los involucrados de manera tal que, estos puedan visualizar un futuro prometedor. No se puede pensar en intervenir en un sistema sin tomar en cuenta la condición del ser humano como especie dominante, que hará todo por sobrevivir y avanzar. El desarrollo social estará antepuesto a cualquier acción de protección ambiental. Se debe desarrollar proyecto inteligentes, sostenibles y sustentable dentro de los cuales se muestren de manera clara y llana los beneficios de los mismo dado que muchas veces el mensaje confunde a la población involucrada que carece de nivel de conocimientos inferior al promedio.

lack of understanding of climate change can lead to confusions over what is conservation and what is privation

We need to use our technology and economic understanding to develop sustainable projects. We need to take into account human nature as always striving for advancement (this seems to be a response to a participant above who argued for going back to pre-industrialization) while we develop sustainable projects. We need to communicate the benefits of these projects to the people clearly because a lot of them have low levels of environmental knowledge.

23. Si la situación continua con esas proyecciones, definitivamente el planeta se vera avocado a tener en un tiempo no muy tiempo, menos de 500 años lo cual es menos de un segundo en la historia de la tierra, a tener los tremendos panoramas evidenciados en algunas películas , el problema es que en la actual economía se antepone el beneficio antes que la conservación. En mi país por ejemplo se están acabando las fuentes de agua naturales de una manera exagerada con la explotación minera ,porque por ejemplo para la obtención de 1 gramo de oro se requiere la utilización de 100 litros de agua, a ese ritmo no hay programa de re-forestación, plantación que valga. Una consideración que deberían hacer las grandes empresas es: para que generar tantas utilidades si no habrá planeta para disfrutarlas.

In less than 500 years this planet will be wiped out. We need to pitch the motto: What are we producing all these things for, if we won't have a planet to enjoy them?

24. empezando por nosotros mismos, si nos ponemos a pensar encontraremos muchas razones, nuestro planeta tierra cada vez lo estamos destruyendo mas, es por eso que deberiamos utilizar recursos naturales que ayudan y evitan la contaminacion ambiental y el cambio climatico, evitar quemar bosques, hacer uso de aerosoles ecologicos y sobre todo concientizar personas, ya que de nosotros depende que nuestro planeta.

We need to use solar panels and wind parks.

25. Empezando por hacer cambios en las políticas de emisiones de gases de efectos invernadero a nivel mundial, eso sería en un principio, parar la fuente; posteriormente trabajar con la población en general con la finalidad de crear conciencia sobre los hábitos de consumo e incorporar talleres con la población rural sobre la situación de sus ecosistemas, ya que una población informada demanda a los políticos el cumplimiento de normas y estándares de salud de los ecosistemas y por consiguiente atacar el efecto del cambio climático.

We need to reduce carbon emissions at the global elvel. We need to raise awareness through education because an educated people will make demands from their government. We should ru workshops with rural populations.

26. educación, educación y mas educación. Pero en principio coincido con la mayoría de mis compañeros: la legislación aplicable a no todos los países debería ser para comenzar de uso obligado, con la misma severidad en todos los países, sobre todo en aquellos donde los procesos de generación de energía aún en pleno siglo XXI son a base de carbón, como es china y la india. crear sanciones de bloqueo de comercio internacional sobre todo a la invasión de productos de china, para obligar a esta gran nación por ejemplo a emplear energías más limpias como el



uso del gas natural, biomásas, biocombustibles y por que no, energía eólica y solar tanto fotovoltaica como de concentración.

en otro orden de idea, en cada país, educar a la sociedad sobre el uso y abuso de la energía, promulgando directivas que ayuden a generar ahorro de energía a nivel de gobiernos regionales, municipales, y privado. Obligar a la certificación energética de edificios, tanto residenciales, oficinas, e industrias, mejorando, y haciendo mas eficiente el consumo de electricidad, gas; procurando mejorar los aislamientos tanto en edificios como en tuberías y equipos industriales, y tratando de introducir cogeneración, para el aprovechamiento del calor residual. en definitiva haciendo mas eficiente los procesos productivos en industria en cuanto a consumo de energía. y creando mas fuente de energía alterna.

**We need to emphasize education. We need to create global blockades and sanctions to countries whose economy is based mainly on non-renewable energy sources (China and India) to push them toward bioenergy, wind energy, solar energy, and photovoltaic. We need to promote communities to push toward demanding energy conservation from their local governments.**

27. Buenas noches sr. Pablo. Veo que también es de Venezuela. Estoy de acuerdo con Ud. La educación, especialmente en los niveles básicos, debe ser una premisa para la socialización de las nuevas generaciones en los temas ambientales. Si no nos enseñan desde pequeños a la conservación, generalmente, no lo vemos como parte de nosotros mismos sino como una imposición. No digo que sea en todos los casos pero es mejor si se inculcan esos valores desde la infancia.

El otro punto importante, y sobre todo con la situación económica por la que estamos pasando, es la accesibilidad de los recursos con los cuales podemos (los ciudadanos comunes) aportar al medio ambiente. Por ejemplo, mi caso particular: Un bombillo ahorrador. Desde que tengo memoria en casa siempre se han utilizado este tipo de bombillos porque aportan mejor luz y ahorran energía. En la actualidad, un bombillo ahorrador cuesta alrededor de 1.500 Bs, unos 7,55\$ calculandolo a Simadi de 198,67 Bs al cierre de hoy, para que nuestros compañeros de otros países tengan una referencia a una tasa de cambio legal. Con un salario mínimo de 6.746 Bs (unos 33,95\$) se puede tener dentro de las prioridades del hogar poner bombillos ahorradores si cada uno representa un 22% del sueldo y tenga que poner por lo menos 4 de esos en casa? No lo creo.

El gobierno de nuestro país tuvo una iniciativa que me pareció una avanzada excelente hacia el ahorro energético que fue el reemplazo de los bombillos. Pero cuando a muchos se les quemó por el tiempo en uso, por defecto o por las causas que sean, los beneficiados no salieron en masa a comprar unos iguales sino que compraron los más baratos que son los que se ajustan al presupuesto individual pero resulta que son los que mas energía consumen.

La oferta de los productos ecológicos debe mejorar para que las personas que tenemos menor capacidad económica podamos incluirlo en nuestros presupuestos y tener una relación ganar-ganar con la adquisición de esos productos: Un artículo de mi consumo que me aporta lo que necesito, a buen precio y que está en línea con los requerimientos de conservación del planeta.

Es mi humilde opinión.

Me alegra poder expresar lo que muchas veces comentamos en grupos pequeños

pero que a través de este foro puede llegar a muchas más personas.  
Saludos cordiales!

You are also from Venezuela! I am so happy to share my opinion and exchange ideas with so many people. We need to start by educating children because they're more open to new ideas than adults, and because they absorb more. I In Venezuela, the government distributed energy-saving light bulbs, but once they went out people replaced them with the cheaper ones that use more energy because the energy-saving ones were too expensive for them. We need to produce energy-efficient products that are affordable for populations so that the poor households can contribute to conservation.

28. Buenas noches. Un saludos desde Venezuela!

Greetings from Venezuela and good night.

29. hola patricia, un cordial saludo. totalmente de acuerdo con Usted, en cuanto a la educación. En otros países de Europa desde muy pequeños aprenden la importancia de la conservación, del reciclaje, del ahorro de energía, de la reforestación, y del uso consciente de los recursos. Y a medida que va creciendo y teniendo más conciencia, se le entrega más y más herramientas que lo prepara para enfrentar como sociedad unida este gran problema.

En Venezuela el subvencionar los bombillos ahorradores eso estuvo bien, pero la consciencia ecológica no solo debe residir ahí, se deben establecer mecanismos para la educación que hagan al ciudadano: "un nuevo ciudadano" más respetuoso del medio ambiente. Y en lugar de implementar como gobierno medidas tales como: oficinas publicas van a trabajar hasta la 1 de la tarde; los centros comerciales deben apagar escaleras móviles y sus sistemas de acondicionamiento de ambiente, apagones a cada rato para distribuir la poca oferta de energía que queda, multarte por esto y por aquello, debería en lugar de eso: estimular si el ahorro energético, subvencionar iniciativas privadas para la explotación de energía renovable, y el mismo estado invertir en mas plantas de energía renovable reforestar inmensas extensiones de tierras improductivas, sancionar a quien deforesta, crear conciencia y educar al ciudadano a como configurar equipos eléctricos ej: de aire acondicionado, como aislar mejor las construcciones, y a las empresas, adiestrarlas desde la directiva hasta el ultimo empleado; implementar la figura llamada en otros países el ENERGY MANAGMENT, que es quien crea planes de gestión de energía, como ser mas eficiente en su consumo, pendiente de las instalaciones eléctricas y mecánicas, aislar tuberías y equipos de intercambio térmico, a crea energías a partir de calor residual a través de la cogeneración, y en definitiva a ser más cuidadoso con el uso eficiente de la energía. Un estado serio y responsable crearía condiciones de incentivos fiscales para propiciar mecanismos que ayuden a evitar cada vez mas la emisión de GEI, y a respetar el medio ambiente.

varios países latinoamericanos que en las cumbres señalan a los mas industrializados de crear condiciones adversas que contribuyen negativamente con el cambio climático, y resulta que no hacen nada desde adentro de sus propios países para evitar su propia contribución. Que en la mayoría de los casos su contribución percapita es mucho mayor que la de muchas potencias industrializadas, si consideramos como contribución no solo la de CO2 neto,

sino una porción equivalente medida como CO2 equivalente, comprendida por las grandes deforestaciones por explotación auríficas y de diamantes. Y que no se respeta el uso de gases refrigerantes que no solo afecta la capa de ozono, sino al cambio climático

Running thoughts – no periods or commas; listing problems and solutions

Responds to Patricia

We need to start teaching the children about conservation. It is already working in Europe. Subventions for energy-saving light bulbs are not enough to make “new, eco-conscious citizens”. Department stores need to turn off escalators and air conditioning, have regular power outages, reforestation, investing in renewable energy, implement energy management strategies in companies, co-generation of energy, isolation mechanisms, and government sanctions and subsidies.

30. El Cambio Climático se puede intervenir, sembrando árboles para contrarrestar el efecto invernadero por las altas temperaturas, a mayor reforestaciones en nuestro planeta, menor efecto invernadero y punto de conversión de las corrientes de agua del atlántico al pacífico, esto debido al bajar los grados de temperatura en los océanos.

We need to plant trees to counter the greenhouse gas effect.

31. estoy de acuerdo la vegetación ofrecen múltiples servicios ambientales, sin embargo el eje para llegar a un verdadero manejo sostenible y por ende combatir el cambio climático es la educación a la población, un pueblo informado actúa y demanda, exige, y realiza acciones en pro al cambio. Saludos!!!

We need reforestation efforts. Our main focus should be education because education leads to empowerment and demands to evoke change.

32. Desde mi perspectiva, son muchas las aristas que determinan el problema del cambio climático, la matriz obsoleta y sobre saturada de la producción industrial, principal emanados del Carbono a la atmósfera, y que poco a poco se da cuenta que debe renovarse, la falta de compromiso de los gobiernos, el velo que cubre a la sociedad y considera, por lo menos en mi país, el problema del cambio climático como algo fuera de las fronteras y no entiende la real dimensión de sus consecuencias en el mediano y largo plazo. Las consecuencias están a la vista, los glaciares de los Montes de los Andes están en un proceso de pérdida, las lluvias son más violentas y sus consecuentes inundaciones destructivas. Los veranos mas calientes. Conviene pues educar, generar nuevas fuentes de energía renovables, controlar la emisión del carbono a la atmósfera, incentivar a las industrias a trabajar con un verdadero compromiso con la naturaleza, impulsar la ciencia y tecnología más responsable y menos comercial.

Governments need to be more open to compromise. People are too indifferent. The glaciers in the Andes are melting and the storms are more violent than ever, and the summers hotter. Educate, use new energy sources, control carbon emissions, push science toward responsible technology solutions that are less commercial.

33. Estimadas y estimados:

Dado que el cambio climático es un problema íntimamente relacionado con el desarrollo económico, ya que se ha dado como resultado de nuestros patrones de producción y consumo actuales y pasados, y que además afectará nuestras

posibilidades de crecimiento en el futuro, cada vez es más claro que la manera de enfrentarlo de manera efectiva es que la mitigación y adaptación sean integradas como elementos clave de la planificación del desarrollo económico y social. El “Informe sobre el Desarrollo Mundial 2010: Desarrollo y Cambio Climático” del Banco Mundial señala que las políticas climáticas inteligentes son aquellas que promueven el desarrollo, reducen la vulnerabilidad y financian la transición hacia caminos de crecimiento bajos en carbono. Esto es un tema que discutiremos en la semana 4, pero que podemos adelantar consultando. ¿Conocen ustedes conceptos como "desarrollo bajo en emisiones", "desarrollo compatible con el clima", "crecimiento verde"?

¿Cómo abordan estos conceptos la atención al cambio climático?

Staff chimes in to redirect conversation to economic growth in relation to climate change. We need to take into consideration social and economic progress that is in line with environmental stewardship, “green growth”. She asks for ideas how this is possible

34. Buenos días, saludos desde Costa Rica Ivannia Alfaro

Como parte de las soluciones, me parece interesante el trabajo del biólogo AFEYAN, NOUBAR en CIANOBACTERIAS produciendo apartir de ellas combustible (Etanol) en laboratorio y recientemente en la PRIMER PLANTA DE PRODUCCION DE ETANOL A NIVEL COMERCIAL CON CIANOBACTERIAS, esto da una solución al conflicto de utilizar tierra de cultivo para alimentos en cultivos para biocombustible.

Microorganismos fijadores de CO<sub>2</sub> obtenidos por ingeniería genética que producen productos basados en carbono de interés

La presente divulgación se refiere a mecanismos para conferir producción de productos basados en carbono a un organismo fotoautotrófico de modo que convierta eficazmente dióxido de carbono y luz en diversos productos basados en carbono, y en particular al uso de dichos organismos para la producción comercial de diversos productos basados en carbono de interés.

Productos basados en carbono de interés” incluye alcoholes tales como etanol, propanol, isopropanol, butanol, alcoholes grasos, ésteres de ácidos grasos, ésteres de cera; hidrocarburos.

Laboratories can produce ethanol via cyanobacteria, which could solve the problem of taking up farming land for energy production.

35. Replanteo mi hipótesis, el sembrar arboles bajan Las emanaciones de co<sub>2</sub>, esto debido a la captura del co<sub>2</sub> en la atmosfera e inclusive manejar Los program de fertilizaciones agricols en Su manejo y uso empleado, debe ser restrigido por la volatilidad de Los nitritos en la atmosfera que afecta la capa de ozono.

Fertilization of agriculture must be restricted by the volatility of the nitrates in the atmosphere that affect the ozone layer ???

36. Concuerdo con muchas personas que lo principal es educar a la población sobre el cambio climático, llevarles el conocimiento sobre lo que es el cambio climático, los efectos que trae consigo y las consecuencias si no se actúa. En mi formación profesional recibí Educación Ambiental donde aprendí que no se puede actuar para prevenir o corregir algo que no se conoce, por lo que cabe recordar que el conocimiento genera conciencia, la conciencia a su vez induce a la actitud y

aptitud para actuar. En la actualidad existen medios como la tv, radio, internet por los cuales se puede llegar a muchísimas personas en distintos lugares al mismo tiempo, pienso que hay que aprovechar cada recurso y cada situación para llevar la temática del cambio climático, siempre recordando del uso de un lenguaje sencillo para que todos puedan comprender este problema mundial.

**Focus in education through the use of mass media.**

37. En mi opinión para darle sostenible, tiene que haber políticas públicas y muy severas.

**We need sustainable, rigorous public policy.**

38. Es importante llevar la información sobre cambio climático y sus impactos en los distintos sistemas, entre más apropiados estemos de estos nuevos conocimientos cambiaremos nuestras formas de vida, hábitos y comportamientos nocivos que influyen en el aumento de la temperatura.

Implementando las escuelas de campo y llevando medios técnicos y económicos a nuestras comunidades viables para disminuir el aumento de la temperatura e implementar medidas de mitigación y adaptación, este sería el reto para los gobiernos, el sector privado, la sociedad civil y las Universidades.

**We need to educate in rural schools and show the students inexpensive ways of diminishing temperature increase. This is the responsibility of governments, universities, civil society, and the private sector.**

39. Estoy totalmente de acuerdo Tamara, reformas incluyentes y no excluyentes son los verdaderos retos!

**Yes, reform needs to be more inclusive to achieve real goals.**

40. Yo pienso que las políticas deben ser severas y que los gobiernos no se dejen llevar por los sobornos de ninguna empresa, me explico: En España actualmente hay un impuesto de energía solar, esto es que quien se compra una placa fotovoltaica y genera electricidad debe pagar. ¿Porque se impuso ese impuesto tan injusto? Por las empresas eléctricas. Tienen un poder bastante alto en el mercado y en el gobierno. No les conviene que la gente se cambie a lo renovable. El tema de la educación es primordial, pero de nada sirve si llega una empresa, se impone y la bloquea.

**Education is fine, but it is of no use when corporations have power over our governments. For example, in Spain people have to pay higher taxes for using photovoltaic energy in their homes.**

41. El medio ambiente se ve solo como un objeto, por esto es necesaria la educación ambiental. Para alcanzar este propósito es necesario dar a conocer y proyectar cuáles son las causas y consecuencias de los problemas ambientales en la actualidad. Además incentivar la investigación y conocimiento en futuras generaciones.

**Education is necessary because we shouldn't see nature as an object anymore. We need to understand the causes and consequences of problems with the environment to incentivize more investigation and knowledge.**

42. Buenas noches, en mi opinión el tema sería **Adaptarnos al Cambio Climático**, pues ya lo tenemos presente entonces como podemos adaptarnos teniendo acciones de amortiguamiento al mismo, en mi experiencia trabajé con un grupo de agricultores cafetaleros y como medidas de adaptación hicimos trabajos de reforestación, cosecha y manejo de agua, manejo de residuos

de sus labores de campo y orientación en el manejo de desechos de campo, que sin duda es un medio de como poder hacer acciones en bien de nuestro ambiente.

**We need to come up with strategies that buffer the effects of climate change.**

**I worked in a coffee plantation that did work of reforestation, harvesting, and management of water and waste management.**

43. jegg, identificado con la de ADAPTARNOS. Dentro de estas conductas sugiero la necesidad urgente de retomar antiguas técnicas de cafetales con sombrío. Esta fue una desafortunada acción gubernamental desde hace varios años de eliminar el sombrío benefactor por cafetales a plena exposición, en razón de obtener más cosechas y por ende para el caso Colombiano insólitas medidas agrícolas destructoras del suelo y ausencia de multiplicidad de productos del sombrío para bienestar del caficultor. Este ejemplo incremento desfares climáticos, escorrentías con perdidas del suelo biológico y equilibrio ecológico en áreas puntuales y locales.

Eduardo Plata R [edplaro@yahoo.com](mailto:edplaro@yahoo.com)

**This was an unfortunate governmental plan many years ago for the purpose of increasing harvest that destroyed the soil.**

44. ¿Cómo intervenir de manera sustentable al cambio climático? opino que ello será más efectivo si se parte con políticas educativas en todos los niveles, desde la fase inicial, con los niños pequeños, hasta la fase universitaria. Se debe educar en la no contaminación, en caminar más, usar menos vehículos motorizados, en reciclar en reutilizar, en el uso de energías limpias, en proteger las áreas verdes, en construir edificios ecológicos. Forjar planes municipales para el recojo de la basura segregada desde la fuente, recuperar ríos. Realmente las autoridades juegan un rol importante.

**We need education at all levels (kindergarten to university) about contamination, to walk more, to use engine cars less, to recycle and reuse, to use clean energy, to protect forests, to build ecologically sound architecture, to insist on public trash pick-ups, to clean up rivers, etc. Government plays an important role.**

45. Comparto la misma opinion que sostiene Lina, se debe educar a aquellas personas que no poseen conocimiento sobre el cambio cambio, sin embargo mi opinion es la siguen. En el colegio nos imparten la educacion que necesitamos en muchas ocasiones se pierden los valores, quizas no nos explican de manera amplia y profunda con conocimientos cientificos las consecuencias de un Cambio Climatico pero es una semilla que se siempre y que no da frutos si uno no la riega, ¿como intervenir de manera sustentable al cambio climatico? puede enfocarse desde dos punto de vistas que llevan a un mismo fin. Principalmente la colaboracion de la comunidad a reusar los materiales y a ordenarlos conforme a su composicion para que las empresas especializadas realicen el reciclaje del mismo. Segundo el Estado (y el Ministerio Ambiental del pais competente en conjunto con los Gobernantes de los Estados) deben conocer y delimitar la geopolitica del pais para saber cuales son los recursos que posee que ambientes geograficos pueden ayudar a contribuir con un desarrollo sustentable que incida en la comunidad y que sea percibido para que de esta forma se pueda medir la capacidad evolutiva de esa comunidad en cuanto a la conciencia que tienen sobre el cambio climatico y que sea progresiva, sin efecto retroactivo y constante para



su perduración.

Saludos desde Venezuela.

Education is good, but not enough. A good education should emphasize sustainability. We must find strategies in collaboration with communities to reuse materials. Corporations must recycle. The state (environmental agency and state governors) must know the country's resources for sustainable development, and take into account the interests and knowledge levels of the community.

46. El desarrollo bajo en emisiones y el crecimiento verde lastimosamente va de la mano con las ganancias, los costos y la comodidad. Enfrentando una economía en recesión y donde el enriquecimiento es la base de la subsistencia, como que la pone difícil. Bonito se oye cuando hablamos de uso de altas tecnologías para disminuir las emisiones de los vehículos, pero nuestra realidad es otra, la gran mayoría de nuestros pueblos subsisten con \$1-2 al día, los medios de transporte público muchas veces no cumplen con la normativa de emisión de gases y siguen dentro del tráfico; o en otras ocasiones necesitamos explotar el petróleo como sea y de donde sea, algunos países de Latinoamérica ya llevan años haciendo uso del fracking y son los mismos ambientalistas los que lo venden como un método no peligroso, ni para el suelo, ni el agua, ni las personas. La riqueza justifica los medios.

No todas las empresas están dispuestas a dar una parte de lo que toman, algunas sí lo hacen, por marketing o real conciencia social.. solo ellos sabrán. Ni todos los gobiernos lucharán por la defensa del medio ambiente por sobre todas las cosas. A veces logran más las pequeñas ONGs en pequeñas comunidades, pues llevan realmente a la práctica los proyectos sustentables, de tal manera que lleguen a formar parte de su vida.

Subsistence and profit don't go together; communities in Latin America don't have the money to implement public transportation that are ecologically sound; not all businesses are ready to give back to the environment after using it, and even if they do it is for marketing purposes. Small NGO's can often accomplish more because they work with the communities.

47. Muy buenas tardes a todos, particularmente creo que podemos y tenemos muy buenas intenciones en torno a intervenir de forma sustentable a combatir el cambio climático.

Estamos conscientes de que nuestra realidad en torno a lo que nos acontece tiene el mayor porcentaje de culpabilidad la huella humana. Ahí estriba el gran problema, pues donde tenemos incidencia los humanos, los intereses priman, ya que por naturaleza somos inmediatistas y salvo un pequeño grupo dentro de lo que están los que promueven este tipo de cursos y tratan el tema, les preocupa poco lo que les llegue a las futuras generaciones, aunque no puedo negar que cada día somos más los interesados en ayudar a la problemática.

La huella humana ha sido la gran protagonista de lo que hoy nos acontece y es en nosotros que descansa el intervenir de manera sustentable al cambio climático.

No podemos decir que ésta no ha sido preponderante en diversos factores que han incidido en el bienestar de cada uno de nosotros, pero de igual manera es innegable que esta huella ha sido devastadora en torno a la protección de los recursos naturales.

Cada uno de nosotros puede contribuir a intervenir de manera sustentable al cambio climático, pero necesitamos más. Se hace urgente que las informaciones en torno a combatirlo sean masivas, educar en relación al tema, que los videos de lo que esta pasando llegue a un mayor número de personas, que las políticas sean continuistas, ejecutadas, monitoreadas y divulgadas, versus los resultados y es que no basta el que sembremos un arbol, evitar la tala de los mismos, caminemos en bicicleta, -asunto difícil en mucha de nuestras ciudades-, el reciclar, no desperdiciar el agua, todos sabemos que el aumento de los gases de efecto invernadero esta minando la posibilidad de tener un mundo con condiciones optimas habitables y eso va más allá de lo que particularmente podamos hacer, es un asunto de carácter macro, aunque en lo que nos toca, hagamos lo propio.

**I am optimistic that we can make a difference although humans are mainly egotistic. We need massive policy changes, as well as individual actions (recycle, use bike, plant tree, save water). We need environmental education.**

48. Buenas tardes.

Estoy de acuerdo con muchos compañeros en que la educación es uno de los mejores mecanismos para enfrentar el cambio climático. Cursos como estos nos ayudan a conocer un poco mas del tema y ser transmisores de las causas y las consecuencias de la intervención humana sobre el planeta, pero pienso que para que llegue a mayor porcentaje de la población debe difundir información con un lenguaje más sencillo. He leído los informes, he visto los videos y todas esas opiniones de científicos que nos explican lo que está pasando y lo que puede llegar a pasar si seguimos así, pero para que esta información tenga un alcance mayor se deben generar contenidos con un lenguaje más sencillo y con una frecuencia alta, por todos los medios, en todos los lugares posibles. Tal vez alguien tiene una práctica habitual en su casa y no sepa que le hace daño al planeta. A esa persona le puede parecer normal, y tal vez pueda hasta pensar que porque solamente lo haga un momento no va a tener incidencia. Para crear esa conciencia hay que informar, repetir y repetir una y otra vez hasta que el individuo aprenda. Una vez aprendido será capaz de transmitir ese conocimiento y así pasar de generación en generación.

**I agree that we need education but it needs to be done in a simple language so that it reaches the masses of people who are not scientists.**

49. Estoy de acuerdo con lo de que muchas personas creen que con sus acciones no perjudican a nadie. Es una costumbre y una que se aprende desde pequeños. Desde pequeños es que se aprenden también las buenas costumbres.

**I agree that too many people don't think their actions have consequences. Environmental stewardship is a custom that is learned from childhood on.**

50. Buenos días, desde Venezuela, concuerdo con muchas de las opiniones expresadas en este foro, pero creo que el problema es mucho más complejo y a pesar de que definitivamente la educación es fundamental, hay otros factores que son determinantes en la búsqueda de una mitigación al problema planteado. Este problema de índole ambiental no lo podemos desligar del aspecto político y del aspecto económico, que sin duda son fundamentales, tiene que haber una sinergia entre estos tres aspectos para poder mitigar el impacto de este fenómeno en el planeta.



Es preciso resaltar, que tiene que haber compromiso y convicción en lo que se está haciendo; se tiene que internalizar que es un problema real y que nos afecta de manera directa, no se pueden quedar las acciones a tomar solo en el papel, sino que hay que ponerlas en práctica, debemos dejar de ser pasivos y pasar a ser activos, ser parte de la solución y no del problema.

En Venezuela, el marco legal es bastante amplio en materia ambiental, incluyendo lo referente al cambio climático, sin embargo es poco el accionar que se tiene en ese campo, las personas que nos dirigen profesan que nosotros somos los que vamos a salvar el planeta y la especie humana, sin embargo jamás se han preocupado por llevar un inventario de las emisiones de CO<sub>2</sub>, no se llevan indicadores de sustentabilidad de ningún tipo y es bastante poco lo que se hace en materia de emisiones.

Pienso que debemos dejar de hablar y empezar a actuar, o pronto será muy tarde ya que las consecuencias de el cambio climático son palpables y cada vez sus efectos son más severos.

**Political, economic, and ecological sectors need to work together to accomplish anything. This needs to happen quickly! We need to stop talking and start acting because it will be too late soon.**

51. Un saludo desde República Dominicana, totalmente de acuerdo con tu exposición Rubén, debe existir una sinergia entre los actores (medioambiente, político y económico). Tal y como lo expusiera en mi comentario, el asunto es complejo y para ser exitoso en combatir el cambio climático deben aunarse esfuerzos locales y globales. En nuestro caso como caribeños, debemos tener políticas más definidas y que las mismas sean continuistas, pues el tiempo apremia y tal y como lo acabamos de leer en el material de estudio, el cambio climático afecta en todos los aspectos del desarrollo de las naciones y comparando el comportamiento desde la era preindustrial hasta nosotros con los siglos anteriores el asunto va a millón. El calentamiento del clima incide directamente a la economía y desarrollo de los países, y si éstos están en vía de desarrollo aún más. Una de nuestras mayores entradas de divisas como país es el turismo, y este pudiera verse muy afectado por los diferentes fenómenos que se pueden desprender del calentamiento del clima. Lo que hoy pudiera ser muy atractivo puede tornarse totalmente diferente cuando los océanos se sigan calentando y subiendo el nivel de los mismos., los ríos secándose, la sequía maltratándonos, esto tiene un efecto multiplicador en la agricultura ya que muchos de los insumos que consume el sector hotelero es local, ni hablar del verdor de nuestras tierras pudiera cambiar y desaparecer especies endémicas por el trastorno en el medio ambiente.

Estamos sintiendo los efectos, el calor es desesperante, ya casi no tenemos el friito que nos encanta, que aunque era poco tiempo lo amábamos, aún en Municipios cuyo clima frío es la constante casi todo el año, estamos viendo temperaturas más calidas, en fin los efectos pueden ser devastadores en renglones importantes para este sector y para la economía del país en general.

**Yes three sectors must work together. Also, global and local forces must work together. All nations are affected, and all industries. The Dominican Republic is dependent on the tourism industry which will be affected by climate change**

because climate change affects the climate in the Caribbean. The climate in the Dominican Republic is getting hotter. Cooler days are missing more and more.

52. Comparto desde Colombia, los anteriores aportes donde se destaca como prioritario la educación desde todos los ámbitos de formación. Siempre he creído en las orientaciones fundamentales y de gran ejemplo las transmitidas en el principal núcleo humano como es la FAMILIA. En donde si los integrantes de cada familia se comporten en armonía con sus entornos de vida urbana o rural los beneficiados son los Recursos Naturales con su Naturaleza, que son parte importante de cualquier ecosistema. Este buen ejemplo se multiplicará en beneficio al entorno de las diferentes etapas de vida en cualquiera de los escenarios del uso de los recursos naturales del planeta Tierra y por ende a ser mejores humanos, desde quienes toman decisiones y participan en ellas dejando garantías sustentables de existencia.

Una forma de actuar los gobiernos de cualquier tendencia es la de garantizar la mejor calidad de vida de los recursos vivos y parte integral de los no vivos, con miras a un desarrollo sostenible y se logren óptimos equilibrios en el uso del planeta Tierra.

Tierra que debemos recordar es prestada para beneficio de futuras generaciones y no como se está haciendo cada día con menos lugares óptimos de vida ante el real aumento de población.

Desde los estamentos estatal, privado y desarrollo sugiero como intervención de manera sustentable al cambio climático garantías de ejecución, control y conservación de políticas climáticas y ambiental desde la educación ambiental, información ambiental y ordenamiento ambiental.

Eduardo Plata Rodriguez

Family influence is the strongest if we want to cultivate eco-friendly habits. We need to hold the government accountable to make environmental regulations by pointing to the best quality of life for all with more sustainable development.

53. La manera mas sustentable de intervenir el cambio climatico concuerdo con todos es creando conciencia y educando pero a la clase dirigenial y gerencial de todo el globo y no me estoy refiriendo solamente a los politicos sino determinante la educacion y conciencia de los empresarios, porque el marketing que ejercen sobre nuestros habitos de consumo contaminan todas las buenas intenciones, y para frenarlos tendriamos que dejar de consumir todo lo novedoso que se produce, convertirnos en existencialistas y negar el "ego" .El Lider dijo "niegate a ti mismo, carga tu cruz y sigueme".

Por otro lado por 1998 el secretario general de la ONU dijo que habia que cultivar 3 árboles por persona para combatir el cambio climático, en ese entonces era más difícil convencernos de las consecuencias del cambio climático, pero a partir del protocolo de kioto imagine con fines de ganar con los certificados de carbono, un riego para zonas desérticas basado en un riego artesanal supongo desde el tiempo de los Incas, lo desarrolle así espero explicarme bien: reciclar los baldes de 20 litros de pintura,oleos y etc. cada balde conectados a una piscina plastica para llenarlos de agua, en cada balde un conector de riego con gotero, a una gota por minuto 20 litros me supone 100 dias de holgura para repetir el riego, el gotero encerrado en botella descartable evitando la evaporacion de agua,

destinado a reforestar los desiertos con algarrobos (*prosopis pallida*) que ademas desarrolla la capacidad de captar la humedad del aire y despues de tres años produce un fruto que alimenta ganado, "altruista" obtenia los certificados de carbono y destinaba los bosques a que los expresidarios reciban solo en posesion 10 Has para que crien ganado (combatia la delincuencia) por lo menos sembrè mis 3 arboles, y se los transfiero para que ustedes siembren los suyos y si tienen como siembren 10,000 Hàs y ganen 12 millones de dolares una vez que este instalado el nuevo bosque.

Tambien pense en que para combatir el cambio climàtico se deberia construir biodigestores en todos los vertederos de nuestras ciudades en lugar de pozas de oxidaciòn, la razòn el metano producido por bacterias aerobicas es dañino para la capa de ozono (no se si alguien calculò la produccion de metano con esta practica habitual en nuestras ciudades y granjas) , mientras que el etano producido por bacterias anaeròbicas es utilizable para producir sin contaminar el ambiente energia limpia, en su momento envie una idea al BM y me ofrecieron pagar 7 dòlares por certificado de carbono de mi "proyecto". En este sentido producir compost por bacterias aerobicas es tambièn nocivo para el ozono.

lamentablemente no cuento con casa propia sino hubiera experimentado con un biodigestor del modelo hindù asegurando el ahorro en la luz, cocina y calefaccion de mi presupuesto, lo dejo a vuestra consideraciòn para que con conciencia combatan el cambio climàtico.

Ademàs por casualidad y paseando por la zona desertica de mi pueblo Guadalupe-La Libertad-Peru que ambicionaba reforestar (mas o menos 10,000 Hàs) despues de las consecuencias de un fenomeno del niño encuentre una tumba preincaica descubierta por la correntia de las aguas, aparte de ceràmicos, (y una gran pepita de oro que desaparecio misteriosamente en el mismo lugar) el vestigio de un remo, cuyo diseño no tiene comparacion con los actuales y bien podria servir para ganar una medalla olimpica porque supone mayor fuerza en la remada, diseño que tambièn serviria para captar eficientemente la energia eolica de manera horizontal, incluso para dar mayor autonomia al auto electrico-captando la energia eolica producida por el desplazamiento- este diseño pretendo desarrollarlo una vez que cumpla mi obligaciòn de educacion superior a mis hijos que serà dentro de 5 a 6 años, salvo que encuentre un ingeniero electrico, un tecnico en fibra de vidrio para previo contrato desarrollar este experimento.

Tengo otras ideas mas o menos absurdas que Dios regala a mi imaginacion espero haberles aportado algo en haras de esta preocupaciòn que deberia ser Global.

**Sentences are paragraph-long and jump from one idea to the next**

**Our marketing economically and its business practices are always going to "contaminate all of our good intentions." We need to stop consuming. It is written in the Bible that you shall deny yourself, carry your light, and follow Christ. In 1998 the UN recommended for each person to plant three trees in their life. I came up with an irrigation system based on the Incas to recycle the buckets of 20 liters of paint and oil, and every bucket is attached to a pool out of plastic to fill up the buckets with water, with each water a connector for irrigation with a dropper, and each drop per minute for 20 litlers for 100 days, the dropper is enclosed in a bottle so to avoid evaporation. This works to water forests with**

locust, which also is useful to captivate humidity. We should also use biodigestives in each dumping ground in all cities instead of oxidation pools to avoid the methane that is produced by aerobic bacteria because it is bad for the ozone layer, whereas ethanol is great for production (goes on about the government paying him 7 dollars for a certificate of his project). I also found an old tomb after The Nino hit from the times before the Incas...

54. hola a todos, bueno mi opinión al respecto de este tema, seria hacer campañas para crear conciencia en la sociedad, implementar la *permacultura* para asi no trabajar del ambiente sino con el, respetando nuestros recuerdos naturales y permitiendo que sigan existiendo, eliminar, minimizar o reutilizar todo producto derivado del petroleo,el uso que le dan y crear nuevas medidas y leyes que eviten la contaminación generada por las industrias y que por medio del Estado se inicie un cambio en el pensamiento de la sociedad y un conjunto de leyes que prohíban la contaminación ambiental por medio del uso de los recursos de manera minima y buscando otros medios de energia que no afecten al planeta.  
We need to start campaigns, implement permaculture, eliminate, minimize, and reuse all products that are derived from petrol, regulate industries, and change our culture.

55. ISO 14001.

RESPONSABILIDAD AMBIENTAL OBLIGATORIA.

Participatn should explain: ISO 14001 sets standards for business to follow environmental management system.

56. Ademas de generar conciencia, educación, campañas, entre otros, existen otras maneras de intervenir ante el cambio climático, en mi País Colombia, a pesar de poseer una gran reserva de bio-diversidad, ya enfrenta problemas graves de cambio climático, algunas hipótesis que se tejen como consecuencia a estos problemas con actividades de explotación minera, una actividad que arrasa con gran parte de los recursos naturales como el agua, la explotación de hidrocarburos es otro factor que tal vez ha incidido en cierta, ademas de las grandes industrias y empresas del país. Desde estas entidades se debe hacer una intervención que las responsabilice y aporten al cambio, ademas del resto de entidades que por medio de sus estrategias de marketing como lo mencionaba un compañero anteriormente, inhiban nuestro desmesurado consumo, nosotros podemos ser consumidores responsables en la medida de que los productos que nos ofrezcan tengan una sello amigable con el medio ambiente. Ademas que para el desarrollo de un país sea medido por la conservación del medio ambiente y no por lo que produce, creo que mas que crear conciencia es una re estructuración de políticas económicas a nivel global, que le exijan responsabilidad social y ambiental a las empresas y que el tema de el cambio climático sea tomado mas enserio por todas las personas del mundo, desde los niños que apenas están creciendo, hasta la persona mayor.

UN CONSUMO RESPONSABLE, RESPONSABILIDAD SOCIO-AMBIENTAL EMPRESARIAL Y POLÍTICAS DE CAMBIO ECONÓMICO!  
Gracias.

Colombia has a great biodiversity, but is struggling with effective ways to prevent climate change. The factors that contribute to climate change in Colombia are

mining, which uses a lot of water, the exploitation of hydrocarbon. We need to do analyses of what industries contribute the most to climate change, including companies that contribute to our massive consumption through marketing strategies. We need to hold these companies accountable, and expect to know how our consumption choices contribute to climate change. A good idea would be to introduce labels on products so we can consume products. A country's level of development should also be measured by how little they contribute to climate change. We need environmental responsibility at the global level, especially for corporations, but also for each individual of all ages.

57. Esto del cambio climatico es de todos, pero me preocupa mucho la informacion que cada uno debe manejar; considero que aun no hay conciencia en el papel que jugamos cada uno en la solucion del problema ya que con nuestras acciones del dia a dia contribuimos positiva o negativamente a la situacion actual del cambio climatico y mientras no lo tengamos claro las soluciones se alejan, por ello los invito a hacer el cambio desde ahora para evitar un planeta 4°C mas calido.

All is well but we must really do our part every day while we don't have clear big solutions.

58. Considero que la educacion desde temprana edad y a todos los niveles, es la clave para intervenir de manera sustentable al Cambio Climatico. Si bien son validas todas la afirmaciones anteriores, en mi opinión, la educacion es la via para el conocimiento de nuestra participaci3n en el aumento de los gases de efecto invernadero y sus consecuencias a corto, mediano y largo plazo. Tal y como lo indica Patricia de Jesus, cada uno de nosotros debe internalizar y tomar conciencia de nuestro papel en la solucion o empeoramiento del cambio climatico a travez de nuestras acciones positivas o negativas. Considero que debemos generar una conducta de conservacion del medio ambiente, consumo responsable de recursos, reciclaje, reutilizacion, entre otras acciones que sean ejemplo a imitar en la via de contribuir a la solucion del problema.

We need to educate children at an early in age. Yes, we need to do our own part every day in order to protect the environment (points to previous post), such as be responsible in our consumption, recycle, and reuse.

59. Considero como muchos lo han dicho en este foro, se requiere de diferentes factores que relacionados pueden traer exitosos beneficios. El primero la educaci3n, pero no s3lo a los ni1os es necesario educar en general a toda la poblaci3n para generar una conciencia del cambio que est3 teniendo el planeta y de la responsabilidad de cada uno en dicho cambio. En segundo lugar adem3s del apoyo de la poblaci3n en general, se requiere del apoyo de los gobiernos quienes definen las pol3ticas y reglamentaciones que apoyan y reglamentan de las poblaciones. Finalmente, se requiere del apoyo de los sectores econ3micos e industriales que hasta el momento en muchas ocasiones han omitido el impacto ambiental que generan sus pr3cticas de producci3n. Si se logra una interpretaci3n desde estostres frentes se podr3a llegar a cambios urgentes para nuestra hermosa tierra.

We need to offer environmental education for all ages to cultivate awareness. We need support from government, industries, and the public.

60. Para mantener la temperatura media es que sea posibles la existencias de vidas, es necesario primero estar sensibilizado y multiplicar a mas personas e iniciar

acciones para la reducción de emisiones en el planeta, utilizando energías limpias, utilización racional de químicos, reducción de contaminación actual. es fundamental la cooperación de organizaciones para enfrentar el efecto del cambio climático.

We need to create awareness by spreading the word. We need to use clean energy, cut down on our use of chemicals, reduce contamination, and build cooperation between different organizations.

61. La sostenibilidad de las acciones van más allá de entender el concepto de desarrollo sostenible, el contexto territorial determina qué tipo de sostenibilidad es la que se debe buscar. Específicamente en cambio climático, el reto es incorporar en la planificación del cambio climático elementos como la reducción de la pobreza, crecimiento económico, acceso a servicios de saneamiento básico, y demás metas tradicionales desde los gobiernos en todos los niveles.

Sustainable development plans need to be determined locally and be worked in with goals of poverty reduction, economic growth, and hygiene.

## APPENDIX 3.J

### How We Can Disseminate Information about Climate Change MOOC on Climate Change

1. Estimad@s:

En líneas de discusión anteriores se ha mencionado un número significativo de estudios que proporcionan evidencia del cambio climático en varios países de América Latina y en España, y también se ha hablado de la necesidad de mayores esfuerzos para generar conciencia, diálogo y acción al respecto.

Un gran reto es la transmisión de información científica a la población, de una manera accesible y objetiva, que mueva a la acción.

¿Pueden compartir ideas y experiencias a este respecto?

In many other threads the studies and evidence in support of climate change have been widely discussed. We have also discussed some of the ways of creating awareness through dialogue and action. One of the more difficult questions to answer is how to communicate scientific studies about climate change to the public.

2. Estimada Ana María Majano y miembros del MOOC, saludos desde Lima Perú.  
Cambio climático en América Latina

El cambio climático sin duda afecta con mayor incidencia a las naciones subdesarrolladas o más pobres, en razón de que los países desarrollados tienen mayor capacidad técnica y económica para prever ciertas contingencias climáticas.

Por ello en países como el Perú necesariamente debemos concienciar a la población civil de la realidad y consecuencias que sufriremos de no tomar medidas de mitigación y disminución del cambio climático de manera seria y responsable.

Ello depende mucho del gobierno en generar políticas de Estado a largo plazo para proteger a las comunidades quienes son los primeros en afectarse con el cambio climático ya q disminuye la producción agrícola, ganadera, hídrica, etc.

Developed nations have the best know-how and economic power to prevent the consequences of climate change. We need to make the people more conscious. I think the government is responsible to protect its communities, who are the first to suffer.

3. Buenas noches a tod@s:

He estado leyendo sus aportes, muy bueno e interesantes, me alegra saber que hay mucha gente que ya quiere pasar de la preocupación a la acción. Creo que una de las formas más útiles y provechosas de ayudar a crear conciencia sobre el



problema es incluir el tema en toda acción que hagamos, en la posición que estemos y en el lugar que estemos. Yo trabajo en diversas líneas, por ejemplo en proyectos de riego: aprovechar cada reunión de los comités de agua, donde se reúnen 50 o más gentes, o en las faenas de limpieza de infraestructura de riego donde inclusive hay más, para tratar el tema, a la vuelta de un año resulta que me reuní con seis comités de riego, y que llegué a conversar con aproximadamente 300 personas, las cuales también lo comentaron con sus familias, es realmente gratificante y estimulante para continuar haciéndolo....

Siento que se está creando conciencia, se ve en las alternativas de adaptación que propone la gente del campo una vez que entiende las causas y analiza lo que ha estado pasando con el clima en los últimos años. Igual de importante es trabajar con los gobiernos locales, y es más útil y con respuestas más rápidas.

Hagámoslo!!

**It's not just government, but everyone is responsible to spread the word every time there are reunions of people. We need to start with the local government.**

4. Hola, creo que no es fácil transmitir que cambio climático tiene que ver con las acciones diarias de cada uno de nosotros. creo que la mejor forma es trabajar desde el paraguas de cambio climático, tanto para mitigación como adaptación. Nosotros estamos como municipio realizando con funcionarios y con los vecinos el plan de acción sobre cambio climático municipal, es una buena forma de bajar la información.

**It starts from the bottom up. We are taking initiative for the encouraging mitigation, as well as adaptation strategies. The most effective way is starting to work with the local government.**

5. Buenas noches (desde Perú)

Sin duda las redes sociales son el medio de información inmediata mas influyente al momento, y de seguro lo será mucho más. De manera practica les comento que en mi país [@LibelulaPeru](#) es uno de los difusores mas importantes que puedo citar, me gustaría mucho saber acerca de los difusores en sus países para tener una idea de nuestra Latinoamérica en ese aspecto (creo que una de los sonidos mas dulces en español es latinoamérica).

Gracias.

**We can use the social media for quick dissemination, such as @LibelulaPeru in Peru, which is one of the most important disseminators of information. What kind of dissemination media do you have in your country.**

6. Se puede fortalecer los convenios con los departamentos de turismo para ejecutar proyectos de eco-paseos donde el usuario vivirá en carne propia (simulando) los estragos del cambio climático. Podrá ver y conversar con las personas afectadas, y verse él reflejada en esa persona que sufre por nuestra negligencia y tomar las medidas necesarias por que en un futuro cercano él estará así.

**We can implement eco-tourism and allow tourists to come in contact with those who have suffered the consequences of climate change or to live them directly. Then the tourist can become more reflective of our human negligence and take the necessary measures because in the future, the tourist will be affected in the same way.**



7. Buenas Tardes:

Creo que existen muchas formas de poder crear conciencia y sensibilizar a todo ser humano, sobre el daño que, día a día, estamos haciéndole a nuestro planeta.

Algunas de ideas pueden ser:

- Material de orientación, información y paquetes de capacitación para respaldar campañas de sensibilización y promoción destinadas a proteger la salud de los efectos del cambio climático a nivel nacional y regional.

- Preparar y poner en marcha una campaña mundial de sensibilización y promoción destinada a dar a la salud un lugar prioritario en el programa de mitigación del cambio climático y adaptación al mismo a nivel internacional.

- Difusión en redes sociales, cortometrajes en cines, televisión, radio, en fin, en todos los medios de comunicación.

- Acuerdos de Colaboración con ONG's, Asociaciones ambientales, Gobiernos Internacionales, Nacionales, Estatales y Municipales.

- Implementar, en conjunto con la Secretaría de la Educación, un nuevo plan de enseñanza para los niños y niñas, los y las cuales, sufrirán, cada día más, todas las alteraciones y repercusiones del Cambio Climático.

El mundo tiene que cambiar para poder subsistir. Pero ese enorme cambio no sólo va a traer sacrificios, esfuerzos y males inevitables. Se trata de una transformación radical.

Bonita tarde

**We need to use all types of media, as well as NGOs and international governments, departments of education, global campaigns, and information packets.**

8. Hola a todos:

Creo que es un reto para cada uno de nosotros el transmitir esta información que manejamos. Comparto con Denis y María Isabel la importancia del uso de los medios de comunicación, pues es una forma de llegar a muchas personas con mensajes claros y precisos sobre las acciones que pueden hacer individualmente para evitar el cambio climático.

Pertenezco a una ONG venezolana que se llama [Vitalis](#) desde donde hemos emprendido varias labores que van desde la realización de eventos formales (Simposios, Congresos, Cursos), hasta rallies ecológicos y mantenimiento de áreas verdes donde buscamos transmitir información no solo sobre el cambio climático sino sobre otros temas ambientales. Pueden seguirnos a través de @ONGVitalis.

Se me ocurre que con este boom de los video juegos se podría desarrollar uno donde se muestren las consecuencias del cambio climático y las acciones que llevarían a disminuir sus efectos algo así como el Mario Bros del Clima!!!

**Yes, we need to use the new media. I belong to a NGO and we use climate themed video games.**

9. Sin duda involucrar la tecnología es crucial. Así como el cambio climático nos genera mas problemas por el nivel de incertidumbre que conlleva, también se van generando herramientas muy poderosas como la ciencia de datos masivos (o Big Data) que podrían generar modelos de simulación muy eficaces para la adaptación. De esta nueva ciencia se vale facebook, twitter, google, los bancos, etc. para estudiar a sus usuarios a un nivel no imaginado; claro también se esta

perfilando para aplicar como soluciones frente a la crisis climática:

<http://www.emc.com/big-data/insights.htm>

**Data mining strategies and social media can be useful in generating models of simulation for adaptation. We can use facebook, twitter, gooogole, the banks, etc.**

10. Bueno, principalmente considero que el de compartir la información acerca de las implicaciones del cambio climático y de que por qué debemos evitar un planeta 4°C más cálido, debe ser uno de nuestros principales objetivos, ya que seria en vano tener la información y el conocimiento pero no replicarla, ya que gracias a que podamos difundirla es mucho mas eficaz realizar acciones de mitigación frente al problema.

una de las formas en la que se puede realizar son por medio de campañas de educación ambiental, talleres, concursos, debates, teatro, promover políticas y estrategias en nuestra comunidad, crear organizaciones que puedan presentar proyectos de mitigación a las autoridades ambientales, entre otras. pero se debe llevar de manera eficaz el mensaje, ya que no solo servirá decir las implicaciones ambientales, sino realmente hacer énfasis en que de las decisiones y medidas que se tomen hoy dependerá la conservación del medio y por ende la calidad de vida en todo el sentido de la palabra.

**We need to use education campaigns, workshops, debates, theatre, and push for political action in our communities as a form organization. We need to put an emphasis on the consequences.**

11. Las nuevas tecnologías de la información y comunicación son canales fundamentales para difundir información de contenido educativo específicamente en asuntos relacionados con la problemática ambiental a través de las redes sociales.

No olvidemos la responsabilidad social que tienen estos medios para contribuir al fortalecimiento de los conocimientos, desde la modalidad de la educación no formar; en este sentido los medios de comunicación en todas sus modalidades, impresos, digital, audiovisual están en la obligación de incorporar en sus programaciones temas ambientales de manera de contribuir con la construcción de una ciudadanía ambiental capaz de conocer y comprender la complejidad de las situaciones ambientales a nivel global y local, principalmente información relacionada con el cambio climático

**The new media are main channels of distributions of information and educate the public about climate change. We need to use all media of communication (digital, audio-visual), which have an obligation to show programs about the environment in order to construct a culture that is more environmentally conscious and able to comprehend the complex situations at a global and local levels.**

12. Saludo desde Colombia. Hemos utilizado multiples metodologias de facilitacion dirigido a tomadores de decisión, y a técnicos de las autoridades ambientales. Los retos mayores han estado en vincular a los sectores productivos. Así mismo, alianzas con medios de comunicación nacionales y locales (incluso tradicionales), permiten una buena difusión. Desafortunadamente, el impacto es mayor en medio de tragedias, estamos avanzando en la procción de buenas iniciativas. Pe.jm Alclima en facebook

**We need to work with the industries and use all media of communication.**

13. Buenas tardes,

Definitivamente la Difusión es la principal herramienta para dar a conocer tan importante tema como el Cambio Climático. Desafortunadamente, hemos visto aparecer y desaparecer diversas campañas publicitarias.

A mi parecer, el tema del cambio climático suele causar preocupación a la población. Y como tantos temas inquietantes, pareciera más cómodo voltear para otro lado y evadir la preocupación.

Por lo anterior, considero que la principal herramienta para hacer frente al cambio climático y tan peligrosos pronósticos, debe ser, ante todo la educación. Los jóvenes son más conscientes de lo que fuimos nosotros, y probablemente las futuras generaciones lo serán también. Más, aún, de continuar los patrones climáticos como hasta ahora, ya no será una posibilidad, sino una cuestión de supervivencia.

Yes, the distribution of information is crucial. Unfortunately, we have seen a number of media campaigns come and go with out impact. It seems the climate change does worry people but instead of facing the problem, they avoid it. We need to use education strategies for the youth, who are more conscious than we were. In the future, our current habits won't be possible anymore, and we will face questions of survival.

14. Indudablemente que debemos trabajar para sensibilizar a los medios de comunicacion social y a los forjadores de opinion para elevar el perfil informatvo de este tema tan importante y que nos afecta a todos y al que todos debemos y podemos contribuir. Para ello hay que llevarle el tema para ganarlos y sean capaces de transmitir a otros información clave y precisa y contribuyan hacer llegar la informacion por los disti tos medios

Certainly, we need to use the social media to form opinions to elevate our levels of education about that which affects us all. We must all contribute. We need to bring them the information, win them, and make them capable to transmit the information further through different types of media.

15. Saludos a todos

Una de las fuentes de información mas baratas son el radio, en México considero que no hay muchos municipios sin radio, programas sencillos con ese sentido deberíamos de aprovechar, las universidades en su mayoría tienen radio y en ocasiones están subutilizadas, por internet las organizaciones mandar boletines que pueda contribuir a esto donde los involucrados sean institutos como CONACYT entre otros para que sea divulgación no investigación, que las universidades locales generen programas de divulgación con los académicos existentes y que sean obligatorios en ese aspecto, en cada municipio en México existe consejos de educación que funcionen y desarrollen estos trabajos desde educación básica, mediante correo electrónico a todos los alumnos enviar desde preparatoria mandarles boletines y concretizar, realizar talleres desde lo local y trabajar con municipios para impacto preferente

Abrazos

Martin Gerardo

We can use the radio, suc as university stations, because the radio is cheap. There are hardly any regions in Mexico without radio stations. We can start with simple

- programs. The universities need to support these initiatives, such as academics, with educational advice. We need to have educational workshops, starting in elementary school, using email, work with local governments, etc.
16. Considero importante que se hable con la población ejemplificando con problemáticas locales, cuando se habla de cambio climático mucha gente se va con la idea de que las grandes industrias son las que contaminan, cuando en realidad el transporte (CO2) y el agua residual (CH4) son de los principales generadores de emisiones  
(<http://www.aire.df.gob.mx/default.php?opc=%27ZKBhnmWkZA==%27>). La gente necesita dejar de sentirlo ajeno, si no, no habrá un verdadero compromiso. We need to use concrete, locally relevant examples. Too many people think the problem is far away and doesn't concern them, and that only the big industries are to blame, when in reality transportation and water use are the main culprits.
17. Muy de acuerdo con Martín Gerardo de México, usemos la radio con spots cortos pero impactantes, aquí los comunicadores nos pueden ayudar muchísimo.  
Cordiales saludos  
Abel Rodríguez desde Huaraz, Perú  
I totally agree with Martin Gerardo from Mexico. We shall use the radio with short but impactful clips.
18. Creo que la forma para que la gente se conciencie sobre el cambio climático consiste en enfocarlo de una forma positiva, a un porcentaje elevado de personas no les importa el cambio climático, o no cree que e vaya a afectar, yo creo que debemos "vender" los efectos positivos que cuidar el medio ambiente" tiene para las personas, mucha gente ignora los mensaje negativos o catastróficas, deben sentirse parte de un movimiento con el que se identifiquen, y que sepan que su calidad de vida va a mejorar, no necesariamente por tener menos cosas, o no utilizar el coche su vida va a ser peor, creo que es importante hacerlo así, y mejorar la comunicación, llegar a las personas.  
We need to use positive messages so that people have a better sense of efficacy.
19. Concuerdo contigo Rocío. Hay un documento que leí en la web que se llama "[Más allá de la ecofobia. Poniendo el corazón en la educación natural](#)" el cual intenta explicar que hemos hecho que las personas, sobre todo los niños, sientan aversión por los temas ambientales pues siempre hemos mostrado su "lado oscuro", les mostramos los problemas, los daños que hemos causado, las horribles consecuencias. Es interesante leerlo y tratar de aplicarlo con los temas que estamos manejando en este curso para ver como hacemos para que las personas se sensibilicen sin alejarse o hacerse de los oídos sordos.  
Saludos desde Venezuela.  
Yes, we need positive messages. I have experience teaching children who are tired of hearing about climate change.
20. Excelente Aportación Cecilia, si me parece que debemos hacer muchos más esfuerzos en la comunicación positiva ambiental, hay una realidad y es que ta cual o estamos haciendo ahora no está terminando de funcionar. Voy a ponerme a leer el documento me interesa mucho.  
What we're doing today isn't working, so yes, we need a more positive approach.

21. Respecto a como compartir información, en Bolivia existen pocas experiencias visibles, entre las mas destacadas estan claro las que se comparte en las páginas web de grupos de activismo por el medio ambiente, respecto a paginas oficiales, la información no es actualizada, también se tiene como experiencia los medios impresos aunque en menor medida.  
**We need to use both social and print media.**
22. Fortalecer politicas que divulguen toda la información y empezar como ciudadanos también en nuestras tertulias con amigos dar a conocer el problema climatico que tenemos  
**We need politics of transparency that divulge all information to citizens, who disseminate the information through word of mouth.**
23. creo que la mejor forma es mostrar las cifras cientificas acompañadas con testimonios de los efectos causados por los cambios en el clima, esto mediante campañas divulgativas obligatorias para cada poblacion, valiendose del apoyo gubernamental en cada pais.  
**I think the best strategy is just to show the statistics in combination with testimonials, along with campaigns with the help of the government of each nation.**
24. Al igual que otras opiniones anteriores, considero que sería una buena opción campañas usando los medios masivos de comunicación como también a través de talleres a las comunidades locales.  
**As others have said, we need to use the mass media and also spread the word through local workshops.**
25. Buenos días para todos y todas.  
Somos conscientes de la importancia de transmitir la información científica a la población, para lograr evidenciar un cambio real en nuestro aporte, como seres humanos, al cambio climático. Estoy de acuerdo con los comentarios anteriores en que se debe aprovechar los medios de comunicación, se debe fortalecer la educación y en que se deben llevar a cabo talleres, concursos, videojuegos, paseos turísticos, etc, todos estos elementos sin duda favorecen la trasmisión de este conocimiento. Adicional considero que sería muy valioso si está información científica se traduce a un lenguaje coloquial, común y sencillo para la comprensión de la gente común y se publicará en periódicos, en la radio, en la televisión, etc.  
**We should use the media, education strategies, workshops, competitions, videogames, tourist excursions, etc. We need to communicate everything in lay terms.**
26. A fines del año pasado Lima fue sede de la COP 20, fue una oportunidad para difundir y conocer muchas experiencias que se están desarrollando en el país relacionadas con los efectos del cambio climático. PACCPERU que trabaja cambio climático en los Andes recuperando saberes locales ([www.paccperu.or.pe](http://www.paccperu.or.pe)), las prácticas adaptativas al cambio climatico en Ayacucho tienen varias publicaciones con PRATEC y Tierra de Hombres; la asociación Bartolomé Aripaylla en Ayacucho ([www.abaayacucho.org.pe](http://www.abaayacucho.org.pe))  
Una interesante experiencia es la de AIDSESEP-ORAU , organización de pueblos indígenas que en esa oportunidad presentó el informe de impacto ambiental y sus

propuestas para mejorar los procesos de consulta previa y las demandas de los pueblos indígenas.

**We need to use local, indigenous knowledge, such as PaccPeru or Aidesep-Orau.**

27. Buenos días a todos, en mi caso Guatemala, trabajamos con comunidades en extrema pobreza, tenemos compañeros originarios de los lugares para poder llevar el mensaje de resiliencia y efectos del cambio climático en su idioma local, a parte de esto, se fortalece la organización comunitaria, se organizan las Coordinadoras Locales de Reducción de Desastres (COLRED) y Equipos Comunitarios de Respuesta ante Desastres (ECORED) en las comunidades de cobertura, capacitando sobre técnicas de rescate, primeros auxilios y temas sobre efectos del calentamiento global. Entre otros programas que buscan fortalecer la autogestión comunitaria a través de un enfoque integrado de cuencas resilientes al cambio climático. Vivamos Mejor Guatemala tiene 25 años de trabajo con las comunidades más pobres del departamento de Sololá. [www.vivamosmejor.org.gt](http://www.vivamosmejor.org.gt)  
**We are working with poor, local communities in Guatemala and their community leaders to disseminate relevant information in their native languages. We are supporting community organizations, supporting the local disaster management coordinators, first aid teams, etc. We support local autonomy through an integrated focus of sources of resilience for climate change. The project Vivamos Mejor Guatemala is 25 years old and works with the poorest communities of the Department of Solola.**

28. Transmitir información científica respecto al cambio climático para generar mayor consciencia y empoderar a la gente es tema de **ingenio y voluntad**. Ya se han mencionado varias ideas muy buenas en este línea de charla, como por ejemplo el **uso de la radio**, el **internet** y la **educación ambiental**; ideas que se pueden complementar con otras más, articulándolas en una **estrategia** con fines más ambiciosos y amplios. Los elementos visuales como los **videos** y las **fotografías**, insertadas en una estrategia de difusión por medio de la educación ambiental y el internet puede resultar. Por último, en este curso nos invitaron desde un comienzo a usar el **#cambioclimático** en twitter, me parece que entre todos podemos generar un **trending topic** si lo trabajáramos en conjunto. ¿alguien se anima a trabajarlo conmigo?

**Many of you have identified great ways of disseminating information, such as the radio, the internet, environmental education. It's a question of ingenuity and will. We need visual elements, such as videos and photography. That along with a diffusion strategy with the right kind of media, could work out. We should use #cambioclimatico on twitter, which this course has pointed to. We can generate a "trending topic" if we work together. Anyone wants to work with me?**



## APPENDIX 4.A

### Repetition of Personal Observations Attributed to Climate Change

*The two most frequently observed symptoms of climate change are droughts (marked in yellow) and floods (marked in blue). Highlighted are only claims that are made from personal observation, not general repetitions. The data is taken from a 68-post long thread that received 333 views. Note: The claims are not direct translations of the posts but merely summarize the central statements in English.*

1. Starting question: This week we have learned about studies that predict an increase in extreme weather, such as scarcity and floods of water. What economic effects will this have on your country?
2. Droughts and floods will cause problems with farming.
3. Droughts and floods interfere with farming (examples from Ghana and the United States)
4. Wants to exchange ideas about climate change and efficient use of hydraulic resources and the recovering of river basins and soil
5. Water shortage has been a huge problem in my country and it affects homes, work, hospital clinics, colleges, commercial centers; the government reacts with unplanned solutions, which generates an informal market for water with very high prices
6. We used to see many different species here in the waters, and they have all disappeared
7. Floodings in Nicaragua affected 90 communities, and 2,521 homes (goes on about effects), the amount of water comes up to one month of precipitation in a regular winter day, and the weather instabilities and cause a loss of produce
8. In Colombia we are facing the problem of disorganization and the topographic complexity, and we need a better administration of our water supply
9. Thank you for the excellent data.
10. Describes water shortage, droughts, and forest fires in Dominican Republic, describes the drying of harvest; inundations in Dominican Republic
11. Water is central to agriculture, which is Nicaragua's main source of income
12. We are living the consequences of water shortage and it affects our agriculture.
13. We are protesting in El Salvador not just due to low productivity but bad harvest and due to deforestation that leaves areas without capacity for absorbing rain
14. Water shortage has an economic impact, which jumps up food prices, and this will primarily affect the poor, who make up 60 percent of the global population, but also the countries who depend on food imports
15. The Dominican Republic has been affected by extreme water shortage since 2013
16. In Brazil, we also have problems with water access
17. Looks for a working partner for MOOC homework

18. Problem of droughts and floodings also in Mexico, especially in the North, where droughts have produced the discontinuation of certain branches of agriculture and produced huge economic loss; also floodings have devastated communities in South Mexico with huge economic losses, death, and diseases due to poor water quality
19. We can really feel the tropical storms along the Mexican coast
20. Water shortage and reduced water quality in Honduras more than ever; must wait for rains, which are more uncertain and erratic now, affecting farming
21. Drought in Guatemala due to deforestation and poor farming practices, such as the use of fertilizers
22. Rain produces floods and they deteriorate the environment.
23. Nicaragua has lost most of its water sources in the last years and experienced floodings
24. Mexico has a problem of water shortage with economic consequences
25. Water shortage and floods in Nicaragua, describes why Managua is especially vulnerable, and has been destroyed by a huge hurricane
26. We live in a caste system in Nicaragua, and the First Lady drinks bottled water from France
27. Floods and droughts in Guatemala, uncontrolled population increase, pressure over natural resources, change in soil, shortage on governmental programs, and affects those who are already the most vulnerable
28. Looking for homework partner
29. Loss of subsistence farming, malnutrition, diseases, and economic loss in Guatemala, and traffic due to inundations
30. Irregular seasons cause farming problems in El Salvador, and posts a table that shows the economic losses due to hurricanes, droughts, and earthquakes
31. Hurricane Stan in Chiapas, Mexico, left its traces with the people; material damage, cost of repair, deteriorating public service, hydraulic works to contain rivers to protect the communities, but no substantial solution like reforestation
32. Thanks previous participant for post. Confirms that the focus on river basins will be most effective.
33. Heavy rains are causing inundations and problems with farming and droughts in Bolivia
34. Floods destroy farmlands, communities, and forest areas, and there is a loss of water sources due to sedimentation of soil into water, and soil is lost due to deforestation
35. We need to protect the soil from flooding though natural materials
36. Looks for homework partner
37. I will be your partner
38. The coastal cities will be most affected by rising sea levels. The regions most vulnerable to floods are Mozambique, Madagascar, Mexico, Venezuela, India, Bangladesh, Indonesia, the Philippines, and Vietnam
39. Mexico is vulnerable to floods because it has an inadequate drainage system
40. Guatemala has been affected by climate change, which has slowed its harvest
41. Lists all the different hurricanes that have afflicted the people of Guatemala



42. We must confront the threat of climate change by striving toward more balance and consciousness and stop destroying nature (*in Portuguese*)
43. I understand you but you can use Google Translate (*in Spanish and Portuguese*)
44. Thanks, friend!
45. Describes water shortage in Jalapa, Mexico, and the increasing competition with neighboring towns (i.e. in Puebla) about river water
46. In Bolivia, we have drought in the heights and floods in the low country (lots of description)
47. Droughts and floods leave my country without harvest, affecting the diets of the population, children are suffering from hunger in situations of poverty
48. We need to rationalize electricity and water because they're essential to life. My country, Mexico, does not promote alternative energy sources. Our governments are populist and paternal, so we cannot wait for them to come out with the grand solution and must take matters into our own hands.
49. Droughts and bush fires in Chile are really affecting the agriculture and economy of the country, heavy rains in rural areas
50. Not enough water leads to droughts, agricultural problems, water shortage, plagues, and disease; too much water causes floods, erosion, death, and property damage
51. In Honduras, both the floods and droughts have economic impacts and affect health and human migration
52. The melting of the glaciers in Ecuador are causing inundations in urban areas, and mudslides that have blocked roads; fish are emigrating due to the warming of the waters, we are experiencing drought in Loja, Ecuador
53. The solution is to only use land for agriculture up to a certain altitude
54. It is difficult to enforce that
55. The owners of land in Latin America should be the indigenous people. They have always lived in harmony with nature.
56. The Amazonian rivers are at stake to change their water quality in the face of climate change.
57. Yes, we have rich sources of water in Peru, but they are contaminated, and we have the problem of solid waste, and our government is indifferent. The problem is that we don't have the economic or technological potential to do anything.
58. Water question is central to all development. Floods and migration have always taken place, but we need to look at economic exploitation as the problem. We all have in common the disappearance of species, of mining and agriculture.
59. Echoes the worry about water shortage within his community. We have done a lot of analysis of water supply, rain patterns, and the sewage system, but the implementation of sustainable methods is expensive. Expresses appreciation for Victor Hugo Jovel and Costa Rican representatives at the Kyoto meeting in 2003.
60. Works for a water distribution administration in Mexico and finds that the water is maldistributed and that the pipes have holes and a lot of water is wasted. Congratulates previous poster for doing these evaluations in their towns. While we don't have political organizing that puts pressure upon the government, and a culture of protection and preservation of the river basins, there will be no administration water.

61. Gives account of the water needs in different areas of Mexico, where it is overall very high, especially in the North. We have not been able to reduce poverty, worry about the future, especially the poverty on the outskirts of the cities; agriculture and hunger. Observes the proliferation of vector-spread diseases. Mexico isn't doing enough to prevent climate change. Describes a terrible future.
62. Water shortage will restrict human activity, which will lead to a decline in population. Agriculture will be affected due to less precipitation
63. Water shortage and severe restrictions
64. Call to action: no more talking more acting!
65. Create wetlands that you can use during dry times and you prevent inundations.
66. Posts three pictures of wetlands.
67. Describes severe consequences of extreme drought in Chile's Region IV that has gotten worse in the last years, but no politics to intervene. They are trying artificial rain but no clouds. They are also trying water wheels, new wells, trickle irrigation, and revert channels.
68. Yes, drought in Chile. Mining and industrial activities are polluting the environment because they use up 30% of the water resources without return to the cycle. Describes the drying of the rivers. Agricultural communities and indigenous communities are suffering. We've got to put a stop to industries aggressive toward the environment.

## APPENDIX 4.B

### **Repetition of Accusations**

*This thread shows the different attributions of blame and responsibility to national governments in Latin America (yellow), economic interests (green), international organizations (purple), and humanity in general (light blue). While governmental responsibility seems to dominate in this thread, all three attributions of blame are repeated throughout the thread. Claims to the need to spread awareness (grey), and the need to start a grassroots movement (blue) are also repeated are also highlighted. The data are taken from a 30-post long thread that received 139 views. Note: The claims are not direct translations of the posts but merely summarize the central statements in English.*

1. Starting question: Even if we did do everything to prevent a 4-degree Celsius warmer world, we can't do anything to prevent a 2-degree Celsius warmer world. What is your community doing? What are you doing to prepare for it?
2. The Venezuelan government isn't doing anything: more petroleum extraction, more illegal mining in the Amazonian, no regulations, and the government closed their environmental department
3. It is the government's responsibility. In Ecuador we have the Ministry of the Environment for prevention and mitigation of climate change.
4. Advertisement to join Facebook group on climate change.
5. Nations need to take measures that respond to their specific territories. Information and education is key because knowledge will lead to adaptation. A cultural change is necessary.
6. We need to make sure that the measures we take today will benefit the next generation, and we need a public that is critical to pressure political "castes" into adopting measures of mitigation and adaptation. Expresses hopefulness for the Paris Summit on Climate Change 2015.
7. Advertisement to join Facebook group on climate change.
8. Economically developed nations did not want to firm a contract to reduce their CO2 emissions in Copenhagen
9. Peruvian government is far from meeting goals of reducing CO2 emissions
10. The Peruvian state is getting around the law to cater to the economic sectors. I am working on research that needs to reach the people so that there's no doubt about the phenomenon of climate change. We need to spread information! ("massive dissemination")
11. Advertisement to join Facebook group on climate change.
12. A lot of people attribute the changes not to humans but to natural climate fluctuations

13. CO2 emissions are irreversible and unless we come up with a technology that sucks up the CO2 in our atmosphere 15-40% of it will persist there for about 1,000 years. We have social movements in my community that are working toward a change of how we live with nature, a change in paradigm, sustainable development of the villages, and governmental responsibility  
Advertisement for joining Facebook group on climate change
14. Yes, the Venezuelan government makes great laws but never follows the law (problem of corruption). I am involved in planting trees, I turns on air condition only at nights, I walk but it's too dangerous to walk to places, there is no public transportation, and the government is using each green strip of land to build roads and buildings. (sadness, helpless)
15. There is agricultural research in Venezuela to recuperate the resilience of the farmers, such as seeds with resilience during climate change. Farmers have a much more direct relationship with environment, which we have lost in the cities, we need to listen to them, not the large monocrop industry.
16. Invites Federico to join an online group to share knowledge and unite in the struggle against climate change
17. We need to join opinions across citizens to pressure national authorities for change. We need to pass from the critical to the solution stage; the conversation shouldn't only be among scientists, now even the Pope has addressed the problem of climate change and the G7 are also making big promises of greenhouse gas reductions. Now we are all concerned with taking practical steps. Consumer citizens, we must pressure authorities in each country to promote the manufacturing of electric cars, pressure energy corporations to establish the infrastructure for these cars
18. We're not doing enough at the level of mitigation or adaptation. A survey by Danish organization showed that 79.52% of people in the world are worried about climate change, but participant argues they don't know how to combat it because the media are not doing a good job in disseminating profound explanation about the phenomenon (problem of knowing about it but not knowing what to do about it)
19. Asks for source to view the survey
20. Provides source
21. Thanks her, interesting
22. Takes issue with looking at it as a global problem because global demands will be stopped by the industries. This must be a struggle from below, a grassroots movement.
23. The public cannot be prepared because they don't know enough and think it's a natural phenomenon. We need to start small and disseminate information that we're learning in this course, to teach people about how their way of life directly impacts global warming, and how the interactions among industry and government contribute to it, divulge the causes, remedy the consequences. Individual helplessness (my small actions don't matter) is demotivating. The linkage between industry and government are causing more and more damage.
24. Our civil society is overwhelmed with this one; our world is run by economic interests (example of Republicans in the United States bashing the Pope as a

communist). We cannot look at this as a scientific problem otherwise we'll do nothing.

25. We are already feeling the impacts of climate change. What can I do, how can I change my way of thinking about my model of consumption, we need a new model!
26. The heat is unbearable in Tegucigalpa. This is very different from two decades ago. Viscious cycle: we need more energy in this heat.
27. What are we doing to resist climate change? What can we do in our everyday lives? In Honduras, many fish in the Pacific are dying. We need an integrated program of action with international compromise, especially from highly industrialized countries.
28. Sense of urgency, in capital letters. We already have enough information, and even if we could understand more details, these doubts are not an excuse for not acting immediately. There are things each of us can do at home and work.
29. Individual actions at home and at work. My country Peru is contributing to the Copenhagen agreement to reduce deforestation to zero by 2021, especially in protection of indigenous tribes. My community doesn't seem sensitized to climate change. Media are not doing their part to promote sensitization and awareness. The people have the absolute right to demand that their governments act, the majority knows that climate is changing and we must prevent a 4 degree climate increase.
30. Two big steps are to recognize our carbon footprint and the second is to act and socialize, education is key for empowerment. The state needs to act now to reach deforestation goal by 2021 and private companies need to start private initiatives.

## Appendix 4.C

### Mimesis of Solution Proposals that Advocate Action from Below

*The solution proposals to make environmentally sound choices and to implement education programs about climate change were responding to the observation that climate change is the burden of every human being and repeated throughout six different discussion threads, respectively. The two threads listed below showcase how repetition of these two statements is subject to mimesis: As one participant starts making a statement, other participants are prone to repeat it. Note: The claims are not direct translations of the posts but merely summarize the central statements in English. The data are taken from a 45-post long thread that received 156 views and a 25-post long thread that received 96 views.*

1. We are not doing enough to resist climate change from our homes, such as recycle, change our consumer habits, and lower our interest in technology.
2. Hi tech has been wasted on space exploration rather than take care of our planet and us as people.
3. At an individual level we cannot accomplish much since developed nations have consumerism as their way of life.
4. Political and economic leaders have the power to induce change at a larger scale.
5. The developed nations have the knowledge to prevent the worse and they know that climate change is happening, yet they don't sign treaties to diminish environmental problems. A few do the harm, and we're all paying the consequences.
6. Advertisement for facebook group on climate change
7. Yes the economic power nations have the most responsibility and we hold them accountable. This is not going to change, so we need to take individual action.
8. So what can a community in Mozambique do? When the community speaks out against it, they are annihilated
9. The same is happening in Colombia: paramilitary groups take away the farmers' land to sell it to big corporations. Non-violent approach might help, and compassion.
10. Shows dissatisfaction with response by Gustavo, despair, stressed out. Is there really no remedy?
11. The big power are only interested in becoming bigger, they are unscrupulous
12. Points to an environmental catastrophe (drought) in Colombia with social, economic, and sanitary consequence, and nobody takes responsibility and there's indifference among the corporations
13. Advertisement to join facebook group on climate change
14. It is difficult to abandon our consumerist lifestyles. Another problem is that climate change is a complex phenomenon that is difficult to explain to lay people.

- Yes, the powerful nations are to be blamed. Each of us is also accountable, that's why we must wake up and change our consumer lifestyles instead of only blaming the powerful nations and big corporations. Change starts at home.
15. It is so difficult to change those lifestyles; hypothetical example of a person that takes car to get cigarettes at a supermarket 5 min from the house will not abandon lifestyle.
  16. Yes, nobody wants to give up on their luxuries. We are not aware. Sadness.
  17. We love our consumer lifestyles and are unconcerned about the consequences so we keep wasting every day.
  18. I'm for a more radical public policy, but this seems to never happen.
  19. Developed nations pollute the most. We love our consumer lifestyles and think they're progressive. Despair: nobody cares enough, nobody is sufficiently aware. Each of us is responsible individually.
  20. We are not aware, and we are selfish (individualist culture), we don't care about the community. Each of us can make a small difference.
  21. It is a mix of indifference and ignorance.
  22. We only fear that which poses an imminent danger, not long-term.
  23. Lack of knowledge is the first thing we need to overcome (education)
  24. Advertisement to join Facebook group on climate change
  25. We cannot do nothing. There's a response for everything.
  26. We need to cultivate consciousness among the youth and stop creating little consumers by showering them with presents
  27. Half of the globe is already aware, especially in developed countries. Difficult to explain climate change, problems of communication.
  28. Advertisement to join Facebook group on climate change
  29. Yes, the indifference of people is concerning. We pay more attention to social trends than our environment. We need to start in our homes.
  30. The pope is giving a statement about the environment and already the power elite is questioning it because it interferes with their exploitative interests
  31. Question about the course
  32. Concern with indifference. We are not doing enough, we need to be more responsible about our daily emissions
  33. Advertisement to join Facebook group on climate change
  34. Indifference has to do with lack of education/access to information. People are more interested in their immediate needs
  35. The problem is not just cognitive (lack of information) but affective in terms of what desires/needs motivate action. Through affective desires we can promote human relations and care for our planet
  36. Indifference due to lack of awareness. We won't act until we have the problem present before our eyes. Expresses appreciation of this MOOC
  37. Information and education can make a big difference. It is useless as long as the large contributors to climate change don't make changes. In Colombia, too many cars that run on fossil fuel.
  38. Affect (hope): Scientists have developed a model that shows that the Montreal Protocol has prevented that the ozone holes become larger

39. We are petrol addicts. We don't want to recognize that we are responsible (we are the solution)
40. We are too quick to attribute responsibility to the people (even if ignorant) because the main responsables are the power elite (hierarchy) that are building more and more urban space in Managua, Nicaragua (presence), describes flooding of channel due to heavy rains
41. we need to spread consciousness from a child's age on through education and for adults through the media of communication. We are not concerned because we don't have the problem present before our eyes, so the information is not reaching us
42. It is the work of an ant but we cannot faint in this crusade. We need to do something and stay strong
43. The array of catastrophes, the cries for help are an opportunity for change since we have the problem present before our eyes (Honduras he says is the most affected by climate change). We need to continue to learn.
44. We are indifferent because we don't think it affects us and because we are distracted with trivial problems. We are not aware that we are the problem. We are not aware that we are the solution.



## APPENDIX 4.D

### Repeating the Motivation to Act

*This thread from the final week of the MOOC illustrates the strong motivation of the participants to become active in their communities (grey) or at the global level (yellow) through social/digital media, such as Facebook groups, online communities, etc. This thread also shows the intense appreciation that participants felt to the community and the World Bank for putting this MOOC together (green). Some participants wanted to become active by disseminating their final project, which were Youtube videos on climate change (red).. Others acted by petitioning the World Bank for financial support for sustainability projects in their region (blue).*

*Note: The claims are not direct translations of the posts but merely summarize the central statements in English. The data are taken from a 67-post long thread that received 213 views.*

1. What actions are you taking at the end of this course?
2. Founded an activist group in Acapulco, Mexico, and describes some of their actions, as a consequence of a lecture on climate change that he organized for a private university there. Calls on all to join activist groups for Latin America. Leaves contact info. Expresses affection for participants.
3. Congratulates Pedro and likes the idea of a LA association. Leaves contact information, from Honduras. Shows his own credentials in the area of bioenergy, willing to respond to questions.
4. Response by second poster: we'll see how things turn out
5. Posts final work on discussion post, summary and link. Activism through final project. Hopes to trigger comments.
6. Your final program is interesting.
7. Introduces the mission of the facebook group (to push new information, paradigms, education to solve the environmental crisis, increase interest in science and its application, put together young and old, make aware of ecology, conservation, etc.); vision is to form an NGO and started blog for this purpose
8. I'm a specialist in energy and bioenergy
9. gratitude for course and its benefits, thanks the World Bank and instructors. Wants to stay in touch – leaves email
10. thankfulness to World Bank and organizers and participants. Instilled a critical consciousness in him. Replicate information in forums, local reunions, lead conferences, create consciousness
11. In order to take up measures to prevent CC in specific zones we need the financial support that the World Bank Group could possibly consider financing
12. Do you want to join the group I am creating?

13. Wants to share final project with others
14. Thanks instructor Ana Maria, thankful for course. Worry, we need to act swiftly. Got his degree in bioenergy and wants to learn more about CC. Wants to form or join a group at the LA level
15. Shares final project with summary about the vision for a biogas project in Honduras
16. Enriching course. We need to work toward a less warmer world.
17. Great to take this course. We must start in our homes/communities/universities
18. This commitment is a calling (post). Join our Facebook group from El Salvador
19. Invites him to join community. Leaves contact info.
20. Yes, here's my contacts
21. I will send you an invitation soon
22. I'm using the information from this course to share with community
23. Thankful for course. Facebook group is great, great idea to start an NG. Her hopes to spread information with community, she wants to start an initiative to collect solid waste. Leaves contact info.
24. link about adaptation strategies (her final project??)
25. Lists things to do in order to prevent as well as to adapt to climate change, all of them are policies. Leaves contact info
26. Invites Yhonattan to his community
27. Turns to Ana Maria to ask if they have access to the listserv to create a community and together save the planet
28. due to privacy laws it is impossible but there are many communities that have sprung from this course
29. Thanks all participants and the MOOC. She want to share information with her colleagues, assembling information from the MOOC, starting to prepare a presentation. Leaves her contact information
30. Thanks course and participants. Change at the institutional level and adapted to each region, especially farming practices (doesn't explain whayt changes and practices)
31. invites her to his community
32. thanks the MOOC organizers and participants. Wants to use information from MOOC to disseminate to communities. Explains what information served him
33. Thanksfulness to instructors and peers. There's a contradictions in government (what they say and what they do). We must unite and inform. The poorest are usually affected the most and the ones with the least CO2 emission
34. Thankfulness to course. We need to start activist groups. She wants to share information with colleagues and students, and we need to make this part of the education curriculum in Mexico, and we need to participate in the legislative debates.
35. invitation to Maria to join his virtual community
36. We need to pressure our governments to push for a binding contract in Paris; we need to become active for the Paris COP because we have the right to save our live planet
37. invitation to join his community
38. Leaves her contact info

39. where are you from, what's your profession
40. making a list of the information gained from this course to share with community
41. Affect: poetic and passionate ("our precious planet"); lots of big, vague statements (the "changes necessary", the "solutions learned", for "the development of society"), expresses appreciation for this community, it is urgent
42. invitation to his community
43. Leaves contact info
44. will send you invitation shortly, assembling course material to share with all
45. Response (original Q): used final work as a distribution at work. I joined facebook to stay in touch an exchange perspectives. Appreciation for course and instructor Ana Maria
46. thankfulness for course, he's learned a lot and it is time to act
47. the solutions my peers have already expressed seem reasonable and doable
48. thankfulness for course. loves the conference (live from the organizers of the MOOC) I will conduct actions with neighbors and kids, and more profound explorations with my students at the university in Disaster Response in Venezuela; thinking about replicating this course in a more simple way
49. thanks MOOC organizers, thanks peers, likes the NGO idea
50. promises to take every opportunity for action that she can by word of mouth
51. Repetition: invites her to community
52. Leaves contact info
53. will send you invitation shortly, assembling course material to share with all
54. Thankfulness about course, has already worked on a civic association to education communities on climate change and is now using this information from this course, is more interested in starting locally and would like more information about Mexico, specifically
55. wants to form a NGO, we need to start at universities
56. Thankfulness for course (World Bank, instructors, participants), works with regulators and administrators of global corporations regarding environmental questions, especially concerned with the barren plains in Colombia, where she's from, in combination with the droughts, the socio-economic situation, wants to form community activist groups, feels especially responsible toward this region, join online communities that have been founded upon this group (Campeones Climaticos Colombia, Grupo Multicultural y Cambia Climatico Latinamericano (LATAM) to exchange information and collaborate
57. With your organization of online communities you're forgetting the importance of individual action that starts from the moment you get up, very poetic and sentimental (we must love our planet and leave a better world behind for our children, feel compassion for other species and other human beings)
58. Thanks instricutors, to protect water sources in my country and therefore use my final project. It is more important to act than to receive a certificate: I had no internet where I was so I could not send in my final project.
59. Instructor: thanks participants for their comments and invites them to post comments on the final works of their peers as well as describe their own final projects
60. thanks instructor and MOOC

61. posts her final project, describes it
62. thankful for the knowledge, wants to use knowledge for the tasks she has at the National Meteorological Institution and in various campaigns for spreading awareness
63. Thanks for the opportunity to take this course. Wants to know if we can keep this discussion forum open for maintaining the community. List of all the groups that have been created in consequence of this MOOC. Shares a link to her Ecotourism company. Shares copy of the initiatives realized in Medellin, on climate change within the interests of disadvantaged groups (women, LGBTI community, green movements)
64. Writes out a three-page proposal for the World Bank to subsidize certain initiatives in Medellin for the protection of the environment (i.e. deforestation) and for the benefits of the community (especially women)
65. Scans in her signature to the proposal as a post
66. Thanks MOOC participants and instructors. To seek out more information, including to finish reading all the information provided by this MOOC. Like most participants I already have an environmental consciousness, but we must search for ways to reduce the carbon footprint and spread information
67. Many, many thanks to the World Bank. Has learned about the democratizing potential of MOOCs, a great opportunity for sharing invaluable documents, knowledge, and professional, prestigious insight across borders, for the growth of collective knowledge, and it seems to me a great medium for exchanging and advancing practical steps toward the reduction of climate change. I would have never dreamed to create a facebook group and even less to create a NGO – we are already 210 students form this MOOC for this initiative

TABLE A

**Diagnosing common experiences of climate change**

MOOC on Climate Change

<b>Observation</b>	<b>Occurrence in threads</b>	<b>Occurrence in posts</b>
Agriculture is affected by change in weather	7	46
Water shortage, drought, forest fires	12	45
Heavy rains and floods	8	44
Unpredictable climate, abrupt weather changes	4	32
Warmer climate (milder winters, hotter summers)	8	31
Malnutrition, disease, migration, death	5	26
Extreme weather (tornadoes, hurricanes)	4	22
Vector-borne diseases and increase in insect populations	3	21
Melting glaciers	6	12
Loss of biodiversity, extinctions of species	2	10
Rising sea levels along coast	1	8
Change in animal behavior (migration, etc.)	3	6

TABLE B

**Repetition of General Solutions**

<b>Solution Statement</b>	<b>Accusation</b>	<b>Occurrence in threads</b>	<b>Occurrence in posts</b>
We need education campaigns and media strategies (new media as well as word of mouth) to disseminate information and spread awareness and consciousness of the environment.	Individual, Government	16	93
We need a complete revolution of the system. / We need a complete change of lifestyle from consumer citizen to environmental citizen.	Individual	12	28
We need environmentally sustainable plans that involve economic development and local culture. We need a more integrated approach.	Government	6	28
Change starts with the individual.	Individual	10	27
We need to start a local movement and pressure authorities from below.	Government	11	20
We need action at the global level: We need a legally binding international treaty. / We need global collaboration among nations. / We need to hold global corporations accountable.	Global elite	6	19
Government needs to come up with plans of action to protect its people.	Government	10	17