

Challenges and Sustainable Solution for Furniture Waste Management in Selected Higher Educational Institutions of Vadodara City

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Abstract

In recent years, solid waste management has gained significant attention as a global issue, with particular focus on waste streams like plastic, glass, and others, being addressed by governments, researchers, and experts. However, furniture waste management is still in its early stages. Specifically, in higher educational institutions, this issue remains a significant challenge for various reasons. This study highlights the key challenges faced by selected higher educational institutions in Vadodara City regarding furniture waste management. The descriptive analysis reveals that a lack of policies and awareness significantly impacts the effectiveness of waste management efforts. Additionally, the study offers practical solutions for managing furniture waste sustainably, with up-cycling being highlighted as a successful approach to address the issue.

Keywords: Furniture Waste, Up-cycling, Educational Institutions

1. Introduction

Furniture plays a crucial role in shaping the learning environment in higher educational institutions. From sturdy wooden desks to ergonomic chairs, these pieces not only provide comfort but also contribute to the overall functionality and aesthetics of academic spaces. However, with constant renovations, evolving infrastructure needs, and furniture wear and tear, institutions often face the challenge of managing discarded furniture efficiently.

In Vadodara, a city known for its rich educational heritage, several higher educational institutions struggle with furniture waste management. Many old, damaged, or outdated furniture pieces are either discarded in landfills or stored indefinitely due to the lack of proper disposal or repurposing strategies. According to **Kumar and Patel (2021)**, inefficient waste management practices in educational institutions contribute significantly to landfill overflow and environmental degradation. Additionally, **Sharma et al. (2020)** highlight that sustainable waste management in academic settings is often overlooked, despite its potential to reduce waste and promote resource conservation.

While sustainability has become a key focus in various domains, furniture waste management in educational institutions remains an under-explored area. As noted by **Johnson and Green (2019)**, repurposing and recycling furniture can not only extend its lifecycle but also minimize the environmental footprint of institutional waste. Finding practical, eco-friendly solutions to handle this waste is essential for reducing environmental impact and promoting a circular economy.

Through this study, we aim to identify the challenges faced by selected higher educational institutions in Vadodara in managing furniture waste and explore sustainable solutions that can be implemented effectively. By integrating insights from academic research, expert opinions, and institutional practices, this study hopes to bridge the gap between sustainability and furniture waste management. It seeks to provide actionable recommendations that can help institutions adopt responsible disposal, repurposing, and recycling strategies, ultimately contributing to a more sustainable campus environment.

1.2 Review of Literature

Research on furniture waste highlights its growing environmental impact and the urgent need for sustainable solutions. **Fisher (2020)** draws attention to the rise of "fast furniture," comparing it to fast fashion, where cheaply made, short-lived pieces are discarded rather than reused, contributing significantly to landfill waste. **Yang (2020)** focuses on school furniture, advocating for designs that are simple, durable, and easy to repair, helping schools save costs while fostering sustainability awareness among students. **Kazim et al. (2020)** emphasize the economic and environmental consequences of excessive furniture disposal, critiquing the lack of systematic recycling initiatives, particularly in Turkey. Their study calls for better waste management strategies to reduce the ecological harm caused by discarded furniture.

The researcher found dearth related to the challenges in higher educational institutions which generate huge amount of furniture waste. Therefore researcher undertook the study. Moreover, these studies highlight the need for greater awareness, policy intervention, and innovative solutions to extend furniture lifespans and minimize waste.

2. Objectives of the study

The objectives of the study were to:

- a) Assess the challenges faced by selected higher educational institutions of Vadodara City.
- b) To imply up-cycling as a sustainable solution to manage furniture waste.

3. Delimitations of the study

The delimitations of the study were:

- a) The higher educational institutions which had establishment of minimum 20 years.
- b) The higher educational institutions located in Vadodara City

4. Research Methodology

The present study was descriptive research in nature to explore the challenges for furniture waste management in selected higher educational institutions of Vadodara city. The study selected 20 higher educational institutions, selected using purposive sampling technique. The authorities of these institutions including deans and administrative heads, were the units of enquiry. Data was collected through a 20-minute interview schedule with institutional authorities and an observation sheet to assess the condition

of furniture waste at the time of the study. The interview schedule gathered insights on current disposal practices, challenges, and awareness of sustainable waste management, while the observation sheet documented the quantity, type, and condition of discarded furniture. The collected data was systematically presented in tabular format, enabling clear analysis. This methodology ensured a structured approach to assessing furniture waste management and sustainable solutions for selected higher educational institutions in Vadodara City.

5. Findings and Discussion

The researcher used observation sheet to observe the actual condition of furniture waste in selected higher educational institutions. During the observation, it was found that all 20 higher educational institutions stored furniture waste as shown in **Table 1**. Out of these institutions, 3 used open storage and others preferred closed storage. The quantity of furniture waste was approximately 2000 furniture pieces. The furniture waste consisted of majorly moderate to poor condition furniture pieces including, chairs, desks, table, shelves and cabinets. Moreover, it was also revealed that majority of the furniture waste was constructed from wood as shown in **Plate 1**.



Plate 1: Furniture waste found in selected higher educational institutions

The findings in **Table 1** reveals that all the selected higher educational institutions, both government (n=15) and private (n=5), store their furniture waste within the institution, as indicated by a 100% response for this practice. Additionally, a significant portion of these institutions engage in selling furniture waste as scrap, with 60% of government and 100% of private institutions adopting this method. Donation of furniture is less common, observed in 26.66% of government and 40% of private institutions. Incineration is minimally practiced, reported by only 5% of government institutions, and no institutions choose to landfilling or dumping as a disposal method.

Problems faced in managing furniture waste

During the interview with the authorities of selected higher educational institutions following data was revealed related to problems faced in managing furniture waste.

Table 1: Frequency and Percentage Distribution of the Responses Based on the Disposal Practices of the Selected Higher Educational Institutions (n = 20)

Disposal Practices	Government Institutions			Private Institutions			Total		
	<i>f</i>	%	Wt. mean	<i>f</i>	%	Wt. mean	<i>f</i>	%	Wt. Mean Score (1-5)
Donated	4	26.66	0.26	2	40	0.4	6	30	0.3
Sold as Scrap	9	60	1.2	5	100	2	14	70	1.4
Stored in Institution	15	100	3	5	100	3	20	100	3
Landfilled/Dumped	-	-	-	-	-	-	-	-	-
Incinerated	1	5	0.33	-	-	-	1	5	0.25

Table 2: Frequency and Percentage Distribution of Problems faced by selected higher educational institution in managing furniture waste (n=20)

Problems faced in managing furniture waste	Type of Institution				Total	
	Government Institutions (n = 15)		Private Institutions (n = 5)			
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Lack of institutional policies	12	80.00	2	40.00	14	70.00
Insufficient storage space	12	80.00	4	80.00	16	80.00
Lack of Staff	7	46.66	0	0.00	0	0.00
Financial constraints	6	40.00	3	60.00	9	45.00
Lack of record-keeping	4	26.66	1	20.00	5	25.00
Transportation	4	26.66	0	0.00	4	20.00
Resistance to change for reutilization	8	53.33	1	20.00	9	45.00
Limited awareness	4	26.66	3	60.00	7	35
No disposal/recycling centers nearby	7	46.66	3	60.00	10	50.00
Irregular monitoring	9	60.00	0	0.00	9	45.00

The findings in **Table 2** reveal several significant problems higher educational institutions face in managing furniture waste. A lack of institutional policies was reported by 70 percent of institutions, affecting 80 percent of government institutions and 40 percent of private institutions, indicating the need for structured waste management guidelines. Insufficient storage space emerged as a significant concern for 80 percent of institutions, with government and private institutions (80 percent) equally affected, limiting the proper handling of discarded furniture. Additionally, 46.66 percent of government institutions reported a lack of staff, whereas no private institutions identified this as an issue. Financial constraints were cited by 45 percent of institutions, impacting 40 percent of government and 60 percent of private institutions, reflecting funding limitations in waste management efforts. Lack of record-keeping was another concern, affecting 25 percent of institutions, with 26.66 percent of government institutions and 20 percent of private institutions lacking proper documentation, which hinders tracking and accountability. Transportation difficulties were reported by 20 percent of institutions, specifically affecting 26.66 percent of government institutions, while private institutions did not identify this as a problem. Resistance to adopting sustainable waste practices was evident, with 45 percent of institutions experiencing resistance to change for reutilization, including 53.33 percent of government and 20 percent of private institutions. Additionally, 35 percent of institutions reported limited awareness of sustainable furniture waste management, with 26.66 percent of government institutions and 60 percent of private institutions affected, highlighting the need for awareness initiatives. A lack of disposal or recycling centers nearby was another problem reported by 50 percent of institutions, affecting 46.66 percent of government and 60 percent of private institutions. Furthermore, irregular monitoring was observed in 45 percent of institutions, with 60 percent of government institutions citing this problem, while no private institutions reported concerns in this area.

Up-cycling as sustainable and creative solution

Out of 68 furniture pieces found in one of the selected higher educational institution, 140 furniture and accessories like partitions, display boards, mobile holders, wall frames, coffee tables, and more were created through upcycling. Unlike traditional disposal methods, these upcycled products were reintroduced for practical use within the institution, helping to reduce waste and enhance sustainability. To raise awareness and encourage adoption, an exhibition showcased the transformed furniture to students, faculty, and university authorities. Interior design experts provided feedback on the design's innovation and quality. Additionally, a guidebook was developed featuring various design ideas and processes involved in the upcycling efforts. This initiative demonstrated the feasibility of upcycling in promoting sustainability and supporting a circular economy. **Plate 2** shows the up-cycling process.

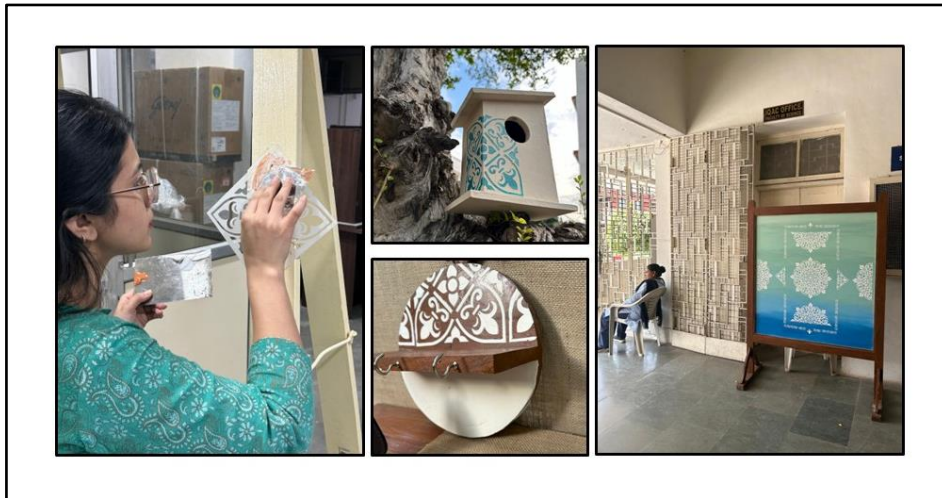


Plate 2: Up-cycling of furniture waste

Results and Conclusions

The study found that higher educational institutions in Vadodara commonly store their discarded furniture on campus, with most preferring closed storage. The waste primarily consisted of wooden furniture in moderate to poor condition, including chairs, desks, tables, and shelves. Institutions mainly managed their waste by storing it within their premises or selling it as scrap, while donation and incineration were less common practices. None of the institutions resorted to landfilling or dumping. Several challenges hindered effective furniture waste management, including limited storage space, lack of institutional policies, financial constraints, and resistance to reusing or repurposing old furniture. Additionally, institutions faced difficulties due to the absence of nearby recycling or disposal centers and irregular monitoring of waste management practices. Up-cycling proved to be a creative and sustainable solution, as demonstrated by an institution that transformed discarded furniture into functional items like partitions, display boards, and wall frames. The initiative not only reduced waste but also reintroduced furniture for practical use within the institution. An exhibition showcasing the up-cycled pieces, along with expert feedback, highlighted the potential of up-cycling in promoting sustainability. The study emphasizes the need for structured policies, better awareness, and collaboration with recycling facilities to improve furniture waste management in educational institutions.

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