

Research on Strategies for Promoting Waste Classification in Universities

Wang Lu, Wang Wei, Miao Jingyi, Liu Liyun*

Central University of Finance and Economics, Beijing, China
*Corresponding Author

Abstract: This study focuses on the waste classification work in universities. Considering the severe urban waste problems and the characteristics of universities, it analyzes the current challenges, including shortcomings in management systems, awareness, facility layout, and publicity and education. It then proposes advancement strategies, covering organizational management such as building structures and institutional systems, diverse channels in publicity and education, integrating into teaching and leveraging the role of volunteers, reasonable allocation of trash bins and construction of temporary storage and transfer facilities at the facility standard level, and constructing an indicator system for effect evaluation, implementing regular and dynamic assessments, and strengthening the application of feedback on results.

Keywords: university; waste classification; logistics management

1. Introduction

In today's society, waste classification has become an important measure to address environmental challenges and promote resource recycling. With the accelerated urbanization process and the continuous improvement of residents' living standards in China, the scale of urban household waste continues to expand, leading many cities to face the dilemma of being surrounded by garbage^[1]. As important places for knowledge dissemination and talent cultivation, universities actively promoting waste classification not only helps improve campus environment but also serves as a crucial way to cultivate environmental awareness and fulfill social responsibilities among faculty and students. Universities, characterized by dense populations and frequent activities, generate a variety of waste in considerable quantities. Effectively advancing waste classification work in universities is a significant task facing every institution. In-depth analysis of the current status of waste classification work in universities and a comprehensive exploration of the challenges it faces are crucial for formulating targeted improvement strategies and promoting the in-depth development of waste classification work in universities.

2. The Real Challenges of Waste Classification Work in Universities

2.1 Deficiencies in Management Systems and Implementation Efficiency

2.1.1 Unclear Definition of Responsibilities

Within universities, multiple departments and units are involved in waste classification work, but in practical operations, there is a lack of clarity and precision in the division of responsibilities among these departments. This ambiguity often leads to passing the buck and buck-passing during the work coordination process. For instance, the logistics department might believe that the responsibility for publicity and education should be led by the student affairs department or the academic affairs department, while the student affairs department may feel that facility provision and maintenance should primarily fall under the logistics department's responsibility. This unclear delineation of responsibilities hampers the effective establishment of work coordination mechanisms, making it difficult to form a strong collaborative effort to smoothly promote waste classification work.

2.1.2 Imperfect Supervision and Assessment Mechanisms

Universities generally lack strict and comprehensive supervision and inspection mechanisms, resulting in a serious lack of daily supervision over waste classification work. Schools have failed to

establish a regular and systematic inspection system, and even if certain forms of inspection activities exist, they often do not promptly correct and penalize non-compliant waste disposal behaviors. This leads to some faculty and students harboring a mentality of luck, not adhering to the prescribed requirements for waste classification. Furthermore, there are deficiencies in the assessment and evaluation system. There is a lack of a scientifically reasonable and comprehensive quantified assessment indicator system for departments, units, and individual faculty and students in waste classification work. This inadequacy hinders the accurate measurement of work effectiveness, making it difficult to effectively implement reward and punishment measures and to fully motivate and engage all parties in waste classification work.

2.1.3 Obstacles to Inter-school Collaboration

The effective advancement of waste classification work in universities relies on close collaboration with external entities such as sanitation companies and recycling companies. However, in actual cooperative processes, a series of issues often arise, including communication and coordination challenges, difficulties in ensuring service quality, and disputes over costs. For instance, sanitation companies may experience delays in waste removal, leading to frequent instances of waste accumulation on campus. Recycling companies may set unreasonable prices for recyclable materials, which to some extent affects the enthusiasm of the school and faculty and students to participate in resource recycling efforts. The lack of clear responsibility allocation between both parties and a lack of effective contingency mechanisms during cooperation are not conducive to the sustained and stable implementation of waste classification work in universities.

2.2 Weak Awareness and Limited Understanding

2.2.1 Lack of Attention from Teachers and Students

Currently, there is a low level of awareness among faculty and students at major universities regarding waste classification^[2]. In the current university environment, a considerable number of faculty and students do not fully realize the profound significance of waste classification for environmental sustainability and efficient resource recycling; they often perceive it merely as an additional task. Some teachers fail to effectively incorporate waste classification-related educational elements into their teaching processes, thereby not fully leveraging the demonstrative and guiding efficacy of leading by example. Student groups tend to focus more on academic affairs, lacking active learning willingness and practical motivation towards waste classification. This leads to a common occurrence of casually discarding waste in daily life scenarios, becoming a key factor hindering the effective advancement of waste classification work.

2.2.2 Lack of and Unclear Understanding of Waste Classification Knowledge

Despite the basic concept of waste classification having achieved a certain level of popularization at the societal level, there still exist many misunderstandings and cognitive blind spots among faculty and students in universities regarding the precise standards and specific operational methods of waste classification. For instance, when faced with a variety of complex types of waste, it is challenging to accurately differentiate the clear boundaries between recyclables, hazardous waste, kitchen waste, and other waste types. There is a lack of clear understanding, especially when it comes to certain special types of waste items such as used batteries, expired medications, discarded electronic products, etc., which contributes to a low level of accuracy in waste classification. This deficiency in knowledge directly leads to a low level of classification accuracy, significantly impacting the overall implementation effectiveness and the achievement of expected goals in waste classification work.

2.3 Imbalance in Facility Configuration and Layout

2.3.1 Insufficient and Damaged Number of Trash Bins

In some universities, the number of trash bins on campus is insufficient to meet the waste disposal needs generated by the daily activities of faculty and students, especially in areas with high population density such as academic buildings, cafeterias, and dormitory areas. Trash bins are often full or overflowing in these areas, which not only negatively impacts the aesthetics of the campus environment but also poses a serious threat to campus hygiene and health. Additionally, some trash bins show signs of functional damage such as breakage and missing lids due to prolonged use without timely maintenance, repair, or replacement. This not only diminishes the functionality of the trash bins themselves but also to some extent reduces the willingness and enthusiasm of faculty and students to

actively participate in waste classification.

2.3.2 Unclear and Missing Classification Labels

The classification labels on the surfaces of trash bins suffer from issues such as being unclear, damaged, or not updated in a timely manner. This situation leads to difficulties for faculty and students in accurately determining the category to which the waste belongs when disposing of trash, thus easily resulting in misclassification. Some trash bins are only equipped with simple text labels, lacking visually intuitive patterns or clear color differentiation indicators. For individuals unfamiliar with waste classification standards, this significantly increases the difficulty of classification operations. Furthermore, on-campus waste collection points and transfer facilities also face the problem of unclear labeling, which poses a serious obstacle to the smooth flow of subsequent processes such as waste classification, collection, transportation, and disposal.

2.3.3 Lack of Rationality in Facility Layout

The layout and placement of trash bins on campus have not fully taken into account the flow patterns of daily activities of faculty and students and their convenience needs. Some trash bins are either too far from areas where faculty and students frequent or are positioned in inconspicuous locations. Taking teaching buildings as an example, trash bins may be concentrated near staircases or at the ends of corridors, which are relatively peripheral locations. During short breaks between classes when students have limited time and a fast-paced schedule, the distance factor makes it difficult for them to accurately dispose of trash into the corresponding bins. In dormitory areas, the distribution of trash bins may be uneven, with some dormitories located far from waste disposal points. This inconvenience in daily life for students weakens their willingness and conscientiousness to actively participate in waste classification.

2.4 Ineffectiveness of Publicity and Education

2.4.1 Lack of Diversification in Propaganda Forms

In waste classification propaganda efforts, universities mostly rely on traditional methods such as posting posters and distributing pamphlets. These conventional forms of promotion exhibit a significant lack of innovation and attractiveness, characterized by their uniformity. The content of these promotional materials often tends to be overly theoretical and lacks a close connection to the practical contexts of daily life for faculty and students. As a result, they struggle to resonate with and capture the attention of faculty and students effectively, leading to a significant discount in the effectiveness of the propaganda. Consequently, the expected educational goals of the propaganda campaign cannot be realistically achieved.

2.4.2 Insufficient Educational Depth

During the implementation of waste classification propaganda and educational activities, the majority of efforts often remain at a superficial level, failing to deeply engage with the thoughts, beliefs, and behavioral habits of faculty and students. Although schools host a series of waste classification knowledge lectures and training activities, these initiatives lack systematic and sustained planning. Consequently, faculty and students, after participating in such activities, fail to internalize waste classification knowledge as a self-conscious behavioral standard. They struggle to consistently adhere to proper waste classification practices in their daily lives. Furthermore, there are limitations in the reach of waste classification education, as some faculty and students may not participate in related educational activities due to conflicts in scheduling or other reasons, resulting in an uneven overall educational impact.

2.4.3 Absence of Long-Term Mechanisms

In universities, the waste classification propaganda and educational efforts have not yet established a long-term and stable operational mechanism. They often take the form of temporary and episodic activities, making it challenging to sustainably and effectively promote the cultivation of environmental awareness and the formation of behavioral habits among faculty and students. Schools lack long-term planning and continuous investment in propagating educational activities. After the activities conclude, there is a lack of timely follow-up and reinforcement of the educational achievements. Consequently, the attention and participation of faculty and students in waste classification diminish over time, making it difficult to achieve a substantial shift from “passively accepting classification requirements” to “actively practicing classification behaviors”.

3. Strategies for Advancing Waste Classification Work in Universities

3.1 Organizational Management Strategies

3.1.1 Establishing a Comprehensive Organizational Structure System

Establishing a dedicated waste classification leadership group, led by senior university leaders with a wide representation of department heads from relevant functional areas, is proposed. This leadership group carries the significant responsibility of comprehensively planning and coordinating waste classification efforts across the entire university. They are tasked with carefully formulating overarching goals and forward-looking strategic plans, actively coordinating the intricate work relationships among various departments, thereby providing a solid foundation for the smooth and orderly progress of waste classification initiatives. Within this leadership structure, a specialized office is established to handle day-to-day operations, focusing on detailed organization and efficient implementation. This office is responsible for developing thorough work plans, rigorously monitoring progress, systematically compiling work-related data, and ensuring precise implementation of all tasks.

3.1.2 Developing a Sound and Comprehensive Institutional System

Carefully formulate a comprehensive and detailed waste classification management system, clearly defining the responsibilities and obligations that each department, unit, and individual faculty and student should undertake in waste classification initiatives. This system should cover waste classification standards, precise disposal requirements, efficient collection processes, reasonable transportation arrangements, and scientifically sound disposal methods to ensure that waste classification activities have clear guidelines and solid foundations at every stage. Simultaneously, focus on establishing a rigorous oversight and inspection mechanism. Conduct regular comprehensive assessments of waste classification practices across departments and different areas, closely linking inspection results with performance evaluation systems. Departments and individuals who demonstrate outstanding performance in waste classification should be duly recognized and rewarded, while those who exhibit poor performance should face serious criticism and appropriate penalties. This will create a strong incentive and constraint mechanism to drive efficient waste classification practices forward.

3.2 Publicity and Education Strategies

3.2.1 Collaborate through Diverse Channels for Propaganda Activities

Promoting the dissemination of waste classification systems in universities and across society, and increasing awareness of relevant policy knowledge, is a crucial step in enhancing waste classification awareness among university students and members of society^[3]. Universities should fully utilize the diverse propaganda channels available on campus, including campus radio, campus newspapers, bulletin boards, official websites, WeChat public accounts, and more, to comprehensively and extensively disseminate the key significance of waste classification, precise classification standards, and scientific methods. By carefully creating engaging and interesting promotional posters, captivating videos, creative animations, and other materials, universities can effectively capture the high attention of faculty and students, significantly enhancing the effectiveness of the propaganda. Actively engaging in various themed promotional activities such as waste classification knowledge competitions, environmental creative contests, waste classification exhibitions, and more can deeply stimulate the enthusiasm of faculty and students, effectively enhancing their understanding and depth of knowledge regarding waste classification.

3.2.2 Integrate Deeply into the Education System

Integrating waste classification knowledge into the overall curriculum system of schools by offering related elective courses or special lectures is essential for systematically imparting theoretical knowledge and practical skills in waste classification to students. By cleverly incorporating elements of environmental education into the teaching processes of various disciplines, schools can guide students to deeply contemplate the inherent and close relationship between waste classification and environmental protection from a multidisciplinary perspective. For instance, detailed explanations of the chemical composition and potential hazards of hazardous waste can be provided in chemistry courses, while biology courses can delve into the principles and methods of biological treatment of kitchen waste. Furthermore, there should be a strong emphasis on enhancing the professional training of teachers to effectively raise their environmental awareness and educational capabilities. This will enable them to more effectively guide students to actively participate in waste classification practices

during classroom teaching, translating theoretical knowledge into practical actions.

3.2.3 Fully Utilize the Demonstrative and Motivational Role of Volunteers

Actively establishing a waste classification volunteer team to attract a wide participation of teachers and students is crucial. Volunteers, after receiving professional and systematic training, should engage in waste classification promotion, guidance, and supervision throughout various corners of the campus. The volunteer team should meticulously set up waste classification promotion points in key areas such as dormitories, academic buildings, and cafeterias, enthusiastically distributing informational materials to passing faculty and students and patiently answering questions on-site. They should diligently stand by waste disposal points, carefully guiding faculty and students in correctly classifying and disposing of waste, and promptly correcting any improper disposal behaviors. Through the active demonstration and leadership of volunteers and their influential impact, a strong and positive waste classification atmosphere can be fostered. This will effectively guide more faculty and students to gradually develop good waste classification habits, promoting the widespread acceptance of waste classification principles.

3.3 Facility Standardization Strategies

3.3.1 Scientific and Rational Allocation of Waste Classification Bins

Based on the functional characteristics of different areas on campus and the actual generation of waste, it is essential to carry out precise and rational waste bin placement. In academic and office areas, an appropriate number of bins for recyclables, general waste, and hazardous waste should be provided to meet the collection needs of various types of waste generated during daily office and teaching activities. In residential areas, in addition to the aforementioned types of bins, kitchen waste bins should be added to fully meet the requirements for classifying and collecting students' daily household waste. The placement of waste bins should consider the principle of convenience for faculty and students while making every effort to avoid adverse effects on the campus's aesthetics and traffic order. The surfaces of the waste bins should be clearly marked with classification labels to ensure that faculty and students can accurately identify the purpose of each bin, thereby achieving precise waste classification and disposal.

3.3.2 Establishing a Comprehensive and Efficient System of Waste Temporary Storage and Transfer Facilities

It is important to strategically plan and set up dedicated waste storage points within the campus for the centralized storage of classified waste. These waste storage points should have functions such as rainproofing, leak prevention, odor control, and more, to ensure that the waste stored there does not cause secondary pollution to the surrounding campus environment. Compared to urban waste, waste on campus is simpler to classify, with clear hierarchical composition and relatively fewer special toxic or hazardous waste components^[4]. Therefore, universities can scientifically and reasonably determine the appropriate scale and layout of waste storage points based on the actual volume of waste generated on campus and the objective requirements for the frequency of waste removal. Additionally, equipping the campus with professional and advanced waste transfer equipment, such as efficient waste collection vehicles, is crucial to ensure that the classified waste can be transported to off-campus professional waste treatment facilities in a timely, safe, and efficient manner. It is imperative to strengthen strict management throughout the entire waste transfer process, effectively preventing issues like mixing of waste types and leaks during transfer, thus ensuring the smooth and orderly progress of the entire waste classification and processing workflow.

3.4 Effectiveness Evaluation Strategies

3.4.1 Establishing a Scientific and Rational Evaluation Indicator System

Accuracy Rate Indicator: The accuracy rate indicator involves regularly inspecting the composition of waste at various waste disposal points in different areas to calculate the accuracy of waste classification for different types of waste (recyclables, hazardous waste, kitchen waste, other waste). Through random sampling, a certain number of waste bins are selected for inspection, and the proportion of correctly sorted waste is calculated. This method accurately measures the level of understanding and actual implementation of waste classification standards among faculty and students.

Participation Rate Indicator: The participation rate indicator involves calculating the proportion of

faculty and students participating in waste classification promotion activities, volunteer activities, and waste classification courses among the total number of faculty and students in the school. Additionally, through methods such as questionnaire surveys and on-site interviews, the level of attention, willingness to participate, and awareness of waste classification knowledge among faculty and students are assessed comprehensively to evaluate the overall level of participation in waste classification work.

Environmental Improvement Indicator: Monitoring the trend in the total amount of waste generated on campus, analyzing the improvement in campus environmental quality before and after the implementation of waste classification work. This includes assessing whether waste accumulation has decreased, whether the cleanliness of public areas has improved, and whether odor emissions have been effectively controlled. This indicator visually reflects the positive impact of waste classification work on the campus environment.

Resource Recycling Indicator: Accurately recording the amount of recyclables collected, the frequency of collection, and the value of recycling. Calculating the recycling rate of recyclables (the proportion of the amount of recyclables collected to the total amount of recyclables generated) evaluates the actual effectiveness of waste classification work in resource recycling. This indicator reflects the contribution of waste classification to resource conservation and reducing environmental pressure.

3.4.2 Implementing a Combination of Regular and Dynamic Evaluation Mechanisms

Regular Evaluation: Establish a set evaluation cycle, such as conducting small-scale evaluations monthly and comprehensive evaluations at the end of each semester. During the regular evaluation process, organize professional personnel to systematically collect and analyze relevant data according to the evaluation indicator system, producing detailed evaluation reports. These reports should cover the completion status of each indicator, problems encountered during work, achievements made, and specific improvement suggestions for addressing these issues. This process provides clear direction and guidance for the next phase of waste classification work.

Dynamic Evaluation: In order to implement a daily dynamic monitoring mechanism utilizing information technology tools, it is proposed to install intelligent monitoring devices at waste disposal points to real-time record data such as the amount of waste deposited, deposition times, and classification situations. Additionally, a feedback platform should be established to encourage faculty and students to provide feedback on problems encountered and improvement suggestions related to waste classification work. By utilizing dynamic monitoring data and feedback information, the system can promptly identify any sudden issues and potential risks in waste classification work, adjust work strategies and measures quickly, and ensure that waste classification work consistently maintains a good operational status.

3.4.3 Strengthening the Application and Feedback of Evaluation Results

Incentive Measures: To link evaluation results closely with departmental and individual performance assessments and reward mechanisms, it is recommended that departments and individuals who excel in waste classification work and achieve outstanding results in various evaluation indicators be provided with material and spiritual rewards. These incentives aim to stimulate the enthusiasm and initiative of all faculty and students to participate actively in waste classification work.

Rectification and Implementation: To address the issues and shortcomings identified in evaluations, responsibility should be assigned to specific departments, and clear deadlines for rectification should be set. Relevant departments must develop detailed rectification plans and implement them earnestly. Strengthened monitoring and supervision during the rectification process are essential to ensure the effective resolution of issues, driving continuous optimization and improvement of waste classification work.

Experience Sharing: To ensure the timely summarization of successful experiences and innovative practices in waste classification work, it is recommended to promote and apply these experiences across the entire campus through internal exchange meetings, experience sharing sessions, work briefings, and other forms of communication. Encouraging mutual learning and sharing between departments will collectively enhance the level of waste classification work. Furthermore, actively sharing experiences with other universities is crucial to contribute to the overall development of waste classification work in higher education institutions.

By constructing a scientifically sound evaluation strategy, universities can comprehensively, objectively, and accurately understand the actual effectiveness of waste classification work. This

approach allows for the timely identification and improvement of issues, continuous optimization of work processes and methods, ensuring that waste classification work meets its intended goals, leading to sustainable improvement of the campus environment and efficient recycling of resources.

4. Conclusion

Waste classification work in universities is a long-term and challenging task that requires the collective efforts of all faculty and students. By establishing a sound organizational management system, conducting comprehensive publicity and educational activities, standardizing facility configuration and management, and establishing a scientific and effective evaluation mechanism, universities can effectively promote waste classification work, achieve reduction, resource utilization, and harmlessness of campus solid waste. This not only helps improve the quality of the campus environment and cultivate environmental awareness and sense of responsibility among faculty and students but also contributes the strength of universities to the sustainable development of society. In future work, universities should continuously summarize experiences, innovate work methods, and continuously promote waste classification work to a higher level.

References

- [1] Li Xueqin. *Research on the Participation Awareness of College Students in Household Waste Classification and Recycling*. *Science Vision*, 2013, (32): 173-174, 248.
- [2] Ma Yan, Shi Pengfei, Wang Tuqiang, et al. *Analysis of the Current Situation of Household Waste Classification in Universities and Suggestions for Countermeasures*. *World Environment*, 2019, (05): 41-43.
- [3] Wang Xiaodan, Li Zhihong. *Study on the Source Classification Behavior of Household Waste by Beijing University Students and Its Influencing Factors*. *Technology Promotes Development*, 2018, 14(04): 244-248.
- [4] Liu Fen, Li Ruijie, Han Ruixia. *Optimization and Feasibility Analysis of Household Waste Classification System in Universities: A Case Study of Southwest University*. *Chongqing and the World (Academic Edition)*, 2013, 30(08): 91-95.