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Taking advantage of Formal Semantics in the Design of Garbage Containers for New Cities

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ABSTRACT

The increasing number of population in cities and towns, the higher standard of living of industrial and agricultural progress has led to an increase in the amount of garbage left by the population. The main problem lies in the absence of waste collection system to collect waste that could work on facilitating the final sorting process, since the sorting process hasn't been performed through the source. Besides, the present used way hurts the beauty appearance of the new cities that are known to be well-planned and designed, where waste is collected in assembly area (tippers) as occurring in the other cities resulting in visual pollution due to the traditional ways. This research is aimed at designing containers to collect waste of indication Formal Semantics and expressing the kind of waste that might be put inside them to garbage collection in a way that is helpful and facilitating the process of final sorting , so that the cities Administration won't be obliged to specify collecting that may harm the general appearance of the new cities so as to protect the environment from visual pollution and the microbe pollution , this is due to the heighten the general sense level of the Egyptian citizen in the planned designed places ,and the other polluted, and the importance of the new cities and keeping the environment from pollution in general , Also, the importance of this research is by its focus on a new collection way , and the sorting process with economic importance , In addition the new design works on decreasing the time element in sorting and preparing the waste to be recycled in Industry and agriculture. The researcher could design containers with indication formality that might be manufactured and distributed in the new cities, and use them in waste collection in accordance with the suggested forms. After implementing a questionnaire concerning the new method to collect the waste, the responses of those included in the questionnaire of the importance of designing in this field, specially this way could play a role in directing the people in sorting while using the suggested system for waste gathering in the new cities. The new method could decrease the wandering of big vehicles special for waste collection in the sub streets as occurring in the big cities.

Key words: Formal Semantics, garbage collection, garbage containers, garbage sorting, Product semantics.

Introduction

Alshorouk, the tenth of Ramadan, Alobour, Bader, and The sixth October Cities have been considered among the most important new cities established by the government, this importance is due to the fact that they are close to Cairo, a matter which is considered a distinguished location. These cities have been characterized by the well planning and designing in when compared to the other cities , these cities are in need for a system to gather the waste from houses and from outside houses , a system that can suit the nature and the system of cities that combine the populated assemblies and the industrial areas (Krippendorff, 1989). In this context, the research may get the benefit from the previous other's experiences in fields of Waste Management, the research will shed lights on the Dutch experiment in collecting and classifying the waste, which is being aimed at in the plan designed by the Dutch government so that they could reach 90% in the waste recycling rate, or reaching zero waste amount. While the strict German experiment has followed the color system in gathering and classifying the waste, by using seven colors for waste collection boxes with reference to each type of waste. The Italian method has depended on a machine in both procedures, in gathering and sorting at the same time , where a machine is put in a street , works automatically , picking the waste according to their kind in the name registered in the machine , then a vehicle comes to unload the contents of machine .

In this context, the researcher is concerned with the indication formality , so that he could express –in this form-about the function performed without writing or forming any indicated expression about the function designed for , from this point the researcher is heading through a path towards designing containers for waste collection , with indication formality reflecting the kind of waste to be thrown inside it , such kind could be put heavily in main streets in the new cities in addition this way can contribute in sorting process in a systematic form , more than the traditional ways.

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This research is aimed at designing containers to collect waste of indication Formal Semantics and expressing the kind of waste that might be put inside them to waste gathering in a way that is helpful and facilitating the process of final sorting , so that the cities Administration won't be obliged to specify collecting that may harm the general appearance of the new cities so as to protect the environment from visual pollution and the microbe pollution , this is due to the heighten the general sense level of the Egyptian citizen in the planned designed places ,and the other polluted , and the importance of the new cities and keeping the way , and the sorting process with economic importance , In addition the new design works on decreasing the time element in sorting and preparing the waste to be recycled in Industry and agriculture.

Previous studies

Product semantics

Product semantics is a theory about how products acquire meaning. Product semantics was defined by Krippendorff, (1989) as being both: "A systematic inquiry in how people attribute meanings to artifacts and interact with them accordingly." and "A vocabulary and methodology for designing artifacts in view of the meanings they could acquire for their users and the communities of their stakeholders. "Product semantics shares many concepts with semiotics, the theory of signs. Within the context of smart environments, an increasing amount of automation and increasing interconnectedness will have a negative impact on the meaningfulness of products. Of course, our understanding of products, and the way they acquire meaning, will also change. Nevertheless, in the envisioned smart environments, we need to provide 50 Design and semantics of form and movement users with handles and clues to make them understand what is happening and allow them to be and feel in control.

The origin of many of the problems that arise lies in the difference in nature of, or more precisely in the incompatibility of the physical world we live in, and the invisible world within our products. In order to understand products and systems, we develop a conceptual model of how we believe things work and how they should be used. These User Conceptual Models (UCMs) are usually an approximation or implication of reality. This means that these models are often incomplete and different from reality, but as long as they work for the users they do not need to be true. As long as the underlying mechanisms of the working of products are simple and reside in the physical world, they have a bigger chance to be understood and to make sense, and thus have meaning to their user traditionally, product semantics is mainly concerned with physical objects.

But meaning arises at different levels. In order to design for sense making, we need to look for references and resemblances between the new and known concepts.

Through the previous study to deduce the product works search to take advantage of the semantics considerations to deduce the product through the shape design for waste containers so as to redirect the user to the quality of the waste and the search for a new way to classify waste out of the house to make the most of the waste.

Garbage sorting physically

Is the process by which garbage separated into different kinds, According to the physical condition?

Solid Waste

Includes household waste, metallic waste, polymeric and inert waste (ash sand form the solid-waste ratio Great Nature percentage of waste.

Silt waste

The most important waste of silt sludge from sewage and industrial waste of water purification.

Doughy or liquid waste

Such as tar and oils used in consuming organic solvents and waste of bathtubs metal coating.

Sort waste according to the chemical nature

Organic waste

Consisting of organic materials (organic sugars consumer solvents and other proteins).

Metallic waste
Such as scrap, debris carts.... Etc...

Waste polymer
Include waste of rubber and elastomeric materials (polyvinyl chloride PVC and polyethylene).

Inorganic waste
Includes glass waste and ash thermal centers for power generation and other (Solomon, 2010).

Ways of sorting household garbage

Guided by the researcher in the field of sorting garbage for some successful experiences in garbage treatment and utilization of locally are as follows:

Dutch way

The focus in Europe in general was in sorting garbage after collection in the past. Since the mid-eighties began to emphasize the ease of garbage production. Because the nature of the Netherlands, where the land is flat and the layer of high groundwater, and sometimes higher than the low-level land, so a decision was made to stop the creation of new landfills. And garbage Management are based on the following priorities:

a)- Burning for energy production, and the final burning or land filling.
b)- The closure of the old incinerators and the establishment of incinerators where strict limits on emissions depends.

The Dutch government has followed another approach depends up on the necessity of sorting at the source, supported by outreach program, according to the laws accompanied deterrent measured to be applied, and that the absence of any of these four elements garbage management plan will fail. And focused on the right logistics measures. Garbage sorting containers must be placed where people need and reaching to it easily, in the supermarket, for example, to put it in some limited commercial squares and streets, airports and main entrances to universities, people do not carry their garbage sorted into these places. they also called for the need to sort organic waste at the source if they end the production of compost or organic fertilizer fit for use, remaining of glass and other materials in the compost all wasted effort. It also found that the fee on homes and industries develop according to the amount of garbage and weight as some countries, because it might encourage people to get rid of their garbage illegally. But household waste has increased with the economic and social growth. And currently heads the government's plan to reduce the amount of household waste, and raise the recycling rate to 90 percent. The goal is to get closer to "zero waste", but to achieve this goal is very difficult, that is better than some of the garbage landfill or incinerated because the re-manufactured may be more harmful to the environment. Some Arab countries Taught Dutch way adapted to the local situation in Lebanon, Syria, Jordan, Iraq, Saudi Arabia, Kuwait and Bahrain (Jacqueline, 2009).

German way

Despite of the stringent environmental laws in this state, the environmental awareness is the main motivation of the citizen. Germans are proud and are very brag garbage recycling in their own system, then no one home empty from the presence of garbage separation bins, colorful four main colors, namely, yellow, blue , green, and brown, along with sub- bins its red color, black, gray, and each color is significant, as follow: Reduce, reuse, and recycling

a). Blue bins: dedicated for throwing paper products such as cardboard.
b). yellow bins: a plastic packages box and all product packaging.
c). Green bins: It is intended for glass products.
d). brown bins: dedicated to organic waste and biodegradable leftovers.
e). the red, black and gray colors bins: they are dedicated to all the remaining waste types.

In addition to the previous bins or special bins, there are bags of certain types of waste such as medicines, paints, batteries, and home appliances. the government is keen to follow the development of a policy depends on the packaging, plastic and glass and therefore the individuals to return them to the supermarket to recover the amount of the money and to encourage them to participate in this national project. The increase in garbage sorting whenever complicated to explain German garbage recycling system; for example, glass containers are sorted by color; white color in place, and in another brown, and green in the third place, it is also not allowed to take a glass after eight o'clock so as not to cause inconvenience to residents, preservation of the environment of visual pollution also calls for preservation of noise pollution. As mentioned, besides the four major bins stationed in every house in Germany, there are distributed specialized bins in different places; in the supermarket there are bins to throw batteries, and in the shops minute no bins for equipment to dispose of

computers and CDs of electronic devices, there is in every neighborhood bins to take all of the shoes, old clothes (Hester and Harrison, 2002).

Italian way

Italian method relies on the sorting at home using the method that suits everyone, and the form in which he sees and made mechanization as the basis in the sorting process and the combination is also placed in the street where the machine makes everything automatically on a combination of the garbage on the basis of type, as shown in Figure (1). It is the same screen as is the case in ATM machines, when used the screen display accepted types by the machine and then the person presses on the screen to determine the type who wants to put it, as shown in Figure (2), while the garbage placed in suitable bags put inside the machine using similar credit cards as used in ATM, and the lorry comes to a final combination to empty the machine components in the case of full Sorting. From previous studies of systems able to sort the garbage, the researcher designed a lorry to collect and sort the garbage, which can be produced and used in Egypt, where no any system of sorting in homes.

Fig.1: Shows the waste sorting machine

Fig.2: Illustrates the screen used in garbage sorting machine

Types of garbage (waste) containers

Types of waste containers located in the street that meet many of the requirements in the proposed design as follows:-

1). Fixed types as shown in Figure (3)
3). Types between stability and movement without precipitating as shown in Figure (5)
4). types of significant quality, using benchmarks, as shown in Figure (6)

Fig. 3. Represents the fixed types containers

Fig. 4: Shows kinds of move by the wheels

As we have mentioned previously that the new cities have a designed and modern planning, but the waste resulted from the population has added the ugliness and malformation instead of adding the beauty. The waste is collected in the same way of collecting in the capital city , by putting big boxes in the main streets , so that people could put their waste gathered without any sorting until being full, then the waste overflows on the ground , after this the vehicles come to gather them and unloading in the final gathering area , then they will be sorted in the gathering site , a matter that indicates the scatter of the waste outside the container after they become full of waste , then a special vehicle come for gathering.

Fig. 5: Shows Types between stability and movement

Fig.6 : Represents the using benchmarks F. the current situation of the garbage collection system in the new cities.

Determine the requirements of the proposed design

Through the study of these species researcher was able to identify a number of requirements for the proposed design as follows:

1. Required the design of container moving hastily.
2. Design must indicate on the quality of the waste received inside.
3. Design must be compatible with the surrounding environment.
4. Enjoy the proposed design with check lightweight materials.
5. Use containers heavily when you put it in the street to be manufactured at the lowest possible cost.

The proposal collection method

We must deal with the archeological sites in a manner quite different from other areas where these non - densely populated areas so that the surrounding buildings consist of two or three and this means that the waste resulting from population less than areas with architecture high therefore suggested that a container reflect the type of waste received or significant in the form of the container to facilitate the screening process and enter cars, large inside the archaeological area and placed the container in large numbers scattered in place to allow sorting and does not give a chance to throw waste on the ground .

And unloading containers, towing a number of them by electric car mini compatible with the container to the outside of the archaeological area to put in a great car for each type of waste is discharge in places of collection and sorting of waste and it happens in the morning with the first light and in this way to result of discharge or contamination and Visual pollution result to the completion of the process of discharging the archaeological area.

The design of the container

The researcher designed container indicates the type of waste that must be ditched inside as shown in the Figure (7)

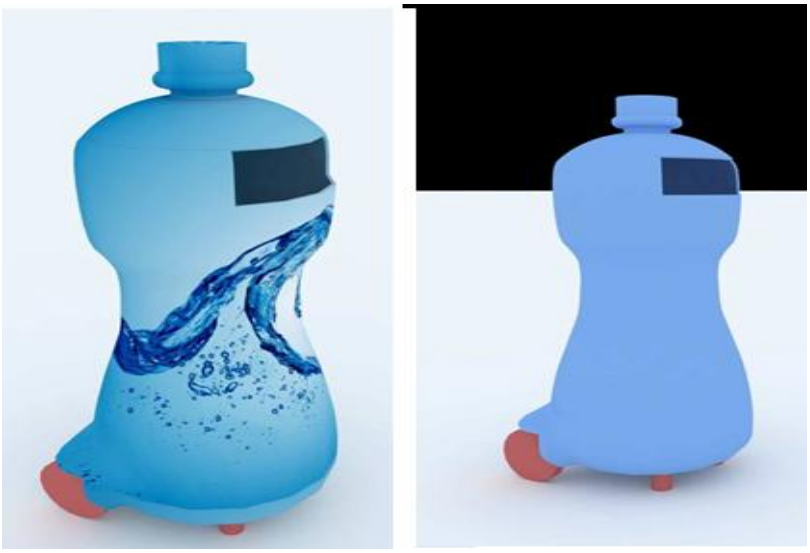

Fig. 7: Illustrates the design in the form of mineral water packaging

Which shows the design in the form of mineral water packaging and composite wheel for ease of movement and be installed in the locomotive pulling, It was designed by the researcher waste form the container based on inferred, refill soda water (cane) and the same way composite wheels for ease of movement, as shown in figure (8)

Fig. 8: Shows container in the form of soda water (cane)

As well as care research paper or cardboard waste container in the form of milk packaging waste can throw inside cartoon as shown in Figure(9) .

Fig.9: Represents the container in the form of milk packaging

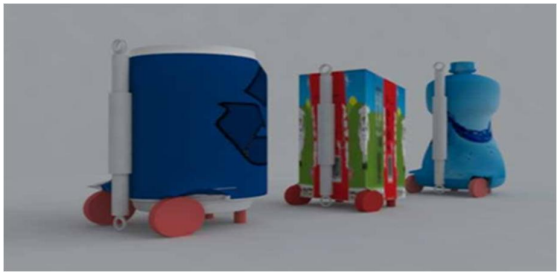

Fig. 10: Shows placed containers in the street next to other different types.

The body of the container

The container is made of fiberglass material or other kind of plastics suitable for the size and nature of the design, which resides in the street and mounted with the calf for ease of movement Order light outside the region also has a hook diameter with each other by a small electric car aligned with them in the shape.

How to use the new container

Placed containers in the street next to other different types as shown in Figure (10).Also placed heavy or large numbers to suit every street be sufficient to some extent by the fullness which helps to no leakage of waste outside of the container, and in the end of the day to night electrical Cars come to pull containers in the form of a train as shown in Figure (11) and thereby prevent large vehicles from entering the archaeological areas that cause the increase in pollution.

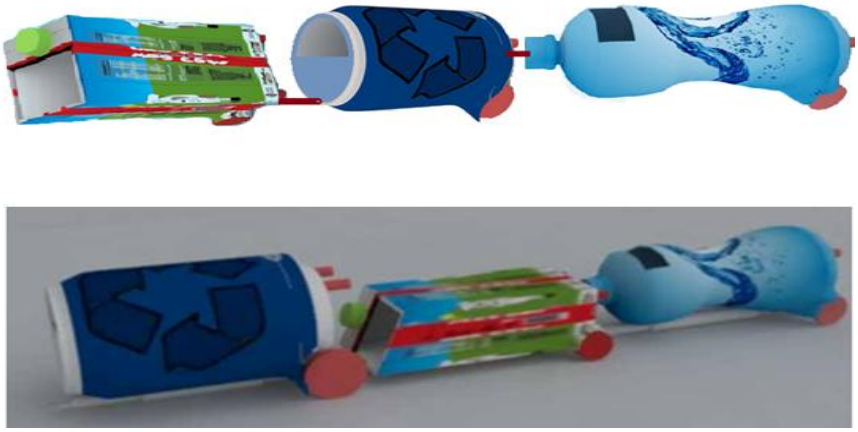

Fig. 11: Illustrates the containers in the form of a train.

Results (endnote)

A-The researcher could design containers with indication formality that might be manufactured and distributed in the new cities, and use them in garbage collection in accordance with the suggested forms.

B-After implementing a questionnaire concerning the new method to collect the garbage, the responses of those included in the questionnaire of the importance of designing in this field , specially this way could play a role in directing the people in sorting while using the suggested system for waste gathering in the new cities.

C-The new method could decrease the wandering of big vehicles special for garbage collection in the sub streets as occurring in the big cities.

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