

Where the R's Are: A Module in Sustainability and Participatory Mapping

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ABSTRACT

Campus recycling staff at New Mexico State University requested recommendations for locations of additional bins. The author seized the opportunity to answer this inherently geographic question by designing a senior-graduate level special topics course. Students who enrolled designed a mapping activity for freshman students which would introduce them to geographic data collection and analysis. Students mapped bins on paper campus maps and with GPS units. Researchers produced a population density surface and created a surface of linear distance to a recycling bin, and a locational-ranking surface that identified areas that would benefit from new/additional recycle bins. A total of 192 outdoor trash bins and 17 outdoor recycle bins were identified. Results identified eight locations for addition of new bins. Recommendations based on this experience include a broad approach to recycling and geographic education that emphasizes sustainability and the importance of the reduce, reuse, recycle, the 3 R's.

KEYWORDS

Geographic Question, Participatory Mapping, Recycle, Sustainability

INTRODUCTION

New Mexico State University is located in southern New Mexico on a 900-acre campus and enrolls between 15,000 and 18,000 students from 49 states and 89 foreign countries. Many of the incoming students in my classes ask me “where are the recycle bins?” When I asked the recycling manager about this, Mr. Lucero asked me to identify suggested locations for additional recycle bins (Lucero, personal communication, 2012). This seemed a perfect opportunity to embellish student's geographic skills to explore and address challenges faced by a campus in the early stages of developing a recycling program. In the spring semester of 2013, I organized a special topics course (Geography 493) for seniors and graduate students to address this inherently geographic question. Two graduate students and 5 senior undergraduate students enrolled. Mapping bin locations was a top priority. During the introductory meeting, three of the undergraduates enrolled indicated that the sustainability module of my freshman course: Geography 120G Culture & Environment, was their first exposure to the importance of recycling. We decided to engage students in that course to introduce geospatial data collection and demonstrate an applied approach to research. Four general objectives were stated

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for the special topics course. First, create a map of bin locations. Second, determine where campus populations were highest. Third, produce geospatial products describing access to recycling bins on campus. Fourth, identify locations to add recycle bins. The final product will be maps of recycling resources and a report to the sustainability office and recycling staff. This paper describes the efforts and products developed in that semester and within the two courses.

BACKGROUND

Teaching with the 3 R's does not mean the same to the current generation as it did to my parent's generation (Hubbard, 1972). Each August, as the school year was approaching, my father would sing a song: "School days, school days. Dear old Golden Rule days. Readin' and Ritin' and 'Rithmetic, taught to the tune of a hickory stick....," Dad would remind us to focus on the basic skills represented by the 3 R's as described in the popular song written by Cobb and Edwards in 1907. Often, this reminder came while enjoying a last weekend at the local swimming park where we drank soda pop from glass bottles. The bottles could be turned in at the snack shop for a refund of three cents each. Soda pop bottles and glass milk jugs were typically collected for re-use by the distributors. Many things have changed in the decades since I was in elementary school. Back then, plastic was a relatively new product in the early stages of development. The proliferation of single-use containers was yet to come. Today, plastic is virtually everywhere.

The modern 3 R's: Reduce, Reuse and Recycle, are central tenants of sustainability that describe cultural and personal practices that will help maintain the natural environment for future generations. The date of creation for the simple, catchy phrase is debated, but many agree that it was right around the first Earth Day, April 22, 1970 (Gordon, 2015). This event, which is also cited as the birth of the environmental movement ("The History of Earth Day," n.d.), led to the establishment of the Environmental Protection Agency (EPA) in December 1970 and substantial amendments to other laws that protect air, water and wildlife from degradation including the Clean Air Act (established in 1970, then amended in 1977 and 1990, Union of Concerned Scientists), the Clean Water Act (1972, U.S. Laws) and the Endangered Species Act (1973).

Sustainability has become a core value on college campuses across the United States (Newport, 2012), yet educating modern college students about the importance of environmental stewardship requires a focused effort. The world they face will require geographic literacy (Heffron, 2012) including skills to collect and organize geographic information. University campuses have significant room to improve recycling programs despite attitudes and basic infrastructure to support recycling (Largo-Wight, Bian, & Lange, 2012). Bin location was found to have a significant influence on recycling behavior (O'Connor, Lerman, Fritz, & Hodde, 2010), with classroom bins being an important location. Gautam & Kumar (2005) mapped population density and designed a model to minimize walking distance to a bin which increased participation in recycling overall. Pike et al. (2003) explored contamination of bins in student housing areas and concluded that a combination of access and education were effective to reduce contamination of bins.

Waste is broadly defined as any unwanted or unusable material (Merriam-Webster, n.d.). The waste stream includes a steady flow of materials. Everything from domestic garbage, packaging, sewage, and yard waste, to industrial waste, commercial and construction refuse, discarded cars and furniture, even toxic paints and household chemicals (Cunningham & Cunningham, 2013b). Modern waste contains both biodegradable and non-biodegradable materials. Prior to the development and wide-spread distribution of plastics and other non-degradable products, waste material was buried in a land-fill or trucked to a regional facility that either buried the waste or burned it. Materials that could be re-used, such as aluminum cans or milk bottles, were kept out of the waste stream by offering a refund, typically a few cents, that consumers would collect when they returned the can or bottle to the vendor or a collection facility. Awareness of the capacity for containers, such as glass milk jugs,

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