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# **Enviropedia: on-line game and learning environment to study materials engineering**

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# Why?

- Traditional educational tools can only partially achieve contemporary educational objectives;
- Increasingly, casual and/or mobile games are being developed for educational purposes;
- Education of students about sustainable materials should be done in engaging way and should change their consumer behavior.

Enviropedia

## Carbon Footprint Calculator

Container	Size	Accessory
plastic	medium	polystyrene lid
		
		
		

**Calculate Footprint!** **34.200 grams of CO2**

Calculate Footprint!

34.200 grams of CO2

# When?

- **We started developing this approach several years ago here at Stony Brook;**
- **It involved Materials Engineering, Technology and Society, Computer Science and Sociology Departments;**
- **We used programming, sociological surveys and materials engineering to develop this very innovative on-line tool.**

# Where?

- We pilot-tested Enviropedia in a one-credit undergraduate freshman seminar (ITS102);
- After this initial testing we hope to introduce a full scale version into introductory engineering courses, which are typically taught in a large lecture setting.



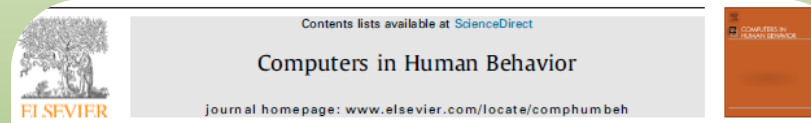
# What?

- We developed: (1) container Chaos, a fast-paced casual game where instant recognition of pro-environmental beverage container choices leads to higher scores; (2) a carbon-footprint calculator for estimating the environmental impact of beverage containers; and (3) a wiki where student teams explore the environmental impact of beverage containers on campus.



# Prognosis?

- We have conducted sociological surveys and published a paper describing our results;
- Given that it is on-line tool we can scale it up for large classes;
- The challenge is to find new ways to motivate students to think about environmental impacts;
- The feedback we need is how to overcome the gap between learning and actively applying this knowledge to engineering design.



## The hidden gender effect in online collaboration: An experimental study of team performance under anonymity

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### ABSTRACT

It has been argued that the generally positive effect that female participation exerts on team performance ceases to exist under conditions of anonymity. We evaluate this thesis in the context of an online learning environment in which the gender of fellow student team members was not disclosed to subjects. To circumvent selection effects in the composition of teams we employed an experimental design in which female and male students were randomly assigned to teams of varying gender composition. Against expectations, we find that under anonymity gender composition continues to impact team performance, with all-female teams being most productive. Counter-intuitively, this team effect occurred in our study without female students individually being more productive than their male counterparts. These findings indicate that the presence of females on anonymous teams can have a hidden effect on the productivity of other team members. Our results underscore that despite face-to-face interaction in higher education increasingly being substituted by Internet-enabled communication, a student's social environment continues to impact academic learning in important ways.

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### 1. Introduction

The dramatic increase in the use of the Internet as a medium and meeting place for team work (Chu & Kennedy, 2011; Sulisworo, 2012) necessitates a better understanding of how conditions specific to online environments exacerbate or suppress features of group interaction traditionally observed in face-to-face settings. This question is relevant in a range of settings, from distributed organizations in which teams seek to effectively communicate despite being geographical dispersed to online educational settings where students' grades may be affected by the efforts of their classmates. A common feature of online groups is that members can participate anonymously or through non-identifying user names. Anonymous participation has been thought to reduce the salience of certain group processes that rely on member identification. Specifically, studies suggest that anonymity in online settings may reduce or even eliminate the otherwise positive effect of gender diversity on team performance

(Caspi, Chajut, & Saporta, 2008; Dubrovsky et al., 1991; Perkowski, 2012; Wade, Cameron, Morgan, & Williams, 2011; Yang, Cho, Mathew, & Worth, 2011).

The thesis that the composition of a team matters net of the individual qualities and attributes of its members has repeatedly been confirmed in non-anonymous settings (Chen, Ren, & Riedl, 2010; DiTomaso, Post, & Parks-Yancy, 2007; Hannagan & Larimer, 2010; Van Knippenberg & Schippers, 2007). Gender diversity in particular has been demonstrated to positively affect the performance of face-to-face teams in various studies involving students (Dufwenberg & Muren, 2006; Hoogendoorn, Oosterbeek, & Van Praag, 2013; Ivanova-Stenzel & Kübler, 2011), with mixed groups outperforming both male-dominated and female-dominated groups. However, whether gender composition continues to significantly impact team performance when the gender identities of members are doaked by a web interface is an open question. As interactions are more and more taking place through online discussion boards, wikis, and social media, knowing how and to what degree team composition can continue to matter even when member identities are not salient is an increasingly important question.

The provisional answer from past scholarship is that in anonymous settings, team gender composition is not consequential for

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