

# On Intelligent Disposal of Campus Garbage Classification in Colleges and Universities

-- Taking Anhui University of Finance and Economics as an Example

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**Abstract:** At present, most of the research on garbage disposal is often focused on communities or towns, and there is not much research on garbage classification on college campuses. According to the education statistics released by the Ministry of Education in 2021, there will be 3012 colleges and universities in China in 2021. The total number of students in various forms of higher education will be 44.3 million, not including the number of teachers and staff. It can be seen that colleges and universities are also places that generate garbage. This paper takes Anhui University of Finance and Economics as an example to study the intelligent disposal of garbage classification from the perspective of colleges and universities, aiming to improve the campus environment and play a practical guiding role in improving the campus ecological environment.

**Keywords:** Garbage classification; Intelligent processing; Resource reuse rate.

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## 1. Introduction

The environmental problem has become one of the serious problems in the contemporary society. The increase of population will inevitably produce more and more garbage. The former way of landfill and incineration is no longer suitable for today, and garbage classification has become increasingly important. With the improvement of education level, the number of college students is gradually increasing. With the increase of the number, the problem of garbage disposal also arises. In fact, today, with the rapid development of society, both the state and the government have emphasized the problem of environmental resources. Environmental protection and green have been paid more and more attention. The concept of "green water and green mountains are golden mountains and silver mountains" has also been deeply rooted in the hearts of the people, which makes garbage classification and resource recycling increasingly prominent in the development. And college students, as the main force in the development of modern society and a group with a high level of knowledge, should do their best in garbage disposal and environmental protection. But in fact, in many universities, garbage classification has not been implemented on campus because the process of garbage classification is relatively complex, takes a long time, and requires the processor to have a good knowledge of garbage classification. This is also a common phenomenon in society, so the intelligent garbage classification system also came into being. It helps garbage classification through big data, the Internet of things and other scientific and technological means.

With the rapid development of modern economy and technology, human beings are facing a serious ecological and environmental pollution crisis. The implementation of garbage classification can help students improve their quality, improve their understanding of garbage classification crisis, and cultivate their sense of social responsibility. College students have rich cultural knowledge and technical ability, strong learning ability and strong environmental awareness.

The implementation of intelligent waste classification in universities is easier to operate, more feasible and more powerful. This research can enhance students' awareness of environmental protection and social responsibility, cultivate students' good habits and improve their overall quality. College students must strictly abide by the garbage classification rules, protect the campus environment, and strive to build a beautiful campus. At the same time, the technical requirements for intelligent garbage classification are also very high. As contemporary college students, they should keep learning and making progress to keep pace with the times. The comprehensive implementation of the campus garbage classification conforms to the ecological environment protection policy issued by the state, which is conducive to promoting the promotion to universities across the country, so as to form experience and promote the realization of an intelligent garbage classification society. The implementation of intelligent waste classification in colleges and universities can improve the school environment and surrounding environment and reduce the waste of school resources. It can also save a lot of time and transport the waste to the waste treatment plant in an orderly and effective way. At the same time, the recycling rate of garbage and resource reuse rate have been improved, and the sustainable development of resources has really been realized.

## 2. Current Situation and Problems of Intelligent Disposal of Garbage Classification in Colleges and Universities

### 2.1. Current situation and problems of the research site

Taking the East Campus of Anhui University of Finance and Economics as the main research and observation site, the garbage classification of student dormitory building, teaching building, restaurant, campus road, playground, basketball

court and other places was observed on the spot. Among them, the types of garbage in the dormitory are complex, including recyclable garbage, such as waste paper, plastic bottles and plastic boxes, as well as batteries, cosmetics, leftovers and other non-recyclable garbage. At present, there are about 8 trash cans at the entrance of the dormitory building of the school. The garbage is transferred in the morning every day, mainly by cleaning trucks. There is no garbage classification, and the amount of garbage in the dormitory has obvious periodic changes. The amount of garbage is the largest on weekends, holidays, and shopping carnivals.

In the form of online questionnaires, 400 questionnaires were distributed and 388 were recovered, including 375 valid ones. Taking college students as the main survey objects, we can see from the data obtained from the questionnaire (Table 1) that most students believe that garbage classification is imminent, and they can also realize their role as garbage dispensers in the campus garbage classification. However, due to the lack of classification knowledge and unreasonable garbage bin settings, it is difficult to achieve accurate garbage classification.

**Table 1.** Basic information of the questionnaire

| Basic information                     |                               |                               |                                            |                            |
|---------------------------------------|-------------------------------|-------------------------------|--------------------------------------------|----------------------------|
| Home location                         | County and township / 40.83%  | General cities / 39.11%       | First tier and second tier cities / 20.06% |                            |
| Understanding of waste classification | often / 25.28%                | occasionally / 62.42%         | never / 12.3%                              |                            |
| Types of garbage produced in school   | Non recyclable waste / 23.91% | Paper and boxes / 55.32%      | Second hand clothing / 7.37%               | Kitchen Waste / 13.4%      |
| Frequency of littering                | Once a day / 61.66%           | More than once a day / 19.53% | Once every two days / 15.28%               | Once a few days / 3.53%    |
| Waste classification intention        | unwilling / 8.45%             |                               | willing / 91.55%                           |                            |
| Acceptable classification time        | unwilling / 7.84%             | Drop and sort / 43.61%        | Within 5 minutes / 35.01%                  | Within 15 minutes / 13.54% |

## 2.2. Current situation and problems in China

At present, many schools in China have not taken corresponding measures for garbage classification, nor have they formulated and issued a sound classification management system and standard according to the actual situation. The infrastructure for garbage classification is also not perfect. Some colleges and universities have not even set up classified garbage cans, nor have they built a garbage removal system.

Through the field survey in the east campus of Anhui University of Finance and Economics, it can be found that the school's propaganda on garbage classification for teachers and students is relatively weak, and the form of work is relatively simple. Both teachers and students do not recognize the important role of garbage classification, and the treatment methods are not fully mastered, resulting in the teachers and students' weak awareness of garbage classification, low

recognition of garbage, and the occurrence of wrong classification. In fact, colleges and universities attach great importance to garbage classification, but they have not actually invested money to take certain measures. The school has no compulsory garbage classification measures, and the supervision and restriction on students are relatively weak, resulting in insufficient attention of students.

Combined with the current situation and actual needs of garbage classification environmental education in colleges and universities, the theoretical framework of garbage classification environmental education in colleges and universities is constructed. It can be seen from the theoretical framework that the content of garbage classification education in colleges and universities is not deep enough and superficial. Many colleges and universities mainly rely on elective courses or student associations to popularize the knowledge of garbage classification in the form of banners, videos, etc., but the content is limited and lacks in-depth analysis and interpretation, so students cannot fundamentally identify with it, nor do they have too many practical activities to increase their understanding of garbage classification. And environmental education fails to reflect the professional advantages of colleges and universities. The environmental education of garbage classification in most colleges and universities only focuses on science popularization and knowledge transfer, but fails to combine the advantages of colleges and universities to give play to their professional strengths. As a higher education organization, colleges and universities are the gathering place and production place of various talents, involving many types of majors. However, in the process of garbage classification environmental education, the main force is educational majors, and other majors have less participation, so no resultant force has been formed.

## 2.3. Excellent cases of garbage classification implementation

In 2021, Shanghai universities will incorporate waste classification knowledge into the new student enrollment education system, and each school will also set up waste classification volunteer service branches. Enhance the garbage classification awareness of teachers and students through various forms of publicity and education activities, and continue to carry out garbage classification publicity and education throughout the year in combination with the Six • Five Environment Day, student ecological environmental protection festival, freshman orientation and graduation season, Shanghai Youth Volunteer Green Camp and other time nodes and major activities; In the annual admission notice of college freshmen, the theme of "garbage classification" is sent synchronously.

This autumn semester, the "Shanghai Municipal School Domestic Waste Classification Effectiveness Supervision Platform" was officially launched. This platform integrates the actual data of the municipal college domestic waste classification, reflects the monthly third-party evaluation of waste classification of each university in real time, provides scientific data support for the formulation of waste classification policies, and also provides data services for each university to improve the level of waste classification management.

Hangzhou initiated the "bucket length system" for waste classification, and actively tried to integrate volunteer

services into waste classification. In addition, Alipay launched the "garbage classification and recycling" function, which covers a number of first-line garbage classification cities led by Hangzhou, and can provide door-to-door garbage collection and classification services.

### **3. Suggestions on the Implementation of Intelligent Disposal of Garbage Classification in Colleges and Universities**

#### **3.1. Increase the amount of intelligent waste sorting equipment**

First, it is necessary to reduce the floor space of intelligent waste classification equipment through research and development. When the intelligent waste sorting equipment occupies a small area, it is possible to place one or more of them under each student dormitory. Second, we need to reduce costs. An intelligent garbage sorting device worth thousands of yuan can not generate profits by separating useful garbage in the short term. If it is put into use in large quantities, it will bring pressure to colleges and universities. Only by reducing the cost of intelligent waste classification equipment and attracting enterprises to participate in market-oriented operation to generate profits, will enterprises put in a large number of intelligent waste equipment, and universities can also cooperate with enterprises for a long time to achieve win-win results. Finally, scientific investment is required. Determine the minimum amount of school investment according to the size of the school, personnel density, etc., and determine a reasonable location to serve as many college students as possible.

#### **3.2. Establish a reasonable incentive mechanism**

Scientific and effective reward mechanism can encourage college students to actively participate in intelligent garbage classification. Participation in garbage classification and use of equipment will generate points. When the points reach a certain level, prizes can be exchanged. The types of prizes that can be exchanged for points should be scientifically designed to improve the attraction of prizes. The categories of physical prizes need to be added, and diversified prizes can be designed according to interest and gender, such as wireless headphones, chargers, mobile phone holders and other electronic products, which will be more attractive to college students. In a word, the more attractive the rewards are, the greater the "rational college students" will feel the benefits after weighing, the more they will implement intelligent garbage classification and improve the campus environment in action.

#### **3.3. Colleges and universities need to strengthen internal management**

Colleges and universities should formulate a scientific garbage classification implementation plan, clarify internal management responsibilities, increase investment in the classification and management of campus domestic garbage, and ensure that funds are available. Establish a collaborative working mechanism for the classification of domestic waste involving the school office, publicity department, Youth League Committee, student office, logistics management office and other parties. All university departments should

clarify their responsibilities, attach great importance to the classification of garbage, regard it as an important task of building a civilized campus, implement energy conservation and reduce emissions, and actively implement and promote related work. All departments and colleges should clarify their responsibilities, attach great importance to garbage classification and treatment, take it as an important work to build a civilized campus and implement energy conservation and emission reduction, and actively implement and promote the work.

The school shall set up a special supervision team, which shall regularly assess, supervise and evaluate the garbage classification work. All departments should strengthen the supervision and inspection of garbage classification, actively find the existing problems, actively correct and reform, and establish a garbage classification evaluation system. The supervision team can also review the archives and self-assessment reports by means of on-site inspection and debriefing, and conduct random inspections, supervise and inspect from time to time, regularly report the inspection, and strictly hold accountable the departments that do not take responsibility and implement the work.

Under the framework of circular economy, intelligent garbage classification will be the development trend of garbage classification in the future. Colleges and universities need to improve students' awareness and regularly organize students to learn the operation of intelligent waste classification equipment. Student organizations and societies can also carry out garbage classification related activities, such as knowledge contests, classification competitions, etc., to improve the accuracy of garbage classification for students. The school also needs to strengthen publicity and improve the green awareness of teachers and students. Only when the classification of domestic waste is truly regarded as a new fashion from the psychological perspective, can we actively overcome the difficulties and use more garbage classification equipment for intelligent classification.

#### **3.4. Simplify the use steps of intelligent waste classification terminal**

A single intelligent waste sorting device can only recycle a specific waste. Although it is easy to operate, if there is not enough specific waste in the fixed time window of this refined waste classification terminal, it is easy to cause high waste cleaning costs. The compound intelligent garbage sorting device can classify a variety of garbage, but the operation is relatively complex.

At present, the application program of the commonly used intelligent garbage classification device is relatively complex. The intelligent garbage classification and processing system is built by relying on the Internet of Things, GPS, cloud computing, big data and other information technologies, combined with various intelligent devices (intelligent garbage classification box, point cashing, car borne all-in-one machine, etc.), using a distributed microservice architecture. It has a variety of use methods, such as face recognition, two-dimensional code scanning, and point card. Before use, you need to download the APP in advance for identity authentication and registration. When delivering garbage, you need to scan the QR code with your mobile phone, make screen selection, and classify the garbage to the specified opening after voice prompts. The operation is complex and time-consuming, which affects the enthusiasm of college students. In the future, it is necessary to improve the

intelligence of the terminal through sensing and deep learning technology, and simplify the use steps of intelligent waste classification equipment.

## 4. Summary

Waste classification and recycling is not only a technical and engineering problem, but also a complex social problem. To solve the problem of overload of garbage disposal in colleges and universities, it is necessary to bring intelligent garbage classification methods to colleges and universities and create a good campus environment. As a special social group, teachers and students in colleges and universities must work together to improve their awareness of garbage classification, develop the habit of garbage classification, promote the gradual improvement of garbage classification and recycling system, and improve the effectiveness of garbage classification management.

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