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The Effect of Communication Medium and Container Location on Paper Recycling: A Case Study

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ABSTRACT: The global resource consumptions are in advanced day by day nevertheless world has limited sources, which should be used for boundless needs of humanity. Due to the fact that governments and the firms are try to find the way to make the sources sustainable. Recycling is one of the best ways to make sources renewable. For this purpose, the main aim of the study is to determine the effect of container location and communication medium on waste paper quantity. Experimental design was performed in two tiers to achieve this aim. The study was applied in Cag University and t-test was conducted to the obtained data. According to the score of t-test results H1 and H2 are statistically significant. Based on these results, the proximity of containers and the use of communication medium are positively effect on the waste paper quantity.

***Keywords*:** Paper Recycling, Communication Medium, Container Location

1. INTRODUCTION

The importance of recycling is becoming greater in scientific researchers in last years, due to the fact that benefits of recycling are concerned both for the general public and the economy (www.printcountry.com). Recycling is needed more than bygone due to the growing the global resource consumption. By increasing the recycling it is possible to reduce the amount of waste that goes to incineration or landfills as it enables the creation of new products from old materials, hence benefiting both the environment and the economy (Vicente and Reis 2008:1). Informing the consumers is one of the essential points to increase recycling. The benefits of recycling and how to recycle is an important strategy designed to promote involvement in recycling (Austin *et al*. 1993: 355–368). The individuals have different tendencies towards recycling. Age, gender, type of residence, the area lives (urban etc,.), legal arrangement, the obtained information and the medium that used for informing individuals are all the factors can affect the recycling level.

2. RECYCLING

"Recycling can be defined as the collection and separation of materials from waste and subsequent processing to produce marketable products" (Davies *et al.*, 2002:31). According to Parsons and Kriwoken (2010:473) recycling is, "the redirection of materials from the waste stream into the manufacturing, agricultural, horticultural and construction sectors for use in the creation of new products". To sum up the definitions, it is possible to say that recycling is an effective resource-recovery mechanism with significant economic and environmental benefits (Valle *et al*., 2004:505). The key strategy to minimization of waste is recycling which offers three benefits (Tam *et al.,* 2009:167):

- reduction in the demand for materials made from virgin resources;
- reduction in the use of energy to transport waste and produce virgin materials;
- diversion of waste that would otherwise occupy landfill space.

To have these benefits there should be a perfect process, which might be complex and complicated. It can involve (www.recyclingnearyou.com.au):

- Waste materials are collected through kerbside collection or drop-off centers
- These materials are sorting a Materials Recovery Facility
- Those materials substitute for virgin material (for example recycled glass cullet, or pelletized plastic)
- And the last step is, to make a new and useful products manufacturers are using these sorted materials.

There are various types of recycled materials such as glass, paper, textiles and non-ferrous metals; aluminum and ferrous metals; steel, and to a much smaller extent plastics. Besides of this, garden and kitchen waste which are putrescible waste can be composted. Glass is fairly the basic material for recycle; the number of times a glass container can be recycled without limit. Newsprint on the other hand has been subject to major recycling material. Aluminum is another recycled material which is essential for environment. Plastics have definitely the lowest recycling rate, because they are difficult to recycle (Davies *et al.*, 2002:31). On the other hand it is considered that the paper recycling is the most popular subject among recycling materials.

Barriers of Recycling

To recycle the materials there are so many important barriers. One of the most important barriers of recycling is lack of equipment and technology. Lack of material to recycle and lack of consumer awareness are the other strategic barriers to recycle (Larney and Aardt 2009:2). If we look on the households perspective, not recycling were 'don't have enough time to sort, save, and transport materials' (76.9%) and 'don't have enough room in my home to store materials' (73.6%) (Murad and Siwar, 2007:8). According to Tam *et al.* (2009:173); the major barriers encountered on the use of recycled materials in construction activities are:

- low landfill charge for waste tipping;
- relatively high transportation costs;
- restrictions from the local councils and state government on construction use;
- inferior recycled material properties;
- lack of knowledge and experience in structural applications.

Knowledge in Recycling

The general tendency to behave positive attitude toward to recycle are older, better-off and more educated people. On the other hand some of the groups argue that younger groups/families are more proactive (Davies *et al.*, 2002:52). People, who are better informed about recycling, have a greater tendency to participate in recycling (Vicente and Reis 2008:8). Better education opens the facility of an individual having a greater capability to understand ecological problems by the way tendency to recycle (Meneses and Beerlipalacio, 2005:840). To become proactive and having positive attitude towards to recycling are all come from the point of well informed. Informing the individuals so many ways can be used. According to the target group characteristic the medium and the contents of the information should be designed. Brochures, fly sheets, billboards, TV and radio commercials, conferences, symposiums can be the effective ways to inform the individuals.

On the other hand having the requisite knowledge and ability to recycle does not always mean an individual will definitely recycle. Recycling is a decision which is low involvement, habits and inertia may block behavior change. Recyclers are generally better educated and married (Davies *et al.*, 2002:102). According to this context to give information to individuals about the benefits of recycling is the key-stone for sustainability.

Recycling in Turkey

Recycling has been a longstanding commercial activity in Turkey. Glass and paper recycling have been conducted at industrial scales since the 1950s. (Metin *et al.*, 2001:3). The importance of recycling is advanced by government, firms and individuals in 20th century in Turkey. It is considered that the given importance to this subject can be based on regulation applied by government. In Turkey the potential of recyclers are too high that cannot be disregarded. Because of the fact that the young generation population is higher than Europe and America, it is important to give information related with recycling to young people. Especially, if the young generation can be informed with the correct content through the accurate medium, it is possible that recycling rates can be increased.

3. METHODOLOGY AND RESULTS

The main aim of the exploratory study is to determine the effect of container location and communication medium on waste paper quantity. Experimental design was performed in two tier to achieve this aim. Hypothesis that developed for measuring the research questions including null and alternative hypothesis are as seen below:

Ho: The waste paper quantity has no difference in terms of proximity of containers from central to local.

Hypothesis 1 (H1): The waste paper quantity has statistically significant difference in terms of proximity of containers from central to local.

Ho: The waste paper quantity has no difference in terms of communication medium.

Hypothesis 2 (H2): The waste paper quantity has statistically significant difference in terms of communication medium.

One group with Pretest-Post Test before test model was used in the study. In a one group Pretest-Post Test Study, the dependent variables (Q1 and Q2) are measured or observed before and after introduction of the independent variables (X1 and X2). In order to explore the role of containers location the dependent variable Q1 (waste paper quantity) is measured before and after introduction of the independent variable X1 (location of containers). Containers locations were changed from central to local areas in this context H1 tested. In order to explore the role of communication medium the dependent variable Q2 (waste paper quantity) is measured before and after introduction of the independent variable X2 (the use of communication medium). Posters were chosen as a communication medium because of the fact that the other media would be difficult to apply such an experimental design. Posters were used to test H2. The experimental design is shown below in Chart 1 and 2 visually.

Chart 1. Experimental design-1

Q1a	X1	Q1b
Waste paper quantity	Proximity of containers	Waste paper quantity

Chart 2. Experimental design-2

Q2a	X2	Q2b
Waste paper quantity	The use of communication medium	Waste paper quantity

The experimental design that was examined in this study has distinctive limitations. The applied study that was carried out in Cag University shouldn't generalize because of the experimental design nature.

Participants and Setting

The participants (N=388) were students of preparatory school of Cag University at March 2010. Based on the idea that the attitudes in young people would be easier to develop relatively, the sample group of 18 years was chosen. The attitude developed in young age is thought to be permanent. Recycling awareness acquired in this age would last for the rest of the subject's life.

For purposes of the study, the building was divided into two environments: (a) classrooms including 19 classrooms; (b) holes including 2 holes. The research was conducted in all areas of the preparatory school building except closets, bathrooms and cleaning room. A yellow container was

used for central and classroom recycling (35X67X30). These containers are obtained from Akdeniz Municipality-Mersin.

A better understanding the role of communication medium in recycling behavior is crucial to enhance consumer involvement in paper recycling. We conducted experimental design for the aim of this study. Experimental design lasted 3 weeks. In order to understand the central role of container we locate 2 containers in two holes in first week. 19 containers placed of classrooms in the second week. Posters were put up to 19 classrooms walls in the last week. Fist week and second week were compared with each other to test H1. Second week and last week were compared with each other to test H2. Subjects didn't know the experimental design in all of tree weeks. This situation prevented the deliberate acts. Subjects acted all naturally on decision of paper recycling.

Posters used for experimental design were colorful and nearly 59X42 size. Four posters as a communication medium were located each classroom. Two of the posters were colorful and only shaped. The other posters were not colorful but information based. The posters placed two wall excluding windows and blackboard at eye level for attraction of attention. One information based and one colorful poster is bringing together for each wall. The containers are placed exit of classroom.

Measurement

Papers get involved in the containers were collected everyday systematically. Containers in this environment were emptied the end of the day from an observer. Primarily an observer look up the container and gathered the waste, subsequently the second observer look up the container and independently recorded the presence or absence of containers. So containers were scored completely. Measures were obtained Monday through Friday; on every day that students were present. Data collection began after the work day ended, usually after 5:00 p.m. and never before 4:30 p.m. All the waste papers gathered daily from whole containers and marked regularly. Daily waste papers were emptied and sorted in a small room and weighed according to days in balance.

A total of 15 measures were scored throughout the study. 200 containers content combined for 15 work days. 10 container measurement gathered for first week and 95 measurement gathered for each week rest. Due to the fact that the form of hole is like 'L' two containers were used for each day in first week. Measurements that obtained from each week are presented on a daily basis (see Chart 3 and Chart 4).

Chart 3. The comparison of first two weeks

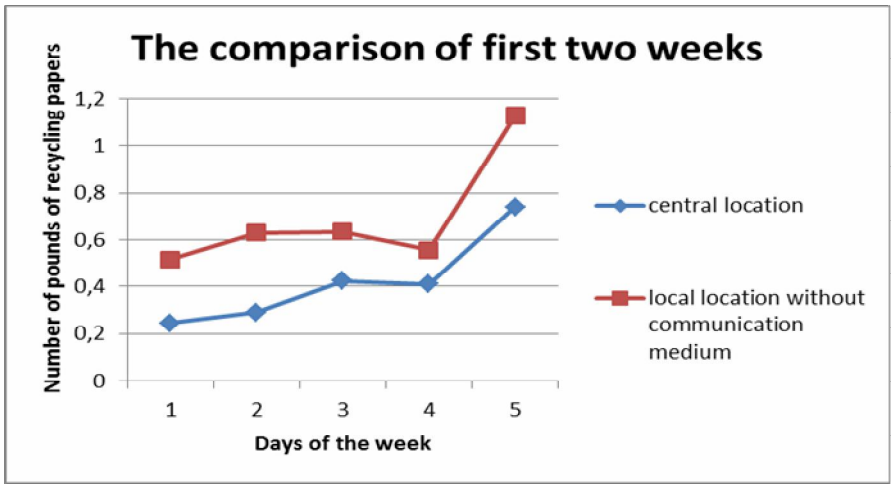
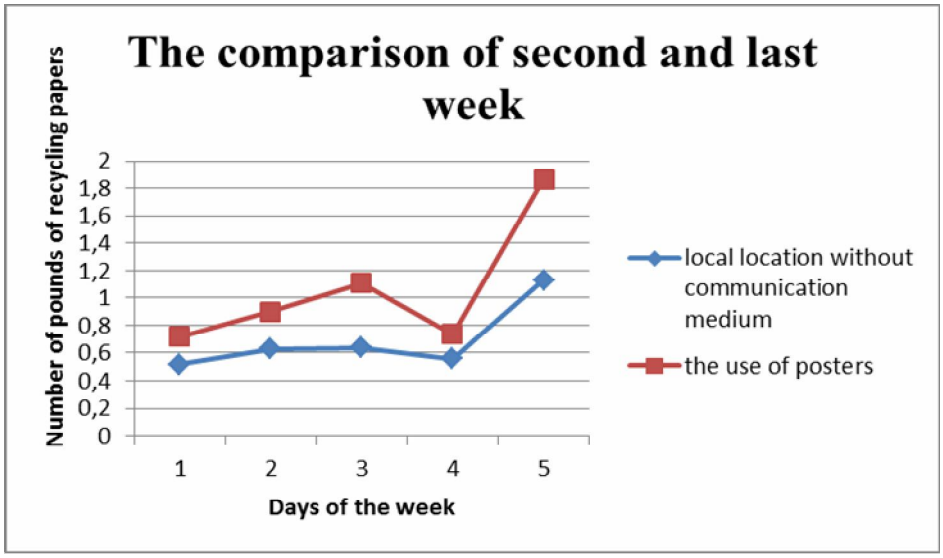


Chart 3 and 4 also show that the continuous changes were seen. While shapes are examined, the most striking result was the presence of continuous increase even in central location. According to this situation we could say that events related to recycling was needed in experimental environment. The cause of why emergence of more waste paper on Friday was the studying lessons practice based that day. The course of 4 items within 19 classrooms doesn't exist on Thursday. The situation that figures of the Thursday's waste papers were relatively low should be considered while interpreting the table. Therefore as shown in Figure.3 and Figure.4 the continuous increase of collected waste paper according to days didn't observed on Thursday.

Chart 4. The comparison of second and last week



Results

Repeated measure design was used for one group in this study for detecting the effect of the independent variable, even when that effect is small. In order to determine whether there is a significant difference between two scales in a group about container proximity scales, independent sample t-test was used. On the other hand in order to determine whether there is a significant difference between two scales in a group about the use of communication medium, independent sample t-test was used too ($p < .05$). The results of these tests showed significant differences between two scales about container proximity when compared to first and second week. The significant differences between two scales about the use of communication medium are seen when compared to second and third week. The items related to these results are presented in Table 1 and Table 2.

Table 1. T-test result-1

Location	Mean	N	Std. Deviation	Sig (2-tailed)
Central location	0,422	5	0,194	0,003
Local location	0,693	5	0,248	

Table 2. T-test result-2

Communication medium	Mean	N	Std. Deviation	Sig (2-tailed)
Local location without communication medium	0,693	5	0,248	0,024
Posters	1,065	5	0,475	

According to mean scores about paper recycling the lowest mean score is belong to central location. The highest mean score of experimental design is belonging to the use of posters as a communication medium. Only 2,112 kilograms was recycled in the central container condition, but when recycling containers were placed in close proximity to participants, 3,466 kilograms was recycled. On the other hand only 3,466 kilograms was recycled in classrooms, but when posters hold the walls, 5,325 kilograms was recycled.

When we look over the significance value about H1 is statistically significant. On the other hand according to the score of t-test result H2 is statistically significant. As a result the null hypotheses are rejected. Based on these results, the proximity of containers and the use of communication medium are positively effect on waste paper quantity.

4. CONCLUSION

Informing the consumers is one of the essential points to increase recycling. The benefits of recycling and how to recycle is an important strategy designed to promote involvement in recycling. As an information tool posters were used to achieve the main aim. On the other hand, the container proximity from central to local was used to analyze according to the purpose of the study. Based on the score of t-test result H1 and H2 are statistically significant. This study found that providing recycling containers in close proximity to work areas resulted in a substantial proportion of paper recycling. The use of communication medium is positively effect on the waste paper quantity.

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