

Communication of Recycling through Labeling and Packaging

By Serena Mistry

Graphic Communication Department

College of Liberal Arts

California Polytechnic State University, San Luis Obispo

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Abstract

Serena Mistry

Graphic Communication Department, December 2012

Advisor: Penny Bennett

Recycling has become a more prevalent practice in the last few decades. However, the labeling system on today's packaging is not always clear in indicating whether something is recyclable. Recently, there has been a great deal of attention directed at a new system, known as the How2Recycle label, an innovative labeling system expected to launch in the next few years. As the population continues to grow at unprecedented levels and more strain is placed on the global environment, recycling becomes more crucial. In the United States, the lack of a standard system for recycling on labeling and packaging deters people from properly recycling recyclable materials. However, if a well-designed, standardized system were developed and employed, more people would practice recycling and thus, less recycled material would be thrown away into landfills.

The purpose of this study was to examine the disadvantages of the current labeling system on packaging and its efficiency in encouraging consumers to properly recycle. It also looks at the How2Recycle labeling system and how it compares to the current system. A survey was conducted to gather data in order to establish how effective these two labeling systems are at communicating recyclability. The primary research objectives were to determine the efficiency of the current labeling system on packaging and evaluate the potential of the How2Recycle label.

Results from the survey data demonstrated the inefficiency and weaknesses of the current system. The data showed that the How2Recycle label scheme was preferred to today's system and had potential for success in the future.

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Chapter 1

Purpose of the Study

Statement of the Purpose

Recycling has become a more prevalent practice in the last few decades. However, the labeling system on today's packaging is not always clear in indicating whether something is recyclable. The Resin Identification Code, though not originally intended for use by consumers, is used on plastic packaging to identify its polymer type, and therefore recyclability. However, this is confusing and ineffective since not all types of plastic are accepted equally for recycling across the United States. Recently, there has been a great deal of attention directed at a new system, known as the How2Recycle label. The How2Recycle label from the Sustainable Packaging Coalition is an innovative labeling system expected to launch in the next few years.

As the population continues to grow at unprecedented levels and more strain is placed on the global environment, recycling becomes more crucial. In the United States, the lack of a standard system for recycling on labeling and packaging deters people from properly recycling recyclable materials. However, if a well-designed, standardized system were developed and employed, more people would practice recycling and thus, less recycled material would be thrown away into landfills.

In this research project, I looked at the disadvantages of the current labeling system on packaging and its efficiency in encouraging consumers to properly recycle. Next there was an overview of the How2Recycle label along with a comparison to the current system. Finally, I explored the importance of the labeling system on packaging in its relation to recycling.

Significance of Problem

The practice of recycling has become more important particularly with the increasing concern of global warming and its effect on the well-being of the environment. More companies are creating products and packaging made with recycled materials to please a new type of consumer who expects businesses to adopt sustainable practices and use green materials. Recycling one's waste is viewed as being responsible and respectable. Nations across the globe are becoming involved in the environment effort by practicing more sustainable methods and implementing more measures to safeguard the Earth against pollution.

However, even with more awareness and sustainable practices, there is still a significant problem with the staggering amounts of waste being generated every day, especially in the United States. Every year, large amounts of recyclable material are thrown away in landfills instead of being properly recycled. This is partly due to the confusing labeling system on packaging. People would likely be more inclined to recycle if there was a more obvious indicator on packaging that an item was recyclable. A more efficient and simple recycling system is needed to improve the current practice of recycling in the United States.

Interest in Problem

The focus of my senior project topic stemmed from my concentration, Graphics for Packaging. I had always questioned whether the current recycling system is actually effective since many people, including myself, never seem to know with certainty whether an item is recyclable. This topic interested me because it links packaging and the environment. The staggering amount of waste in landfills needs to be resolved. The recycling guidelines on labels and packaging are confusing and ineffective. Surprisingly, the How2Label system is one of the first major attempts at redesigning the current labeling system on packaging. By recreating the current system on packaging, waste can be further reduced and more consumers can participate in recycling. As the population grows and technology advances, the issue of recycling becomes even more critical.

Chapter 2

Literature Review

Introduction

When it comes to determining recyclability, the current labels on packaging in the United States are confusing and inconsistent to the general public. This literature review looks at the current system of recycling in the United States and review other systems that have been proposed. It begins with a brief overview of how large scale recycling developed. It also takes a look at the current waste production in the United States, the resin identification code system and existing challenges of the American labeling system. Next, it explores one notable labeling system outside of the United States, the United Kingdom's On-Pack Label. Finally it examines the Sustainable Packaging Coalition's How2Recycle label as well as its potential in the United States.

Evolution of Large Scale Recycling

Though seemingly a recent trend, recycling has actually been around for thousands of years, practiced in a variety of forms. According to *The Economist* (2007), "metal items have been recycled by melting and reforming them into new weapons or tools" and "it is said that the broken pieces of the Colossus of Rhodes... were recycled for scrap." Before the age of mass production, most of the population would individually practice some form of recycling since it cost more time and money to produce goods. But with the advent of the Industrial Revolution, those goods could be produced quicker and more economically on a large scale.

Recycling practices were more common in times of war and economic hardship. For example, "many people survived the Great Depression by peddling scraps of metal, rags and other items," while "scrap metal was turned into weapons" during the second world war (*The Economist*, 2007).

Eventually, with the population in the staggering billions and unprecedented waste production, large scale recycling became more substantial. In the past, people recycled for economic reasons, however, as waste became a larger concern, they recycled for environment reasons.

Recycling in the United States

In the last few decades, recycling has become a popular trend in the United States with more awareness and movements seeking to be eco-friendly and protect the environment. Recycling got its official start in 1970 when the first recycling centers were created (Palliser, 2011, p. 14). Though it took a while for recycling to really take off, by 2009, “there were almost 9,000 curbside recycling programs and over 3,000 composting communities in the United States” (Palliser, 2011, p. 14). Figure 1 below shows municipal solid waste recycling rates from 1960 to 2010 (Environment Protection Agency, 2011).

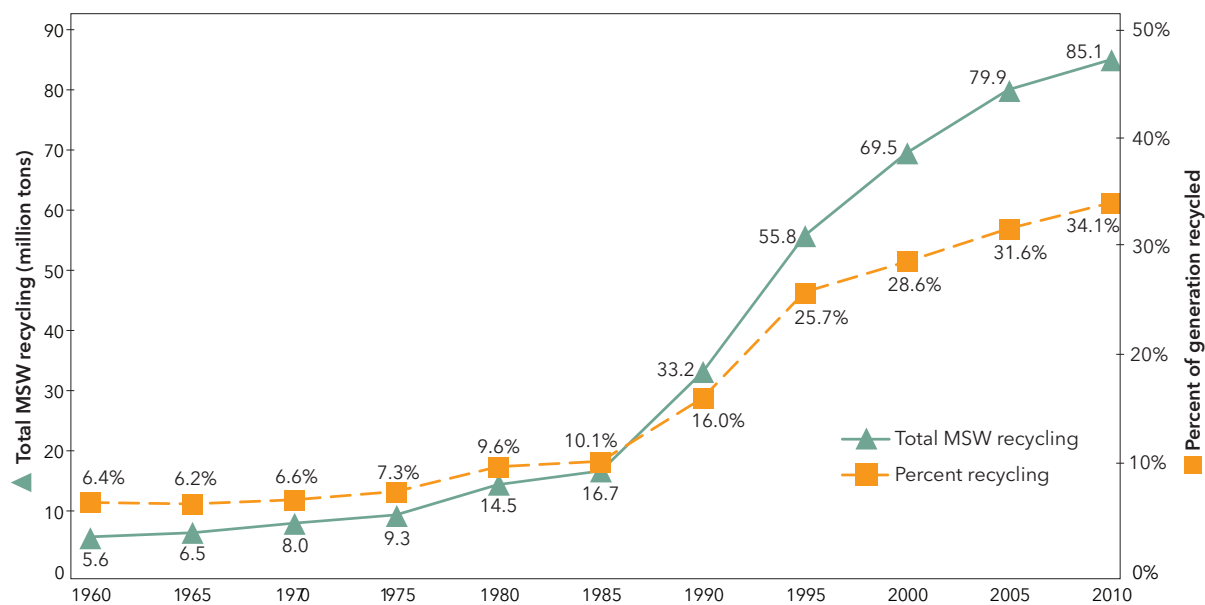


Figure 1. Municipal Solid Waste Recycling Rates from 1960-2010

According to the NYC Department of Sanitation (2012), “public demand for environmentally responsible products has continued to grow, especially in recent years.” Throwing out recyclable material into the trash is increasingly considered negligent. However, there is still a large problem

of recyclable materials being thrown away each year. And this is made worse with the increasing amounts of waste being generated.

Waste Production

The volumes of waste produced today are unprecedented to that of the past. With the population nearing seven billion, the production of waste is becoming a larger issue. According to Palliser (2011), “in 2009, American generated 243 million tons of municipal solid waste (MSW) and recovered 82 million tons of this material (61 million tons were recycled and 21 million tons composted)” which calculates to a “recycling rate of about 33.8%” (p. 14).

Landfills are being modified to be able to handle the growing quantities of waste. According to Palmer (2011), the total capacity of the landfills has increased. The trash capacity of landfills varies among the states, for example, Arkansas has enough capacity to go more than 600 years without opening another facility while Massachusetts and Rhode Island only have 12 more years (Palmer, 2011). Recycling becomes more vital with the immense growth of waste in the last few years.

Resin Identification Code System

The resin identification code system can be seen on almost all plastic packaging, represented by the universal recycling symbol around a number (between one and seven). The Society of the Plastics Industry (SPI) introduced the resin identification coding system for plastic in 1988 in response to the needs of state regulators and recyclers who required a more consistent way of identifying the type of resins most commonly found in the residential waste stream (NYC Department of Sanitation, 2012). The resin identification code system consists of seven categories represented by numbers, which specifies the type of resin as shown in figure 2 (The Planet Bottle, 2011).



Figure 2. Resin Identification Code System

The resin identification coding system was never intended to be a recyclability indicator used by consumers. However, today, it is used in that particular way. The NYC Department of Sanitation (2012) writes “the SPI resin identification coding system has gained widespread recognition and is used voluntarily by many manufacturers and localities worldwide,” with “39 states [adopting] it as mandatory for products sold in those places.”

Since the Resin Identification System was not created for consumers, it is not a suitable system to use on packaging. The numbers do not distinguish between the different types of plastic molding processes, which determine whether a product can be recycled. For example, even though blow-molded and injection-molded plastics have the same resin and share the same code, they have different melting points and cannot be melted together for recycling (NYC Department of Sanitation, 2012).

Another problem with the Resin Identification System is that it uses the universal recycling symbol which can cause confusion. This not only frustrates the consumer population, but also discourages them from recycling in the future. The types of plastics accepted for recycling also differ throughout the United States. So even though a particular numbered plastic may be accepted for recycling in a state, such as California, it may not be accepted by another recycling center in another state like Iowa.

The Resin Identification Code system is also inefficient since it requires remembering which numbers are recyclable. Memorizing which numbers are recycled in your area can be difficult, not to mention irritating. The resin identification code is also ineffective because it is not a consistent standard throughout the United States. If all recycling centers across states and counties accepted the same types of plastic, the system might run more efficiently. The system might also be enhanced if public recycling bins themselves indicated which numbers were accepted as recyclable.

Existing Challenges of Current Labels on Packaging

There are a number of existing problems with the current labels on packaging today in the United States. According to the GreenBlue Institute (2011), there are five main challenges:

1. Labels are confusing and green washing is common

2. No harmonized, consistent labeling system exists across materials
3. Labels are not comprehensively applied to all material types or package components
4. Recycling collection and processing infrastructure is fragmented and inconsistent
5. Common legal requirements are inconsistently applied and rarely enforced

The use of the universal recycling symbol on packaging is used to indicate recyclable practices in manufacturing, percentage of recycled content and other aspects that sometimes have nothing to do with the actual recyclability of the product. According to the Federal Trade Commission, “a recyclability claim, like ‘Please Recycle,’ should be made only if a ‘substantial majority’ of people have access to recycling for that type of package,” (Johnson, 2009). This is one way labeling on packaging can be confusing to consumers. Another problem, as mentioned by the GreenBlue Institute (2011) is the increasing number of green claims companies are making nowadays. Though some claims are true, others are baseless, made solely to improve a company’s image among the public.

No consistent labeling system exists within the United States, but there have been attempts to create standards for materials such as glass. However, without a general standard to follow, these efforts have failed to come up with any successful systems. Additionally, packages that consist of multiple materials make it further complicated.

Notable Labeling Systems Outside the United States

United Kingdom – On-Pack Recycling Label and WRAP Program

The GreenBlue Institute (2011) describes the English On-Pack Recycling Label as “a voluntary labeling system that may apply to any primary packaging entering the market in the UK that will end up in the UK domestic waste stream.” Though recent, the On-Pack Recycling Label is a popular initiative. Piloted by Marks and Spencer and other companies, prior to its full launch in 2009, the On-Pack Recycling Label was implemented on the packaging of over a hundred companies in 2010 (GreenBlue Institute, 2011). Figure 3 on the next page gives a visual depiction of the On-Pack Label (GreenBlue Institute, 2011).

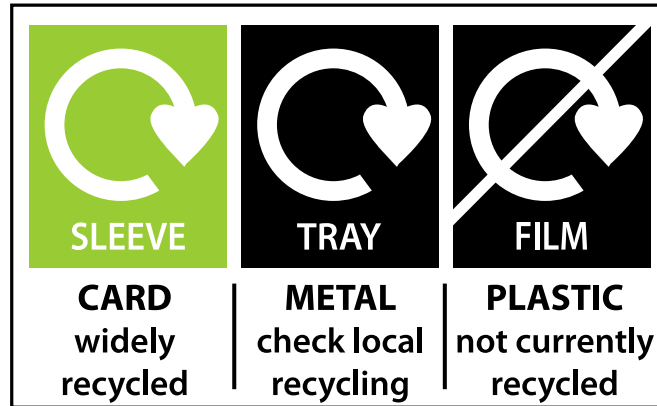


Figure 3. On-Pack Label

The On-Pack label was designed to be easily recognizable by consumers. “In 2008, recognition of the label’s ‘Recycle Now’ logo within the UK is over sixty-five percent” (GreenBlue Institute, 2011). The design of the On-Pack label also allows room for expanding into new areas of recycling in the future.

The Waste and Resources Action Program (WRAP) is important in the recycling movement within the United Kingdom. It provides a model for indicating to the consumer whether a package is recyclable (Johnson, 2009). The WRAP model consists of three main components: a labeling system broken down into three categories, a data-collection effort to validate the three label categories and a website with a search for local recycling facilities by material and postal code (Johnson, 2009).

Sustainable Packaging Coalition’s How2Recycle Label

There have been attempts within the United States to alter the labels on packaging to make it easier for consumers to determine if something is recyclable. Price (2011) discusses one such attempt: “the Sustainable Packaging Coalition, a project of the non-profit group GreenBlue, is working to redesign recycling labels.” According to Sustainable Packaging Coalition (2012), “variation in recycling programs, unclear labeling, and inaccurate recyclability claims make proper recycling a challenge,” so “the How2Recycle Label was created to provide a consistent and transparent on-package recycling information to consumers.”

The labeling system will have four categories of packaging as described by Freinkel (2011):

- **Widely Recycled:** packaging materials such as glass, cardboard, PET plastic bottles which are recycled in most communities.
- **Limited Recycling:** materials that are only recycled in 20 to 60% of the U.S., such as polypropylene yogurt containers.
- **Not Recycled:** materials that are rarely recycled, such as Styrofoam.
- **Store Drop-Off:** bags and plastic film that are often collected by grocery stores for recycling.

According to Garry (2012), the How2Recycle label “follows the Federal Trade Commission’s ‘Green Guides’ designed to prevent green-washing, and is based on the On-Pack Recycling Label adopted in the [United Kingdom],” discussed earlier. An example of the How2Recycle label is shown below in Figure 4 (Sustainable Packaging Coalition, 2012).

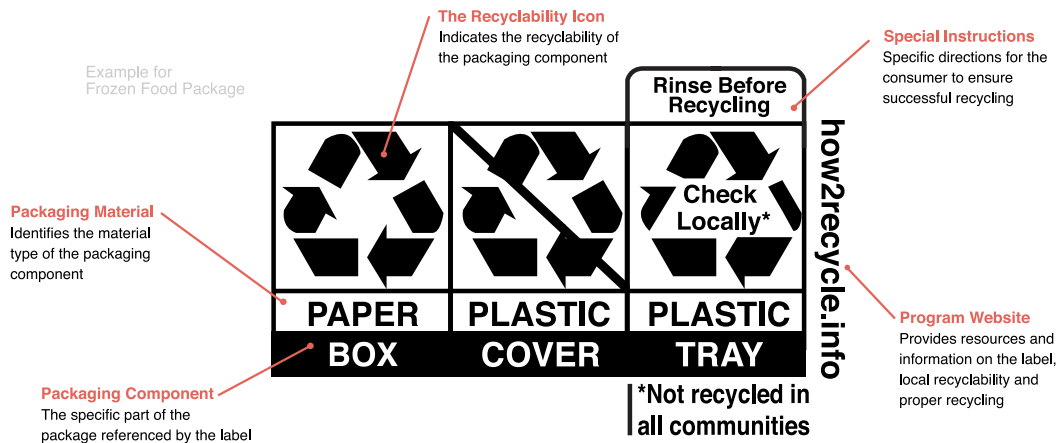


Figure 4. How2Recycle Label

Garry (2012) explains the design of the How2Recycle Label:

Each recycling label contains the well-known chasing arrow triangle know as the Mobius loop logo, and names a packaging material, such as paper, and a packaging component, like a box. A diagonal cross across the logo is employed for the not-yet-recycled label, while the verbiage “check locally” and “not recycled in all communities” is used in the limited recycling label.

“The Sustainable Packaging Coalition has around 200 member business including everyone from Burt’s Bees to Nike to Proctor and Gamble” (Price, 2011). The support of these big companies and corporations gives the How2Recycle label momentum to move forward. According to Pierce (2011), ConAgra Foods, Costco Wholesale, Microsoft, REI and Seventh Generation have agreed to implement the How2Recycle label on select packaging nationwide in 2012. After its test run on select packaging, the potential of this label will be easier to forecast.

Potential of How2Recycle Label

According to GreenBlue Institute (2011), making a comprehensive labeling system work involves matching the label to the objective, actively administering and enforcing a nationwide labeling system, creating a label easily recognized by consumers that drives positive action, and maintaining a labeling system flexible enough to apply to all types of materials, package formats and all recovery systems at present and in the future. The primary objective of the Sustainable Packaging Coalition’s How2Recycle Label is to provide consistent and transparent on-package recycling information to consumers (Sustainable Packaging Coalition, 2012). Since the How2Label is not a standard and is still being tested, it is difficult to judge its potential success.

Administering and enforcing a nationwide labeling system involves the proper use of the label’s text, color and graphics on packaging, maintaining an information database to support the label, establishing a governing body to resolve complaints, enforcing terms and conditions, and requiring a fee to be paid for the use of the label (GreenBlue Institute, 2011). A successful label would also be easily recognizable to consumers and motivate them to recycle. The GreenBlue Institute says there should be minimal text, if any, included in the design of the label (2011). The How2Recycle label fails to have an easily recognizable logo or minimal text. It is difficult to judge the potential of the How2Recycle label as it has not been approved by the EPA or other government agencies and is still only being tested.

On the other hand, the label has already received support from the public sector. Scott Mouw, from the North Carolina Department of Environment and Natural Resources says North Carolina supports the How2Recycle label stating “recycling programs across the country and the general public’s

commitment to recycling behavior will greatly benefit from a clear and sensible packaging labeling framework” (Pierce, 2011). The companies that are part of the Sustainable Packaging Coalition have also provided a large amount of support. With the backing of a large corporation like Proctor and Gamble, the potential of the How2Recycling label in becoming a standard looks promising.

Chapter Summary

The current infrastructure of the label recycling system on packaging in the United States is inconsistent, complicated and therefore inefficient. A new system must be considered if the United States wants to preserve the environment and move forward as a sustainable country. As the population continues to grow and technology continues to advance, this issue becomes more significant.

The Sustainable Packaging Coalition’s How2Recycle label looks promising, but it is still too early to tell how it will perform. The UK’s On-Pack Label and the Green Dot System are both excellent examples of recycling systems. Though the recycling rates of Americans have increased in the last few decades, there is still a lot of room for improvement. By redesigning the labels on packaging and implementing a recycling symbol that is recognizable and understood by the general public, the issue of recycling can be greatly improved.

Chapter 3

Methodology

Introduction

The purpose of this study was to determine the efficiency and accuracy of recycling labels on packaging. The currently existing labeling scheme and the How2Recycle label were examined in this study. A survey was conducted to gather data in order to establish how effective these two labeling systems are at communicating recyclability.

Specific research objectives included the following:

- Determine the efficiency of the current labeling system on packaging
- Evaluate the potential of the How2Recycle label

Data Collection Plan

The plan involved a survey about the recycling systems communicated by labels on packaging. The survey was sent out to the Graphic Communication department email list at California Polytechnic State University in San Luis Obispo. This listing included students and professors of both genders within the Graphic Communication major. The target number of respondents was 30. The survey consisted of no more than ten questions and included images of the two labeling systems. It was made up of multiple-choice questions along with a few short-answers format questions. All but the last question required an answer in order for the participant to complete the survey. Two main important elements considered in the survey included the ease of determining recyclability and the components of the label such as color, type and symbols.

In the survey, there were at least two questions regarding demographical information about the participants such as gender and/or age. This shed some light on the demographics of the participants,

which was useful in later interpreting the data. There was a question asking the participant about their frequency of recycling. This was a useful piece of information to gather as it provided a higher degree of reliability in regards to other questions.

Two to three questions were based on more general ideas about the recyclability on packaging. For example: asking the participant about how effective the current recycling instructions are or what the most obvious indicator of recyclability is. There was a required short-answer question asking the participant what they thought of the current labeling system in practice now and its role in recycling. This provided some useful information about the opinions of the participants. The last few questions looked at the two recyclability labels on packaging. Participants were shown an image of each system and asked how successful or effective the label was in communicating recyclability. Finally, there was a last “question,” which thanked the participant for their time and allowed them the option to submit any comments they may have about the survey. The proposed survey is shown in Appendix A.

Data Analysis Plan

After the survey was sent out, and responses were collected, the data was ready for analysis. The survey remained open between three to four days. Since most people check their email frequently, there was less of a chance that potential participants would take the survey if they haven't within the first few days of the survey's release. The data was evaluated, first for general patterns and then eventually, input into graphs. Any possible sources of bias were addressed. The efficiency of both labels was examined across the survey results. Through looking at the results of the survey, the overall efficiency of each labeling system was measured and the research objectives were achieved.

Chapter 4

Results from Study

Overall, a total of 35 participants took the survey, which was sent out to the Graphic Communication department email list at California Polytechnic State University in San Luis Obispo, California. Meeting the target of 30 participants, the survey exhibited some trends, which will be discussed later in this chapter. All results from the survey are shown in Appendix B.

The first question asked, “What is your gender?” The majority of participants, (85.7%) selected female. Chart 1 below represents the results, which can be attributed to the majority of women in the Graphic Communication major. This causes a bias in the data since the two genders are not represented equally. Sending the survey to larger groups that are less gender imbalanced may result in more reliable data.

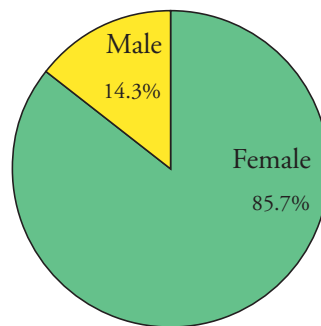


Chart 1. Question #1 - Gender

The next question, “Which category below includes your age?” consisted of age ranges including “under 18,” “18-25,” “26-35,” “36-50,” and “50 and above.” 91.4% of responses selected the range of 18-25. This can clearly be linked to the fact that the department is made up of mainly undergraduate students. 8.6% selected “between the ages of 36-50,” which likely comes from professors taking the survey. The other age ranges were not selected by any of the participants. The results from this question showed that the group surveyed provided limited results. Obviously at a college, the majority of students fit into one age group. Sending the survey out to a more age diverse population would have been more suited for this project.

The third question, “How often do you recycle?” displayed four choices including “never,” “sometimes,” “most of the time,” and “always.” 65.7% of all participants answered that they recycled “most of the time.” 20% said they recycle “always” and 14.3%, “sometimes.” None of the participants selected the choice “never.” The results from this question are shown in Chart 2 below. This question demonstrates the participants had a sufficient amount of recycling experience, which made the data more reliable.

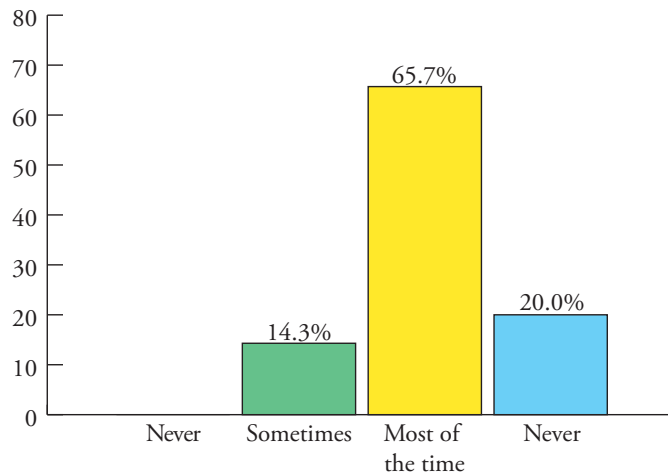


Chart 2. Question #3 - Recycling Frequency

The next question asked, “do you think the current recycling instructions on packaging effectively communicates recyclability?” The majority (80%) said the current recycling instructions on packaging do not effectively communicate recyclability, while only 20% believed the current system is effective. This question was significant as it demonstrates that most of the participants believe the current system is unsuccessful.

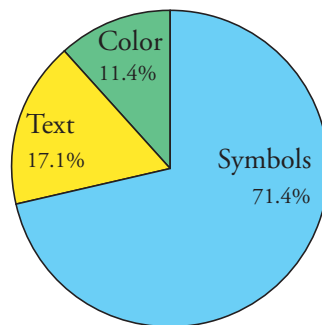


Chart 3. Question #5 - Recyclability Indicator

Question #5 asked “which do you think serves as the best indicator on a package that an item is recyclable?” and consisted of three choices: “color,” “text,” and “symbols.” “Symbols” was the most popular choice of 71.4% of participants. Text followed with 17.1% and color with 11.4%. One other option for this question would have been to have the choices ranked rather than just having it be single-answer multi-choice style.

The sixth question, an open-response format, asked: “what do you think of the current labeling system in practice now and its role in recycling?” The responses varied in length and opinion. Open-response is more difficult to examine than multiple-choice style questions and requires more intensive analysis. In order to best analyze these responses; they were classified into three groups as shown below in Table 1.

Table 1. Question #6: Responses by General Opinion			
	Inefficient	Undecided	Efficient
# of Responses	25	7	3

As shown above, the results suggest that most of the participants regard the current system as inefficient. Table 2 below shows a selection of the responses which consider the current labeling system inefficient.

#	Table 2. Question #6: Responses Considered “Inefficient”
3	I don’t understand it. I’m often confused as to what is recyclable and what isn’t
8	Not very effective. If people can’t figure it out within five seconds, it goes in the trash.
11	I don’t think the labeling system is very clear because although every product has a recycle symbol located somewhere on the packaging, there are some materials that aren’t recyclable but yet still have a recycle symbol on it. I think that confuses the consumer if they don’t understand what the numbers and the acronyms stand for.
12	I honestly didn’t even know there was a system.
15	Many products that are recyclable don’t have the symbol, so it’s hard to know whether the symbol is just absent, or if the product is not recyclable at all. There are also many exceptions to recyclable materials (ex: pizza boxes with grease)
20	INEFFECTIVE! I try to recycle just about everything, unless it is something that has food or other product residue still in/on it. The symbols are way too small and I am noticing more and more products don't have recyclable symbols at all. In other words, the packaging is so “pretty and sleek”, but is coated with clay or some type of plastic that makes it to where you cannot recycle it. There MUST be a better way to have nice packaging and still be able to keep it out of landfills.

21	The current labeling requires consumers to know trade acronyms - not cool, man.
22	It's confusing and I never have a cheat sheet to tell me what the numbers mean... I'm not going to take the time to memorize them.
27	It doesn't grab my attention, most of the time I don't look at the recycling label.
31	No one memorizes which numbers can be recycled so it's a bad system
33	They're often hard to find because they are placed in "hidden" spots. I also unaware of which of these numbered recycling symbols can be put in the traditional blue recycling bin
35	I think it's confusing because everyone recognizes the recycling symbol but no one is sure which numbers are actually recyclable in their area.

The responses shown in Table 2 bring up some common points. For example, many participants noted that interpreting the resin identification code system requires the consumer to remember what each number stands for. Many of the responses referred to the recycling of plastic. This is unsurprising since materials such as glass and aluminum are widely-known to be recyclable, whereas, not all plastics are the same. A couple of responses mentioned that a great deal of product packaging that is likely recyclable does not have a recyclability symbol or indicator. One participant admitted they "honestly didn't even know there was a system," which strongly demonstrates the failure and ineffectiveness of the current labeling system.

The responses deemed "undecided" were more neutral, reflecting the positive and negative aspects of the current system. The number of responses that fit into the category "efficient" was the smallest out of the three groups with only 8.6% of participants. All responses from Question #6 are shown in Appendix B.

The next two questions involved images of the recycling systems. One asked the question: "based on [image of resin identification code system], how successful do you think the current recycling symbols are in communicating the recyclability of a plastic package?" The choices included "very successful," "successful," "neutral," "unsuccessful," and "very unsuccessful." The majority (51.4%) of all respondents said the plastic recycling system was unsuccessful. 20% said it was neutral, 17.1% said very unsuccessful and 11.4% said successful.

The second question followed an image of the How2Recycle Label and asked, "how effective do you think the How2Recycle label (image shown) is at communicating the recyclability of an item?"

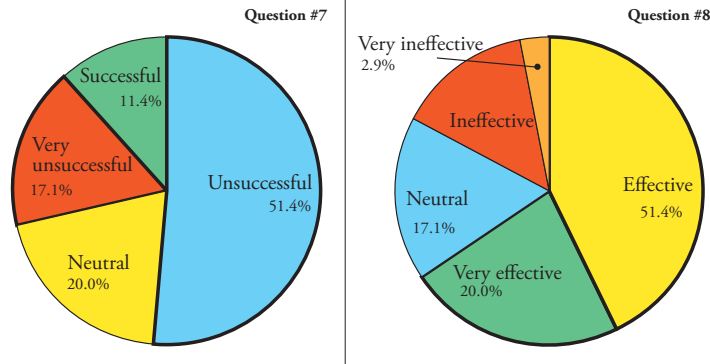


Chart 5. Questions #7-8 - Recycling Systems Comparison

The options included “very ineffective,” “effective,” “neutral,” “ineffective,” and “very ineffective.” 42.9% said it was effective, 22.9% said it was very effective, 17.1% said it was neutral, 14.3% said it was ineffective, and 2.9% said it was very ineffective. The majority felt it was either “effective” or “very effective.” The results of both questions are shown above in Chart 4. Of the two systems, the questions on the survey revealed there was a clear preference towards the newer, How2Recycle Label.

Finally, the last question gave the participants the option to add any comments or suggestions. A total of seven participants left responses. Most of these responses involved the How2Recycle label. One respondent commented that the How2Recycle label “is a little confusing” and not “obvious and straightforward enough.” Another said they didn’t understand what the How2Recycle was trying to explain. Table 3 below displays a few of the comments from question #9. Most of these responses reference the How2Recycle label. The results in Table 3 show that an open-ended response question about the How2Recycle Label would have been suitable for the survey.

#	Table 3. Question #9: Comments
1	The above graphic needs to have graphic instructions to globally reach the masses; for example, a graphic of the item being rinsed, etc.
2	I still think the How2Recycle label is a little confusing. I don’t think it’s as obvious and straightforward enough.
3	The How2Recycle label is a little busy, but it’s easier to understand.
6	It depends where this label is going to be located... on the product? I don’t really know how to read the label.
7	I don’t even understand what the How2Recycle label is trying to explain.

The survey generated supportive data for this project. A few modifications could have made the survey better. For example, a more gender and age diverse population to survey would have generated more reliable data. Adding an open-end response question to the survey about the How2Recycle label would have also been a suitable option. Overall, the open-ended format questions provided valuable information about the participant's opinions and knowledge. Despite being more difficult to analyze than many of the other questions, Question #6 showed that most participants thought the current system is unreliable. Questions #7-8 were also important as they clearly reflected the majority opinion of each system. The images in the questions helped explain the systems to the participants and shape their opinions.

The results from this survey show the issues and confusion of the current system as well as the general opinions of the How2Recycle label. The current system cannot be successful without any changes. The How2Recycle label is a step in the right direction but it is not entirely easy-to-understand either.

Chapter 5

Conclusions

The issue of recycling becomes seemingly more important every year as overpopulation and deterioration of the environment continue to occur. This makes it even more crucial for the labeling system on packaging to clearly communicate whether or not something is recyclable. The primary objectives of my research were to look at the current weaknesses of the current labeling system on packaging, examine the potential of the How2Recycle label and finally, explore the importance of the labeling system on packaging in communicating recyclability. A standard system for recycling instructions on labeling and packaging that is both straightforward and consistent is desperately needed to better encourage recycling.

The survey provided valuable data, which demonstrated the disadvantages of the current system and its overall inefficiency. The majority of people surveyed did not believe the current recycling system in practice is effective. The responses suggested the major weakness of the plastic resin identification code system is that people do not memorize the numbers or acronyms. One participant mentioned that the nicer packaging is “coated with clay or some type of plastic,” which makes it difficult to figure out whether a whole package is recyclable or not.

The survey data also portrayed the How2Recycle label as a better alternative to the current labels on packaging. The data demonstrated that the How2Recycle label was deemed more effective than the current labeling system. The final question on the survey revealed some concerns about the How2Recycle label that might make it confusing and ineffective. One participant noted that the label was too complicated, while another described it as not “obvious or straightforward enough.” Some participants suggested ways it could be improved, such as showing a container being rinsed to better communicate the instructions at a more global level. It is difficult to determine the complete capability of the How2Recycle label to succeed but the data shows that it clearly has some potential and is preferred over the existing system.

After sending out the survey and analyzing the data, a few weaknesses were discovered. One limiting factor of the survey was that it was only sent to people within California. There might have been some out-of-state students in the group survey but the majority was most likely from California. The major problem with this is that the recycling system varies across the country. By having more out-of-state residents, the survey may have exhibited different results. A higher number of participants would have also made the results more meaningful. Another weakness was the question about the How2Recycle labeling system. An open-ended response question for the How2Recycle label might have provided more valuable results. The response-style question for the current system helped generate some interesting points from the participants and doing the same for the How2Recycle label would be helpful.

There are many disadvantages with the current labeling system in its communication of recyclability. It is complicated, inconsistent and therefore, ineffective. It fails to encourage consumers to properly recycle. The How2Recycle label also has its disadvantages. However, through the survey, it was shown that it was much more popular than the current system. Without being altered significantly, the current labeling system will continue to confuse and discourage the consumer into recycling packaging.

The How2Recycle label has potential but some weaknesses that may impair its function. A successful system should employ easy to recognize symbols and be consistent throughout all aspects of its design. It should be standardized throughout the whole country and the general public should be informed of how it functions. In conclusion, the current system is ineffective and needs to be redesigned. The How2Recycle label has potential and it will be interesting to see it on packaging in the next years.

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Appendices

Appendix A. Survey

1. What is your gender?
 - Female
 - Male

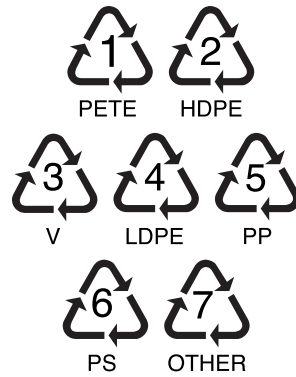
2. Which category below includes your age?
 - Under 18
 - 18-25
 - 26-35
 - 36-50
 - 50+

3. How often do you recycle?
 - Never
 - Sometimes
 - Most of the time
 - Always

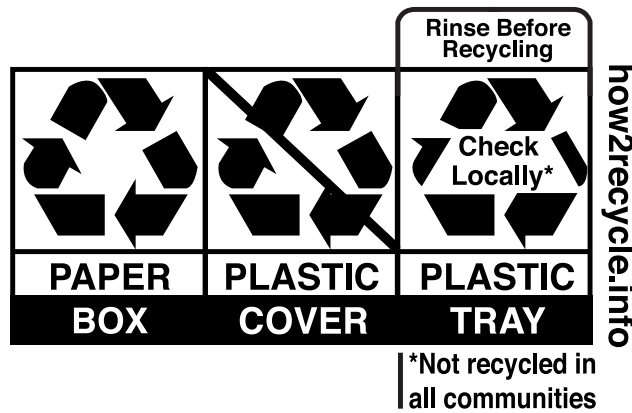
4. Do you think the current recycling instructions on packaging effectively communicate recycling?
 - Yes
 - No

5. Which do you think serves as the best indicator on a package that an item is recyclable?
 - Color
 - Text
 - Symbols

6. What do you think of the current labeling system in practice now and its role in recycling?





7. Current Plastic Recycling Instructions. Based on the above image, how successful do you think the current recycling symbols are in communicating the recyclability of a plastic package?
- Very successful
 - Successful
 - Neutral
 - Unsuccessful
 - Very unsuccessful





8. The following is an image of the How2Recycle label. How effective do you think the How2-Recycle label (shown above) is at communicating the recyclability of an item?
- Very effective
 - Effective
 - Neutral
 - Ineffective
 - Very ineffective
9. Thank you for your participation. Please submit any comments you have below.

Appendix B. Survey Results




1. What is your gender?

		Response %	Response Count
Female		85.7%	30
Male		14.3%	5



2. Which category below includes your age?

Under 18		0.0%	0
18-25		91.4%	32
26-35		0.0%	0
36-50		8.6%	3
50+		0.0%	0




3. How often do you recycle?

Never		0.0%	0
Sometimes		14.3%	5
Most of the time		65.7%	23
Always		20.0%	7

4. Do you think the current recycling instructions on packaging effectively communicate recyclability?

Yes		20.0%	7
No		80.0%	28

5. Which do you think serves as the best indicator on a package that an item is recyclable?

Color		11.4%	4
Text		17.1%	6
Symbols		71.4%	25

NOTE: Percentages may not all add up to 100% as they have been rounded to the nearest tenth decimal point.

6. What do you think of the current labeling system in practice now and its role in recycling?

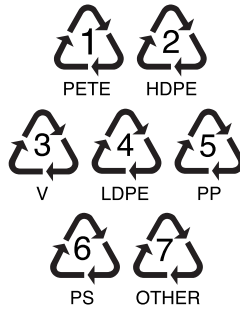
Responses by General Opinion			
	Inefficient	Undecided	Efficient
# of Responses	25	7	3

#	Responses Considered “Inefficient”
1	It attempts to do a proper job, but the abbreviations used are either overlooked or not understood.
2	Not much
3	I don't understand it. I'm often confused as to what is recyclable and what isn't
5	Not good
8	Not very effective. If people can't figure it out within five seconds, it goes in the trash.
9	Nobody knows what “PETE,” “HDPE,” “V,” etc. means.
10	Semi-confusing
11	I don't think the labeling system is very clear because although every product has a recycle symbol located somewhere on the packaging, there are some materials that aren't recyclable but yet still have a recycle symbol on it. I think that confuses the consumer if they don't understand what the numbers and the acronyms stand for.
12	I honestly didn't even know there was a system.
14	Hard to understand
15	Many products that are recyclable don't have the symbol, so it's hard to know whether the symbol is just absent, or if the product is not recyclable at all. There are also many exceptions to recyclable materials (ex: pizza boxes with grease)
17	Vague not common knowledge
18	It's not super helpful because a lot of people don't know what the numbers mean.
20	INEFFECTIVE! I try to recycle just about everything, unless it is something that has food or other product residue still in/on it. The symbols are way too small and I am noticing more and more products don't have recyclable symbols at all. In other words, the packaging is so “pretty and sleek”, but is coated with clay or some type of plastic that makes it so where you cannot recycle it. There MUST be a better way to have nice packaging and still be able to keep it out of landfills.
21	The current labeling requires consumers to know trade acronyms - not cool, man.
22	It's confusing and I never have a cheat sheet to tell me what the numbers mean... I'm not going to take the time to memorize them.
23	It's confusing because not everyone knows what each number represents.
24	I think most people don't know what the symbols actually mean.
26	I do not understand all labeling. Sometimes, I am not sure if the article I have should be recycled or not.

27	It doesn't grab my attention, most of the time I don't look at the recycling label.
29	Should be more obvious and easier to decipher.
31	No one memorizes which numbers can be recycled so it's a bad system.
32	I don't know what the letters mean
33	They're often hard to find because they are placed in "hidden" spots. I also unaware of which of these numbered recycling symbols can be put in the traditional blue recycling bin.
35	I think it's confusing because everyone recognizes the recycling symbol but no one is sure which numbers are actually recyclable in their area.





#	Responses Considered "Undecided"
7	It's ok
13	Though I understand the numbers and symbols, it would be nice to know what they stand for and understand what I'm allowed to recycle at home in the recycling bin.
19	I know that the first few numbers are the easiest to recycle, and number 7 is almost never really recycled depending on the plant. The different numbers correspond to the types of recycled products. I know this from a GrC class by Professor Rong. However, if I didn't take that class, I would have no clue what the different numbers meant.
25	Whenever I see the recycling logo, I know that the item can be recycled, but I am not 100% sure what each different number means.
28	It's good if you know what all the symbols mean but can be confusing if you don't.
30	I think that for those who understand what the text means, it is very effective. But that it is safe to say MOST people have no idea what HDPE and PP etc. mean. I think people easily understand color-coding, as long as it is widely known and advertised.
34	I always try to recycle paper, but with some plastics and other different materials, I'm not sure if the number is able to be recycled in my area.

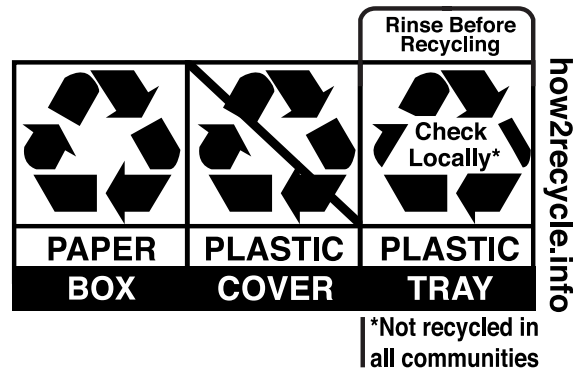
#	Responses Considered "Efficient"
4	It's decent
6	It informs me on what is/is not recyclable with symbols that are easily identified. Since in California all I have to do it put it in the blue bin, it's easy. In other states, which require separation--knowledge of what the materials are is important.
16	I think it's pretty good. If I don't know something is recyclable, I will look on the package to figure it out. If there is no evidence of recyclability, I probably trash it.








7. Based on the above image, how successful do you think the current recycling symbols are in communicating recyclability of a plastic package?

Response % Response Count

Very successful		0.0%	0
Successful		11.4%	4
Neutral		20.0%	7
Unsuccessful		51.4%	18
Very unsuccessful		17.1%	6



8. How effective do you think the How2Recycle label (shown above) is at communicating the recyclability of an item?

Very effective		22.9%	8
Effective		42.9%	15
Neutral		17.1%	6
Ineffective		14.3%	5
Very ineffective		2.9%	1

NOTE: Percentages may not all add up 100% as they have been rounded to the nearest tenth decimal point.

9. Thank you for your participation. Please submit any comments you have below.

#	Responses
1	The above graphic needs to have graphic instructions to globally reach the masses; for example, a graphic of the item being rinsed, etc.
2	I still think the How2Recycle label is a little confusing. I don't think it's as obvious and straightforward enough.
3	The How2Recycle label is a little busy, but it's easier to understand.
4	I'm not sure what "cover" means, but everything else makes sense.
5	Good luck on your project! It would be awesome to see your ideas implemented.
6	It depends where this label is going to be located... on the product? I don't really know how to read the label.
7	I don't even understand what the How2Recycle label is trying to explain.