Reduce, Reuse, and then Recycle

The Issue of Paper Use at Smith

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Abstract: The purpose of this project was to approach the issue of paper usage at Smith College through encouraging Smith students to reuse paper before recycling. I have constructed “second-hand” notebooks for academic use to provide a concrete example of how students can participate in the first two steps of paper conservation before they dispose of it in the recycle bin. I collected paper from recycle bins throughout Smith campus and the local community and bound them into academic notebooks for student use next semester. I found that all of the paper that was disposed of in the recycling bins at Smith College was not reused first, although there were some pages that contained double-sided printing. Throughout my research I found that paper constitutes a disproportionate amount of Municipal Solid Waste, and that recycling itself poses significant threats to the environment, although it is a positive alternative to disposal in landfills. My goals were not only to make a small difference in the amount of paper being recycled on Smith campus by physically removing reusable paper out of recycling bins, but also to generate an environmental consciousness and awareness throughout Smith and the local community about paper use and the importance of conserving this resource.

Introduction: Reduce, Reuse and Recycle. Often times we forget about the first two steps, and as they are listed in order of importance, it is imperative that the Smith community redirect their focus. Although most of us may actively recycle, this alone is not enough. Recycling is expensive, sometimes ineffective, and environmentally damaging (Virtanen and Nilsson, 1993). The transportation of these materials, collection, sorting, and processing involved in making new products out of recycled products requires energy (fossil fuels) and produces damaging emissions, which are direct negative effects on the environment. This is not to say that we should dispose of recyclable materials in landfills, rather, it is to suggest that before these materials are sent to be recycled, they should be used to their absolute fullest potential.
There are many ways to approach this issue through this sustainability project, however, I would like to focus on the use of paper at Smith College. At the beginning of every semester, Smith students purchase new notebooks, folders, binders, etc. for their next three months of education, yet, when the semester is through, the notebooks are tucked away or discarded. I would like to make a small difference on campus by encouraging Smith students to reuse their paper before they merely throw it in the recycling bin and say they did their part. This will help to conquer the first two steps, reduce and reuse, by reducing the amount of new paper purchased by Smith students while reusing old paper.

I decided to do this project because of the history of paper usage in the U.S. and the disproportionate amount of paper that is used by college students. Throughout my research, I have found that paper is the most prevalent material in municipal solid waste (MSW). Paper alone accounted for about 68 million tons (or 28 percent) of MSW in 2009 (U.S. Environmental Protection Agency). Luckily in 2007, paper recovered per person averaged 360 lbs (American Forest & Paper Association). In the United States, 43 million tons of paper out of the 68 million tons we used in 2009 was recycled, which is equal to about 62 percent and about an average of 334 pounds per person/year (U.S. Environmental Protection Agency). This seems like good news and as though there has been an increase in consciousness about the importance of recycling. However, this does not mean that the amount of paper use has decreased, and it is unlikely to do so in the near future. In the United States 2 billion books, 350 million magazines, and 24 billion newspapers are published every year and the average American uses one 100-foot-tall Douglas fir tree in paper and wood products per year, which is astounding. Our paper comes from three different sources in the U.S. and only one third of it is recycled paper fibers. Another third comes
from virgin sources and the last third comes from woodchips from sawmills. This means that every three pieces of paper is still being sourced from the felling of a tree.

**Materials and Methods:**

**My Approach:**

The most effect way to approach this project was to localize my efforts to the Smith campus and the local community. To deal with this issue, I produced second hand notebooks for Smith students, and will encourage them to use them instead of purchasing new notebooks by giving them away. I had a cover designed for the notebook that included an aesthetically pleasing image that was related to the goals of my project. It also contains text that encourages reuse of paper before it is recycled. This purpose of including the graphic and text was to convey a compelling message to the Smith College campus, that it is imperative to reuse paper before it is recycled. My hope for the design of the cover is that it will attract the attention of other students, and the message of reducing and reusing paper will travel among students.

**Paper Collection:**

To collect the paper, I sorted through the paper within recycling bins and trash cans throughout campus. Any of the paper that was only used on one side was taken to be included in the notebooks for my project. Any of the paper that was used on both sides was either left in the recycling bin, or if it was recovered from the trash can, it was moved to a nearby recycling bin. I also sorted through the paper that had been left behind in the printers of multiple libraries and classrooms throughout the buildings of the science quadrangle. When I discovered that this was a very labor intensive process, I attempted to set out collection boxes directly next to the recycling bins with signs that encouraged students to place reusable paper within them instead of throwing
them in the recycling bin. This approach to collecting paper and educating students did not prove fruitful, and I returned to trash-picking.

**Community Involvement:**

Many local businesses also contributed to my project when they were asked if they have paper that has been printed on one side that could be reused. I received many old menus and schedules from restaurants, and other scraps of paper that were no longer being used. I went to many libraries to collect paper, however I was pleased to find that many of them had very little to contribute because they do not use very much paper at all. One of the libraries that I visited did not have any paper because they reload used paper into the printer to be printed on again on the opposite side. Although this did not contribute to my collection of paper, I was pleased that the issue of paper reuse was already being addressed in some places throughout the local community. And as my goal is not merely to save the pieces of paper that I personally collected from being recycled before they are reused, but it is also to spread awareness about the issue, this was a very positive discovery. Local schools also donated much of their paper to my project, such as old flyers and letters home to parents. It seemed as though they overprinted approximately 50 sheets of paper for every flyer that they sent home with the students which was alarming. When I explained the nature of my project, I also encouraged the main office to cut down on the total number of paper being overprinted because it was not only taking up a lot of space in their office but it would save the school a lot of money throughout the month simply by not making a superfluous amount of extra copies.
Sorting:

After a suitable amount of paper was collected, I had to sort through all of the individual sheets and make sure that the information on the printed side was not private. If there were any names, phone numbers, or any other personal information on the sheet, I went through with a marker and made sure that the information was no longer legible. Many of the schedules that I collected at restaurants have the phone numbers of employees on them which would present a huge issue if I were to distribute them to Smith students. Some of the paper had to be returned to a recycle bin because of fear that the text on the printed side was so personal that I would be invading someone’s privacy by making it public information. This was a very time consuming process but eventually all of the paper become suitable to include in the notebooks.

Notebook Construction:

All of the paper was then counted by individual sheets and placed into notebooks of fifty pages. I wanted to ensure that the notebooks were large enough so that they would be of practical use for a semester long class, however, I also wanted to make sure that the optimal amount of notebooks was being made in order to distribute the “educational” portion of the goal of this project to as many students as possible. All of the fifty page notebooks were then stacked so that they could be brought to Paradise Copies in Northampton, MA to be bound.

Currently, I am waiting patiently for a pdf version of the environmentally designed cover to be sent to me. I am also waiting for approval from the Environmental Science and Policy department of Smith to get the notebooks bound, as I personally do not have the funds to accomplish this on my own. When the cover is in my possession as well as permission to get the books bound, I will bring the fifty individually stacked fifty-page notebooks to Paradise Copies
to have them bound into individual notebooks. They will also make a copy of the cover for every notebook on the recovered paper that I have collected and will provide for them. The notebooks consist of fifty usable pages, along with the cover that has been designed by my sister specifically for this project, and a stronger piece of paper for the back. The paper that will be used for the cover and the back has also been recovered by me for this project. The binding will be a coiled, black binding from Paradise Copies and will cost approximately $1.25 for each notebook. As all of the paper within the notebook was free, this means that at less than $2.00, considering the printing of the designed cover will cost approximately $3.00 total (fifty copies for the fifty notebooks) each notebook will cost significantly less than purchasing a new product from a retailer. This is another factor that should be communicated to the students, since each student participates in an average of four classes per semester and presumably purchases a new notebook for each course. If a student were to purchase a new notebook for every course that they take during their college career then they would be buying approximately thirty two new notebooks. If the student were to construct these notebooks themselves out of recovered paper, it would only cost approximately $40.00 (assuming that they would like to have them bound) as opposed to purchasing thirty two notebooks at approximately $5.00-$10.00 a piece for a total of approximately $300.00. However, if this is not a possibility, it also costs less to purchase recycled materials because they cost less to manufacture, (Canterbury and Mathis, 2004).

**Distribution:**

After the notebooks themselves are completed, I have decided to give the notebooks to the Environmental Science and Policy department to distribute them to their students next semester. There is a First-Year Seminar that Professor David Smith leads in the fall that focuses on the topic of sustainability, so I believe that this is the ideal place for the notebooks to be used.
Any of the spare notebooks can be given to other professors to distribute them to their students. I had intended to hand them out at Smith College’s Earth Day Festival this spring, however, the books were not bound at this time. There is also fear that even though the students may take them with intentions of using them next semester, they may not actually return with them in the fall. It seems that the most effective time to distribute these notebooks would be in the fall, but as I will no longer be a student at Smith, I will have to pass on the responsibility of this portion of the project to someone else. Distributing the notebooks to the Sustainability First Year Seminar is ideal because they focus on instilling an environmental consciousness in Smith First Year students as soon as they begin their journey at the college. The notebooks will help contribute to the overall goals of the course, and will help to remind the students on a daily basis that they can contribute to reducing paper use. There will be forty students in the course, and it turns out that I have enough paper to produce approximately forty-five fifty-paged notebooks. This is because some of the paper is used lined paper and this paper will not be able to be bound correctly. I also needed to deconstruct two notebooks to be used for the cover of the notebooks and the back.

**Results:** The result of this project is fifty notebooks that have been constructed out of used paper. All of this paper has been used on one side, however, it is still suitable for note-taking on the opposite side. They will provide students who prefer to hand write their notes with a more environmentally friendly option of doing so. It will also encourage these students not to purchase new notebooks at the beginning of every semester, but to reuse paper to its fullest potential before recycling it. As I will not be able to see the end result of this project, it is difficult to predict. However, I anticipate the use of the notebooks by fifty students throughout Smith campus who will receive a better understanding of the importance of reducing paper use,
and that they have the ability to participate in this movement by reusing old paper before it is recycled.

**Discussion:** Recycling is a very expensive and environmentally damaging process. It requires a lot of water and chemicals for processing and releases damaging emissions from fossil fuels produced by transportation of these materials, collection, sorting and the processing involved in making new products out of recycled products. Paper production is a source for Bisphenol A (BPA) and thus there are high concentrations of BPAs found in recycled paper (Gehring, *et al.*). These BPAs are being leached into the groundwater continuously from landfills that receive significant masses of wastepaper. BPAs are a source of xenoestrogen emissions in wastewater which cause hormonal disturbances as they mimic the natural female sex hormones (estrogens). Other harmful contaminants used in paper recycling include (Fukazawa *et al.*, 2002) Benzophenone which is a free radical generator that increases cellular damage and changes that lead to cancer. It also has estrogenic capabilities interfere with sexual development and can accumulate in body fat stores. Dimethyl phthalate may cause asthma, allergies, autism, precocious puberty, birth defects, and unusual changes in hormone levels. Anthracene is very toxic to aquatic organisms and can cause long-term imbalances in the ecosystems. It can be absorbed into the body through inhalation and cause respiratory issues. Pentachlorophenol can cause damage the liver, kidneys, lungs, circulatory system, immune system, nervous system, and gastrointestinal tract. It is also being studied as a potential carcinogen. Because of its use in paper recycling and other industries it is prominent in drinking water.

This project is easily reproducible not only for future members of the Environmental Science and Policy seminar for their sustainability project, but also by all Smith College students. Some of my recommendations for this project in the future would be to work with
Facilities Management from the beginning. I found throughout my collection process that the recycling bins were emptied very frequently, and this made it difficult to collect more than a few pieces of paper at a time. If I were to do this project again, I would also attempt to design some sort of competition amongst the houses to collect reusable paper. This could be done by contacting the sustainability representatives throughout the houses. The sustainability representatives that are particularly active would be willing to help in the collection of the paper, and in increasing house awareness about paper usage. Towards the end of this sustainability project, I was also thinking about the effectiveness of making this a campus wide movement. Throughout campus, the amount of paper that is used on a daily basis is wasteful and superfluous. If there was a single day throughout the week that the entire campus community participated in where no new paper was used, this was save an immense amount of paper. This could be done by encouraging professors to allow students to submit their assignments for that day through Moodle or via electronic mail. Students could also be encouraged to use their computers for note-taking in class for the day. I anticipate that this would not only be a great way to inspire awareness throughout the entire Smith College community, but it would also be supported campus-wide. I recommend that this activity be done on Earth Day, as this would provide the student organizing this event with plenty of time to talk to President Carol Christ, to get the support of student organizations like the Green Team, and it would be the perfect event to celebrate Earth Day.

Conclusions: My project had a relatively simple goal, although the construction of these notebooks turned out to be a very time consuming process. The goal was to reduce paper use on Smith College campus but reusing old paper. This is an integral step to paper conservation before it is sent to a recycling center. Although recycling can cause environmentally damaging
emissions and uses a massive amount of chemicals in its processing, it is necessary to reuse the paper fibers in the generation of new paper, so as not to require virgin fibers for every piece of paper. The process of recycling is not as damaging as the process of deforestation, and thus it is the desired alternative. However, paper should be used to its fullest potential before it goes through this process. The construction of these second hand notebooks has not only helped to save approximately 2,500 pieces of paper from being used inadequately before being recycled or thrown away, but it will also help to instill a broader environmental consciousness on campus. With further work from students in this seminar in the future, I believe that there is hope for this project to make an even larger change in the environmental education that we wish to distribute to the wider campus community.

In terms of the bigger environmental picture, I am hoping that Smith students will begin to recognize the importance of participating in all three steps of resource conservation. All three steps in conjunction with one another help to minimize the amount of natural resources we extract from the environment as a campus. With less natural resource extraction there will be less of a need for new roadways to the resource, less large vehicles transporting goods, less emissions and energy consumption, and less waste. In short, less than 30% of potential recyclables are actually recycled, so it seems more important now than ever to encourage reuse.
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