CARBON LITERACY EXERCISE:
A SERIOUS PLAY CARD GAME FOR OUR ECOLOGICAL FUTURE

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ABSTRACT

In this interactive exercise session, we will explore the use of an interactive carbon literacy training activity that uses large cards to facilitate small and large group dialog on climate change futures—both positive and negative. The 'card game' was inspired by the training delivered as part of the UK-based Carbon Literacy Project (www.carbonliteracy.com), a charitable project, which enables a days-worth of action-based climate change learning in many settings. This experiential method is suitable for higher education (undergraduate, graduate, executive & Ph.D.) and workplace training, and draws upon futuring methods, coaching practices, and the sustainable development goals. In the session, we will run an abbreviated version of the whole exercise, debrief and provide some theoretical background, and discuss potential applications in business ethics, business and society, and sustainability courses.

INTRODUCTION

This experiential exercise involves a set of cards focused on two potential future scenarios related to climate change. The "Positive Futures" half of the cards identify scientific and human interventions that could positively contribute to climate action resulting in a decrease in the overall global temperature. The "Troubled Future" half of cards details destructive individual and organizational activities that fuel carbon emissions and global warming beyond the limits for species survival.

The exercise unfolds in a few simple steps. First, the learners are divided into two groups and provided half of the cards, either the Positive or Troubled Future set, and then are asked to create a timeline from beginning to end. Next, the groups create the timeline negotiating between them what goes where. Following this step, the groups then "walk" the timelines and discuss the line starting with the Troubled Future and then going to the Positive Future. The debrief session follows focusing on affective and cognitive inquiry. This activity has been used successfully with traditional undergraduates (all levels), graduates, educators, and executives, as well as North Americans, Europeans, and Australians. Due to the subject nature, it is inherently usable with any national context and in cross-cultural learning environments.

THEORETICAL FOUNDATION/TEACHING IMPLICATIONS

There are two main theoretical linkages for this activity: 1) climate change research within the management education and development domain and 2) learning methods from coaching.

The U.S. Global Climate Research Program defines a climate-literate person as someone who, "understands the essential principles of Earth's climate system, know how to assess scientifically credible information about climate, communicates about climate and climate change in a meaningful way, and is able to make informed and responsible decisions with regards to actions that may affect climate (USGCRP, 2009). This notion of a climate-literate person is complex and reliant upon interdisciplinary training. While climate literacy education is increasingly common in scientific disciplines, it has lagged in the social sciences and within management education and development (MED) even though management is historically an interdisciplinary field. The handful of

MED articles in the domain cover a range of topics like a surveys of climate change topics with higher education in the U.S., MBA courses, and internationally (Hess & Collins, 2018; Rao et al, 2017; Perkins et al.), introductory climate change modules for business courses (Tackas, 2013), and the use of experiential exercises like role plays in climate change education (Paschall & Wustenhagen, 2012). There are clearly many opportunities for higher education in preparing the next generation of leaders, especially with the recent targets set for the UN Sustainable Development Goal Climate Action (SDG #13) which advocates for "improved education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning" (United Nations Statistical Commission 2017: Target 13.3). We offer that this exercise is well suited to improve higher education by raising awareness about climate change and the associated technologies (computer, machine, and social) that can mitigate the potential climate changes facing the globe.

Coaching techniques were integrated into the exercise, which are normally applied to the timeline of an individual to alter perceptions, reduce anxiety and envision possible futures. These are based on research into psychotherapeutic interventions (Konefal et al 2006) and supported by recent behavioral brain research: Agren et al (2017) for example demonstrated in their research how verbal instructions and imaginary can reduce fear responses and reconsolidate these on a different level. These coaching techniques influenced the design of this activity in the following manner. The students walk first along the "Troubled Future" and see how this would unfold if no action would be taken to the contrary. This increases anxiety as participants imagine this future and envision this reality in their minds. However, the students are then taken back to the current situation and next walk along the second story created by some of the students. This story depicts a "Positive Future" where humans reduce climate change impacts and achieve the goal of limiting global warming to no more than 1.5 degrees. We see in the "Positive Future" the evolution of step-by-step changes where individuals and organizations take action based on current insights about climate change mitigation and using relevant tools. They walk towards a future where humankind has managed to achieve this goal and it appears possible. Behavioral brain research has been incorporated into this experiential exercise by applying Agren and colleagues' insights so that the fear associated with climate change is reduced and replaced by a vision that with the right efforts a positive future is possible. Several trials of the game have so far indicated that students feel empowered, but also that their locus of control (Peyton & Miller 1980; Sagone & De Caroli 2014) has shifted. Instead of blaming others for the crisis (external locus of control), they realize that their individual actions will collectively lead to the desired outcome (internal locus of control).

This session contributes to effective teaching and learning by offering an immediately usable exercise that involves kinesthetic, peer, and experiential learning. It can easily fit within a 50-minute class and expanded if time and learning objectives allow. We know from continued pleas from the UN system, governments, and the low-lying and island nations much more integration of these topics in needed in higher education, particularly business education (Roth, 2017). Likewise, Millennials and Nexters are familiar with and desire more sustainability topics in their education. A recent study found that "Business students want environmental sustainability embedded and expanded into business education" (Franceschini et al, 2015). In sum, this activity is easily inserted many management and business courses with limited prep.

LEARNING OBJECTIVES

The learning objectives of this session can be varied based on the course and level of instruction.

1. At the most basic cognitive level, the exercise allows students to understand the multi-faceted interventions available to alleviate destructive climate change.
2. For introductory social science courses like organizational behavior (a core business course), the exercise highlights the distinctions between internal and external locus of control through the real-life challenge of climate change. Similar content connections can be made to foundational social science courses like psychology, sociology, political science, and economics.
3. For upper-level students in sustainability degrees or minors, the exercise permits the opportunity for analysis of climate change interventions by making explicit their criteria for selection, differentiation, and integration within the different future "lines." Learning objectives at this level allow for direct connections to different disciplines by having students link the activity to current research and models from their course area of study.
4. For advanced students, the exercise allows for the metacognitive dimensions, such as the opportunity to deconstruct one's biases related to interventions, reflections on the current state of climate and the strengths and limits of their disciplinary frameworks, and creation of new narratives.

EXERCISE OVERVIEW

As discussed above in the Introduction, the exercise is relatively simple with four main steps. First, we will break into two groups. Second, we will give each group the cards. Third, we will encourage the groups to create a narrative line. Fourth, we will dedicate time to debrief. The main logistic is having a copy of the "cards" and a space large enough to lay out two future "lines" and having learners be able to stand around the cards simultaneously. Those who wish to use this exercise in their classrooms will be provided a .pdf file with the cards. Facilitators have the choice to permit self-organization within the teams to lay out the cards as they wish with variation and reflect back choices to the team to decide or to provide clear guidelines for the teams. This depends on the instructor's style and teaching philosophy. The timing is quite flexible, but for best results requires a minimum of 60 minutes. See **Appendix B** for photos of the exercise.

Questions for the exercise should be structured around the learning objectives. See **Appendix A** for examples. It is important to be attentive in the debrief section since this is a topic that individuals can be quite passionate about. Sometimes debates can occur between two individuals, so pay attention to group dynamics making sure tensions are identified and discussed and not to the expense of others joining the discussions.

SESSION DESCRIPTION

At the conference, we will run the session (Steps 1-4) and then have additional time dedicated to discussing applications in our classes and linkages to the traditional organizational behavior cannon. The timeline below lays out a 60-minute agenda.

Activity	Time	Elapsed Time
Welcome & Session Introduction	5 minutes	0:00-5:00
Break participants into two groups	2 minutes	5:00-7:00
Allow groups to create the two lines (facilitation approach will allow for self-organizing)	15 minutes	7:00-22:00
Walk the lines and debrief	20 minutes	22:00-42:00
Discuss applications to participants courses	15 minutes	42:00-57:00
Wrap-up, session feedback, and networking	3 minutes	57:00-60:00

We have led this exercise at other academic conference in the United States at a management teaching conference, at an international business and society conference in Germany, and a business ethics conference in Australia. The 'card game' was inspired by the training delivered as part of the UK-based Carbon Literacy Project (www.carbonliteracy.com) , a charitable project, which enables a days-worth of action-based climate change learning in many settings. The globally unique project creates a 'carbon instinct' in its learners that in turn enables them to apply their new knowledge and motivation to whatever sector they work in. Accreditation is available for Carbon Literacy learners, which enhances employer recognition and can count towards the host organization being officially recognized as Carbon Literate.

This proposal is different for three main reasons: 1) the audience is different (interdisciplinary games vs. exclusively business), 2) the debrief session will be different (experiential educators), and 3) the version of the cards will be updated slightly based on the use in the classroom and boardroom in the interim months. This proposal is not under review at the date of this submission. Our hope is by facilitating this activity with the ABSEL colleagues we can get critical insights for further refinement that will support publication within the year.

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APPENDIX A

Below is a sample of students based on my use in a business ethics course informed by both the revised Bloom's Taxonomy of Educational Objectives and Significant Learning Experiences.

- What is your reaction to this activity? (starting with open questions to get a pulse—allows for cognitive and affective reactions)
- If feelings/emotions are covered, follow up by asking about thoughts about the card content.
- If cognitive reflections are emphasized, follow up with questions about emotions and feeling. One strategy for this is to have people share an "emoji" they observed in the exercise. This can be framed as either an emotion observed in their groups or their own. Students should be allowed to pass. (cognitive/affective evaluation)
- What provided debates and controversies in your groups? (It is typical to have hopefully constructive conflicts between group members).(cognitive analysis)
- Where did you come to quick consensus and why? (cognitive evaluation)
- What was missing from the cards? What would you add and why? (knowledge)
- What connections do you see between this exercise and our course? (analyze-integration)
  - Ethics-Philosophical Traditions: How are utilitarian premises present? What would the Rights and Duties authors say about your lines? Is ethics of care relevant to this activity? If so, how? What aspects would the Justice authors appreciate and why?
  - Ethics-CSR: Who are the stakeholders for your lines? What SDGs? What sectors and spheres are needed for the Positive Future to unfold?

APPENDIX B: PHOTOS OF THE EXERCISE