

The Great Plastic Bag Debate: A Recommendation for the College of Saint Benedict and Saint John's University

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Introduction

Plastic and paper bags pose a huge problem for the environment, even if they are compostable, and paper bags contribute more to the total mass of landfills than plastic bags. In addition, the decomposition of paper bags adds CO₂ back to the atmosphere while plastics raise the issue of bio-accumulation and magnification. Plastic bags have been a source of great controversy in society today, institutions, counties, cities, states and even countries have banned the use of single-use plastic bags. One argument for the bag bans, was that it would save the entity money. The caveat being that it had to be implemented correctly, which meant including a fee if anyone needed to use a plastic bag. It was also meant to reduce the amount of waste going into landfills which would increase savings. Paper bags are another area of concern because people often take them at face value, disregarding the production process. Replacing the paper and plastic bags with durable cotton tote bags will save the campuses money, change social consumption habits, and prevent environmental degradation in the long-run.

Environmental Impact	Non-renewable energy, GJ	GHG emissions, CO ₂ eq kg	Solid Waste, kg	Fresh water consumption, gal	Mass, g
1,000 grocery single-use bag	508.67	26.67	4.67	38.67	4
1,000 biodegradable reusable bag single-use	2945	182	34.1	250	44
1,000 biodegradable reusable bags used 52 times	57	3	.7	57	44
1,000 paper bag single-use	2620	80	34	1000	52
1,000 woven cotton bags with at least 100 bags replaced per bag	17.58	276.71	2,750	N/A	125,400

Table 1. Energy inputs and waste potential of the different bag options

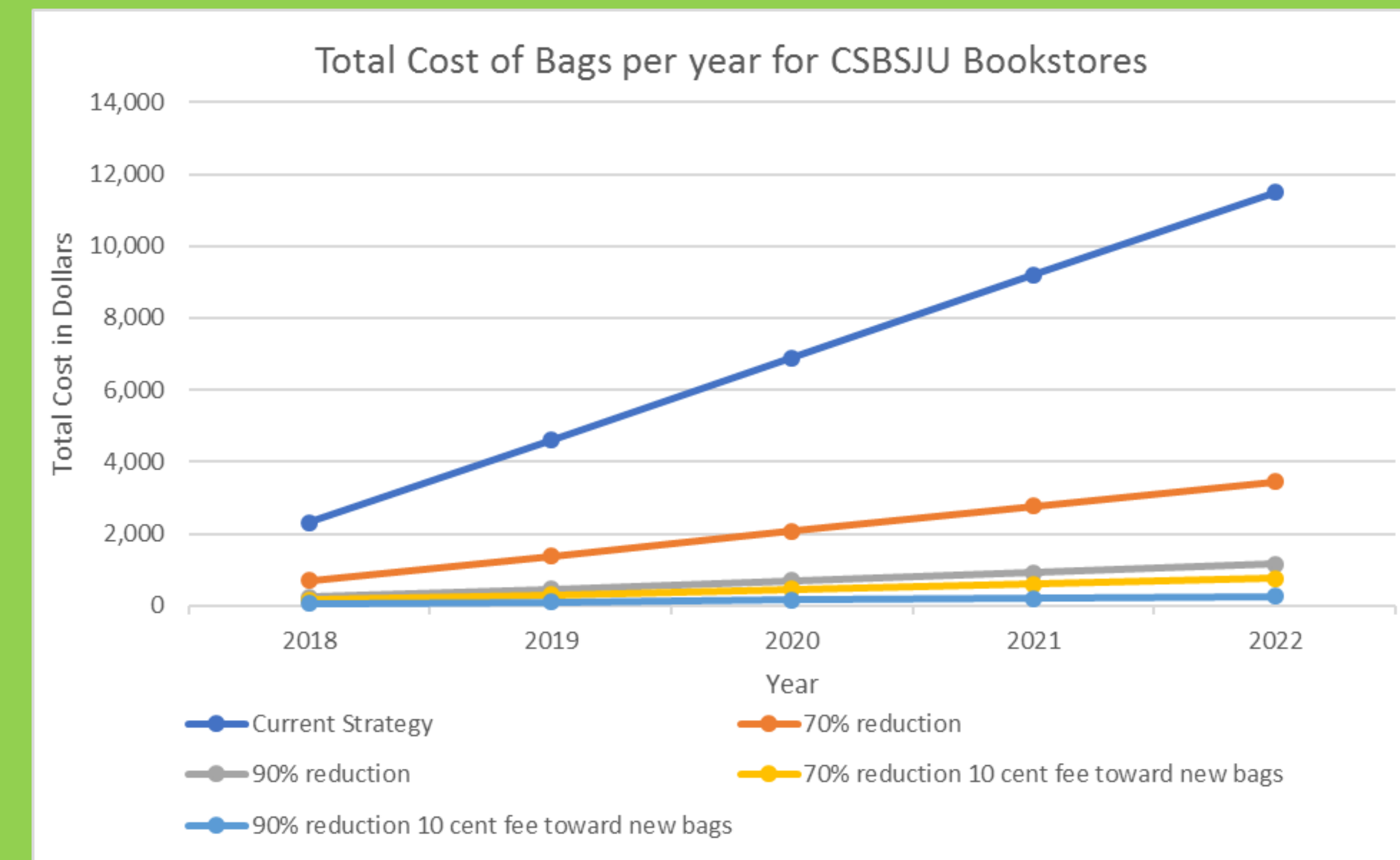


Figure 2. Shows the difference in cost between the current strategy and the potential reduction in the amount of bags used if the 10-cent fee is introduced



Figure 1. Visual representation of how a reusable bag works and a popular slogan.

Students Observed	Single use bag	Single use plastic	Biodegradable reusable plastic bags	Paper	Reused biodegradable reusable bags	Used durable bag	No bag
Total 1437	750	245	427	78	0	66	621
Percent of total students observed	51%	17%	29%	5%	0%	4.60%	43.3%
Percent of bag using students	91.88%	30%	52.32%	9.56%	0%	8.08%	N/A

Table 2. Observational data collected from McGlynn's and Sexton

Year	2018	2019	2020	2021	2022
Current Strategy	\$2,300	\$4,600	\$6,900	\$9,200	\$11,500
70% reduction	\$690	\$1,380	\$2,070	\$2,760	\$3,450
90% reduction	\$230	\$460	\$690	\$920	\$1,150
70% reduction 10 cent fee toward new bags	\$150	\$300	\$450	\$600	\$750
90% reduction 10 cent fee toward new bags	\$50	\$100	\$150	\$200	\$250

Table 3. Represents each data point on Figure 2.

Methods

A literature review was conducted on the topic of alternatives to contemporary grocery bags, observational data and interviews were conducted to gather social trends and usage statistics, and a cost benefit analysis was conducted to show the costs relative of the contemporary options and alternatives. The research is limited to case studies, environmental implications, societal attitudes, and life cycle analyses. Therefore, the data collected focuses on cost, social aspects, and environmental degradation. Observational data was collected by spending 8 hours a week at Sexton and McGlynn's to get an estimate for how many and what kinds of bags people use. Interviews were conducted to gather exact data on total use and monetary cost associated with each current option.

Findings

- Of the students observed, none reused the biodegradable reusable bags.
- 4.6% of students who go out of their way to no use the bags currently offered and used things like their backpacks instead.
- 91.88% of the students who used a bag, used it in a single use fashion.
- Cotton bags have the highest potential for waste if used improperly.
- Implementing a fee on bags, the school could save up to \$11,250 over 5 years.

Conclusion

The observational data suggests that the biodegradable plastic bags are not being used how they are supposed to be used, meaning the cotton bag has the highest potential to change social consumption behavior. Switching from single use options and getting rid of them entirely, makes the consumer reuse their cotton bag which makes the cotton bag option better than the biodegradable reusable plastic bag. Meaning, the more a consumer uses their cotton bag the lower their environmental impact. If the cotton bags are implemented correctly, their potential for decreasing environmental degradation increases.

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