Sight, Mind, and Action: The Effects of Visible Trash Bins on Students' Littering Behavior

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ABSTRACT

This study explored the effect of visible trash bins on the waste disposal behavior of college students and how color, size, labels, and picture indications influence their littering behavior. This study examines how the visibility and design of trash bins in academic settings influence students' littering behavior and their motivation to avoid littering. The visibility of trash bins is important for encouraging people to properly dispose of waste. This study is important as it offers valuable insight into the effects of visible trash bins on student littering behavior, promotes accountability, and guides educators and administrators in fostering environmental stewardship. This study utilized a quantitative research approach, particularly a descriptive type, to gather data from 130 college students at a State University in Bulacan. The study found that Trash Bins play a significant role in maintaining a clean environment; hence, the design, features, and presentation of trash bins play a significant role in making the trash bin more noticeable. The study concludes that visible, properly labeled, and well-placed trash bins are significant in promoting cleanliness and suggests designing bins according to user preferences, with explorations of various public locations such as streets and parks to study more about the impact of visibility of trash bins on littering behavior.

Keywords: Littering Behavior, Visible Trash Bins, Littering, Environmental Awareness

INTRODUCTION

Littering is one of the major problems that our country and the world are currently facing. In 2024, the Philippines grapples with a significant littering problem, particularly concerning plastic waste, with a high amount of waste generated daily and low recycling rate, leading to environmental issues and flooding. Solid waste is one of the most serious environmental problems owing to its high negative impact on natural resources and human health. Solid waste is one of the most serious environmental problems owing to its high negative impact on natural resources and human health. Cognitive theory by Azjen (1985) proposes that an individual's decision to engage in a specific behavior, such as littering or stopping littering, can be predicted by their intention to engage in that behavior. The theory of planned behavior extends the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Intentions are assumed to capture the motivational factors that influence behavior; they are indications of how hard people are willing to try, how much effort they are planning to exert, and how to perform the behavior. According to Writer and Writer (2023), littering is often caused by individuals who do not understand the consequences of their own actions. They do not know how it affects them or how it will affect others. This is just one proof that improper waste disposal 1 has a serious impact on both the environment and human health, because when garbage is not thrown away properly, it can clog waterways, cause flooding, and pollute the air and soil. This puts human lives at risk of spreading diseases and creating unhealthy living conditions. According to Hail et al. (2021), trash bins are helpful in people's daily activities by providing answers to various unexpected situations, habits, attitudes, and relationships with the waste we produce. Trash bins help to promote cleanliness and facilitate proper waste management. The simple act of throwing trash everywhere or improper littering can lead to long-term damage, such as flooding and pollution, which affect the entire community. Therefore, it is important to take responsibility for proper waste management before the damage becomes irreversible or to avoid conflict. Solid

waste management is the collection, treatment, and disposal of solid waste. Proper waste management segregation is one possible way to reduce or prevent the amount of garbage that causes floods.

According to Cariaso (2023), the Philippines generates at least 61,000 million metric tons of waste daily, 24 percent of which is plastic. The country produces 163 million plastic sachet packets, 48 million shopping bags, and 45 million thin-film bags daily. According to Jou (2024), even though the government has to promote cleanliness in its community, it has nothing to do with the results of proper waste disposal and segregation. Therefore, it is recommended to further strengthen the policies regarding waste segregation. This is just one proof that improper waste disposal has a serious impact on both the environment and human health, because when garbage is not thrown away properly, it can clog waterways, cause flooding, and pollute the air and soil. This puts human lives at risk of spreading diseases and creating unhealthy living conditions. The simple act of throwing trash everywhere or improper littering can lead to long-term damage, such as flooding and pollution, which affect the entire community.

It is also said that schools are pioneers in promoting cleanliness around the environment by inculcating in the children the importance of cleanliness and teaching them how to be responsible for their surroundings. Students must be exposed to the reality of littering if there is a seminar that teaches the importance of cleanliness. Lastly, it was also suggested that the government must utilize everything that they have to continue to educate youngsters about littering.

Objectives of the study:

This research aims to fill the gaps in existing research on littering behavior problems. It sought to determine how the presence of trash bins affects the behavior of humans whenever they see litter around them. This study aimed to explore how students' littering behavior can be described. It also aimed to seek students' opinions on the proper disposal of trash. We also determined if a trash bin has something to do with the attitude or behavior of students towards maintaining the school's cleanliness. It also aimed to determine whether there is a specific feature or design that encourages students to throw their trash properly and avoid littering. This research also identified some key factors that influence human behavior related to littering, such as peer influence, whether it affects them.

Statement of the Problem:

The general problem of the study is: How does the presence of visible trash bins in academic settings influence students' behavior toward littering avoidance?

Specific Problems:

1. How may the littering behavior of the students be described?

2. How may the visibility of trash bins be perceived?

3. Is there a significant relationship between the perceived visible trash bins and students' littering behavior?

4. What designs or features of trash bins encourage students to avoid littering?

Hypothesis of the Study

H0: There is no significant relationship between the perceived availability of trash bins and students' littering behavior.

METHODOLOGY

Research Design

This study used a quantitative research design, specifically a descriptive approach. The researchers chose this design because it entailed collecting numerical data to further comprehend whether the visibility of trash bins could have an impact on the littering behavior of students. This was a descriptive type of research because the

researchers aimed to determine whether a visible trash bin helped reduce littering or whether students continued to litter despite the presence of trash bins around them.

Participants

The respondents were college students of a state university in the province of Bulacan in the Philippines, covering all 13 colleges within the university. College students were chosen because they could understand and respond to various environmental and behavioral issues. According to Liu (2023), the study found that college students' environmental knowledge and values significantly influence their green purchasing intentions, highlighting the importance of education in fostering sustainable behaviors. The researchers used Quota Sampling to obtain the number of respondents needed per college. According to Alex (2024), quota sampling is a nonprobability sampling technique that involves selecting participants based on specific characteristics to ensure that certain segments of the population are represented. A total of 130 students participated in the study, with 10 chosen from each of the 13 colleges.

Instruments

The instrument of the study was a researcher-made questionnaire, designed based on a review of related literature, specifically the study by Ngamaleu (2021) titled "Littering Attitude among University Students in Cameroon", in which he utilized the Likert Scale as the instrument of the study. Three experts validated the questionnaire.

Procedure

The researchers, through the utilization of Quota Sampling, looked for 130 college students at a state university in Bulacan who were willing to participate in the study. The respondents were given a consent form to formally ask for their permission. After the consent form was signed, the questionnaires were handed to the participants to start answering. Statistical treatment involves the application of a variety of computational tools and platforms. Initially, Microsoft Excel was used to calculate frequencies, average means, and standard deviationsand to organize the data using the VLOOKUP function. Subsequently, the researchers used the Social Science Statistics website, which is an online free platform, to conduct Pearson's Correlation Coefficient analysis. This statistical test allowed researchers to determine the strength and significance of the relationship between the perceived availability of trash bins and students' littering behavior. By entering the variables into the platform, the researchers obtained the r-value and sig-value, which were then used to test the study's hypotheses and draw valid conclusions aligned with the research objectives. The rest assured that the data that the respondents entrusted to the researchers would be kept at full discretion for the safety of the respondents. Should the respondents want to see the study or withdraw their participation, they are allowed to do so.

RESULTS

Data concerning the research objectives were gathered from the thirteen (13) colleges in a state university in Bulacan. This chapter discusses the results of the Likert-scale questionnaire completed by 130 respondents. Furthermore, the respondents were assured that the data they provided would be used only for this research and that their identities would remain confidential. The objective of this research was to determine how a visible trash bin affects students'littering behavior. The results are presented based on the Statement of the Problem presented in the introduction.

Part I: Visibility of Trash Bins

Table 1 presents the data gathered regarding the visibility of trash bins around the campus. The average rating indicates whether trash bins are easily noticeable and accessible to students, which can affect proper waste disposal habits.

Table 1 Visibility of Trash Bins

Indicators	Ave Rating	SD
1. I can properly dispose my trash if there's a nearby trash bin around me.	4.70	0.50
2. I am encouraged to properly dispose of my trash, if there is a nearby trash bins from where I am eating (e.g. canteen, cafeteria, food stalls)	4.72	0.52
3. I am encouraged to properly dispose of my trash if the trash bins are placed near the waiting bench/ shed.	4.64	0.56
4. I am more likely to properly dispose of my trash if the trash bins are not full of trash.	4.48	0.64
5. I am encouraged to properly dispose of my trash if the trash bins are neat and clean.	4.64	0.61
6. I find it convenient if the trash bins do not have complicated covers.	4.38	0.78
7. I am encouraged by the color of the trash bins to properly dispose of my trash.	4.15	0.85
8. I am encouraged to properly dispose of my trash if the trash bins are creative and attractive in the eyes	3.97	0.92
9. I am more likely to throw my trash in the trash bins that are big enough	4.45	0.69
10. I am more encouraged to properly dispose my trash if the trash bins have convenient features (e.g. step-on, swing lid trash bin)	4.40	0.74
TOTAL	**4.45**	**0.68**

Table 1 provides valuable insights into how the visibility and availability of bins or the strategic placement of trash bins can influence proper waste disposal behavior among these respondents. From the findings, the highest mean score of 4.72 was attributed to trash bins placed inside dining areas, indicating a strong agreement on their effectiveness in encouraging respondents on proper disposal practices. This suggests that both convenience and accessibility are significant and crucial in shaping positive environmental behavior. By contrast, bins with innovative or decorative designs received a lower mean score of 3.97, highlighting that a large number of users prioritized functionality and accessibility over aesthetic appearance. The study's overall mean score of 4.45 in this table, interpreted as "Strongly Agree," reflects a very positive perception of the trash bin's visibility and usefulness for users. A standard deviation of 0.68 indicates moderate consistency, suggesting that most of these participants shared similar views, with only slight variations influenced by some specific bin features such as color, size, or cleanliness. These findings underscore the importance of strategic bin placement in a specific area over visual design alone in promoting responsible waste disposal.

Part II. Students' Littering Behavior

Table 2 presents the data gathered on the Littering Behavior of students at a State University in Bulacan..

Table 2 Students' Littering Behavior

Indicators	Ave. Rating	SD
11. I am aware that trash must be disposed of properly.	4.9	0.3
12. I am aware that littering can harm the environment.	4.83	0.51
13. I am accountable for keeping my environment clean.	4.71	0.53
14. I keep my trash in my bag/pocket if there are no available trash bins.	4.66	0.57
15. I do not throw my trash everywhere if I see no trash bins around.	4.46	0.76
16. I properly dispose of my trash based on its designated trash bin.	4.15	0.78
17. I properly dispose of my trash even smaller ones. (eg. candy wrappers)	4.4	0.77
18. I pick up trash whenever I see any and dispose it properly.	3.56	0.95
19. I do not throw my trash everywhere even though there's already trash thrown there, because I know that it is not the proper place to dispose my trash.	4.28	0.84
20. I am influenced by my friends to properly dispose of my trash.	3.70	1.03
TOTAL	**4.36**	**0.70**

Table 2 shows compelling evidence of a strong level of environmental awareness among college respondents, indicated by a high mean score of 4.90, which signifies that they recognize the importance of a clean and

healthy environment. Notably, the respondents' influence on their friends to properly dispose of trash is seen with the rate of 3.70. However, when it comes to individual acts of environmental responsibility or self discipline—such as picking up litter and placing it in its designated bins—the lowest mean score is 3.56. This suggests that their personal initiative still has room for improvement. The overall total mean of 4.36 with a standard deviation of 0.70 signifies strong agreement that the students strongly agree with environmental responsibility regarding littering behaviors, though with consideration of moderate variation. This includes a high level of environmental awareness and discipline; the moderate SD suggests some variability, especially on behaviors influenced by peers or extra effort like picking up trash. Overall, students demonstrate a commendable environmental awareness with a lot of opportunities to strengthen individual accountability.

Part III: Relationship between Visibility of Trash Bins and Students' Littering Behavior

Table 3 presents our research hypotheses. The table shows whether there is a significant relationship between the visibility of trash bins and students' littering behavior.

Table 3 Correlation Analysis Between Visible Trash Bins and Students' Littering Behavior

Variables Correlated	**r**	**Description**	**Sig-value**	**Decision**	**Interpretation**
Visibility of Trash Bins and Students' Littering Behavior	0.501	Moderate positive linear correlation	0.00001	Reject Ho	There is a significant relationship between Visible Trash Bins and Students' Littering Behavior.

Table 3 highlights a significant relationship between the visibility of trash bins and students' littering behavior. The correlation coefficient (r-value) of 0.501 indicates a moderate positive linear relationship, meaning that as the visibility and availability of trash bins increases, proper waste disposal behavior also improves. This suggests that college students are more likely to dispose of their trash properly when they encounter bins that are clearly visible and easily accessible. Additionally, the significance value (sig = 0.00001) confirms that the relationship of these two ideas is statistically significant, implying that this observed correlation is unlikely due to the chance. These study findings emphasize the importance of strategic trash bin placement.

Part IV. Design and Features of a Visible Trash Bin

Below is a ranking of the most significant feature of the least significant feature for the students.

Table 4 Design or features of Trash Bins

Indicators	**Ave Rating**	**SD**	**Ranking in order of significance**
21. Trash Bins that are properly labeled	4.68	0.63	1
22. Trash Bins that have pictures	4.21	0.96	2
23. Trash Bins that have different colors	3.74	1.14	5
24. The size of the Trash Bins	4.06	1.04	4
25. Step on / Swinging lid Trash Bins	4.10	1.08	3
TOTAL	**4.16**	**0.97**	

Table 4 shows detailed insights into how the design and specific features of trash bins can influence students' waste disposal behavior. Among these various features being evaluated, trash bins with proper and visible labeling received the highest average rating of 4.68. This indicates that students have a strong preference for clearer labels on bins, which help them to easily identify the correct bins for various types of waste, thereby promoting even more effective and responsible disposal ways and practices. Bins differentiated by color received a lower average rating of 3.37. This suggests that even though there is a specific color coding in trash bins that can support waste segregation, it is not as impactful alone without accompanying clear labels. The overall mean score of 4.16 indicates that students generally agree that features of trash bins are more important in shaping their disposal habits. However, the relatively high standard deviation of 0.97 is due to varied opinions among respondents. This variability shows that while some students highly value specific features of bins like labeling, still, others may not find features like size, color, or design as influential as they are. These

study's findings highlight the significance of prioritizing clear and informative labels in trash bin design, while recognizing that the other features of bins may still play an important role as supporting, more or less, every part and role in encouraging proper waste disposal behavior are all important.

DISCUSSION

Students reported high agreement with statements on the importance of proximity, cleanliness, and user-friendly features of trash bins. Highest ratings were for bins near dining areas, while creative design features ranked lower. These findings align with the Theory of Planned Behavior's perceived behavioral control construct—students are more likely to perform a behavior when environmental facilitators are present.

Students expressed strong environmental awareness, scoring high on statements of accountability and intentional proper disposal. However, picking up others' litter scored lowest (mean = 3.56), suggesting a distinction between individual responsibility (intentional action) and collective responsibility (intervening in others' waste). This gap may reflect weaker subjective norms around shared accountability.

A moderate positive correlation ($r = 0.501$, $p < 0.001$) was found between trash bin visibility and proper waste disposal. This supports the Theory of Planned Behavior, indicating that visible, well-designed bins enhance perceived behavioral control and thus influence intention and behavior.

Students prioritized clear labeling and pictorial guidance. Less emphasis was placed on aesthetic features like color. This again supports that functionality contributes more to perceived control than design appeal.

Findings demonstrate a strong influence of environmental design on behavioral intention, in line with the Theory of Planned Behavior. Visible, labeled, and convenient trash bins positively affect students' waste disposal actions. While most students show high levels of personal responsibility, lower scores for picking up litter indicate a potential gap in collective norms. Future interventions might focus on promoting a culture of shared environmental care.

The study's reliance on quantitative methods limits insights into deeper motivations. Incorporating interviews or focus groups in future studies could help explore barriers to collective action, especially for behaviors requiring extra effort. Moreover, extending the study beyond campus to public spaces like parks and streets could improve generalizability and inform policy or design improvements.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, the following conclusions are drawn which are as follows:

A Visible Trash Bin is important to keep the environment clean. Factors such as availability, appearance, and design are crucial for making a Visible Trash Bin more appealing and attractive to students. It is trash bins with labels that students think are the most beneficial. In contrast, students do not prefer unnecessary and complicated features of trash bins. The placement of trash bins also matters to them if they are accessible enough to common areas such as the canteen and lounges.

On the other hand, students are well aware of their roles and responsibilities in keeping the environment safe and clean, and making sustainable efforts to preserve the environment. Students' awareness is important for keeping the environment clean. One of the best factors in students' awareness is that they share their knowledge with others to make the environment healthy for everyone.

Based on these results, the researchers made recommendations to reduce littering. All the data gathered and the given results are considered in creating recommendations for more effective trash bins.

1. **Employ Mixed-Methods Methods:** Future research will need to integrate quantitative questionnaires with qualitative measures like interviews or focus groups. This will reveal the underlying motivations, beliefs, and cultural norms driving littering behavior and offer a richer, more nuanced understanding of behavioral drivers.

2. **Take Research Off Campus:** To enhance the external validity of findings, subsequent studies must be conducted in public spaces like parks, streets, markets, and transportation hubs. These are different structural and social contexts that might provide more insight for planning policy and infrastructure.
3. **Encourage Educational Campaigns Promoting Collective Responsibility:** Educational institutions must create campaigns with a focus on collective responsibility, ensuring students act not just for individual cleanliness but also to maintain public environmental standards. Peer influence and social modeling should be deployed to amplify subjective norms that deter littering.
4. **Optimize Trash Bin Design According to Behavioral Insights:** Schools and municipalities must focus on functionality in designing trash bins. Characteristics like pictograms, clear labels, cleanliness, ease of access, and proximity to busy locations greatly enhance perceived behavioral control, making proper waste disposal more likely.
5. **Policy Synthesis and Inter-Facing with Local Government Units (LGUs):** Research findings ought to be applied to waste management policy at the institutional and municipal level. Joint initiatives involving schools and LGUs can implement streamlined bin designs and educational programs in varied community contexts.

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