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Providing a model for promoting use of houseplant with sustainable development approach in use of the flower pot

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Abstract

With the expansion of urbanization per capita green space per person has dropped. Reducing human contact with nature considering human very very long history with plants and trees considered as a fundamental problem. Therefore, to develop and use new approach to solve this problem a new branch of plants named Houseplant was raised and born which made using products called flower pot inevitable. Considering this condition and the short cycle of buying-discarding in these products the Researcher try to present a model with sustainable development approach in use of the flower pot. In this research the researcher has surveyed the relationship between the appearance quality and the lifespan of using that product. The results show that preserving appearance and applying metal and material with more financial value lead to decrease discarding flower pots and consequently it will keep the environment safe from harm.

Keywords: sustainable design, metal products, houseplant, flower pot

Introduction

According to latest statistics from the General Population and Haousing cencus in 2012 about 71/4 percent of Iran population lived in cities (Notebook, 2011 General Population and Housing Census 2012). The expansion of urban densities has brought lots of problems. Reducing people's share of housing and overcrowding threaten the privacy and comfort zone of people (Mahmoudian et al, 2003). On the other hand, we all know about the historical relationship between human and trees and plants. Actually forest was the very first home for human. Many studies have stressed the importance of public accessibility of urban green spaces (UGS) (Cvejic´ et al., 2015). But, as urbanism has extended the people access to green space has reduced. Considering the old connection between human and plants and new way of living called living in apartment, human tried to keep the connection with plants through taking care of them inside which led to new branch of plants came out named houseplant. Taking care of plants arouse the need for a certain product called flower pot which mostly are made of Ceramic or Plastic (PE). Considering that, Ceramic is non-recyclable and this fact that PE recycling itself is harmful process for environment and based on the hypothesis that "preserving appearance and applying metal and material with more financial value lead to decrease discarding flower pots" researcher try to find a way to change or stop this cycle through designing new product.

Literature review

Apartment as a place for living individuals and its condition affects the resident's life and could strongly influence the physical, mental and social aspects which is actually the quality of occupant's life (Cho et al, 2010). As we face the increasing awareness of importance of IEQ (indoor environmental quality) more and more studies have been done to evaluate IEQ of buildings (Chao et al, 2001, Mui et al, 2009,Yu et al, 2010, Hui etal,2007, Ali etal,2009, Lee et al, 2009). When we talk about the factors of health related environmental, IEQ becomes the integral part of the building (Wong et al, 2008). After all, residents have developed a growing expectation on quality of their home environment with an increasing demand for improving the quality of life (Cho, 2009). In this regard, The perception of quality is rather affected by judgments than by the objective specifications (Amerigo, 1997). On the other hand, home quality can be felt as satisfaction level that dwellers feel in their housing over a particular amount of time (Lee, 2003). Considering the relationship between outdoor air pollution and human health that has been well-studied (Berman et al., 2012; Hao et al., 2015; Tager, 1999), Indoor air pollution have been shown to have an equal or more impact on human respiratory health in comparison with outdoor air pollution because people spend more time indoors (Klepeis et al., 2001). Therefore, applying houseplants was strongly recommended as a possible air-purifying system for indoor environments (Claudio, 2011). It has been proved that houseplants can purify benzene, toluene, trichloroethylene, formaldehyde, etc. (Dela Cruz et al., 2014; Wang et al., 2014). In addition, having connection and taking care of plant or Horticultural activities include plant- and garden-related tasks which have long been used for therapeutic and rehabilitative purposes considering the innate closeness humans feel towards nature(Devis, 1994). Contact and relatedness with nature were generally shown to restore attention (Bergman et al, 2008), decrease stress (Van et al, 2011), promote pleasant moods and boost psychological healthiness (Zelenski et al, 2012). The advantages of horticultural programs apply to the physical, mental and social fields. Horticultural activities were specified to provide

physical exercise and sensory stimulation; to expand feelings of calm and relaxation, sense of fulfillment , self-esteem, life satisfaction, sense of responsibility in nurturing plants; and to reduce the feeling of loneliness, and improve social interaction (Detweiler et al, 2012). For instance, Among older adults living in the community, gardening was indicated as one of their pleasant activities in routine life which making them physically active and giving them an enjoyable experience (Burton et al, 2014). in light of the instinctive connection with nature, Having an experience connected with horticultural activities indicated to be more positive compared with occupational tasks (Bassi et al, 2018). In addition, in a research by Lee et al it was indicated that horticultural-related activity reduce stress level in children (Lee et al, 2018). More over the consequences of being in touch with plants and green space which is one of the requirements of this project, we need to examine how to protect these green space and plant from harm. Sustainability or sustainable development has become a significant and major research area these days (Zhen et al., 2015). All products impact three aspects of sustainability including economy, environment and society throughout their life cycle which are material extraction, manufacturing, transportation, use and disposal (Tarne et al., 2017). In product design the definition of sustainability is the ability of a product to work while having the lowest environmental impact and be capable of providing economic and social benefits (Hacking and Guthrie, 2008; Hall, 2011). It's important to know that All three sustainability aspects must be

considered as an integral part of sustainable design (Gennari, 2000; Jia et al., 2017). However, at first environment matters to product design. So, developing an environmentally aspects or ecological (eco)-design was considered during the first wave of sustainability (Lofthouse and Bhamra, 2012). Recycling has been discussed as a prominent way to conserve energy and natural resources. The term recycling

refers to "minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (i.e., recycling aluminum cans, paper, and bottles, etc.)" (U.S. Environmental Protection Agency, 1997). Far from the positive aspects of recycling Catlin et all in their project consider the possibility that the ability to recycle can have an impact on a consumer's consumption level. More specifically, they examined the effects of recycling availability on resource usage through both lab and field experiments. their results support this proposition and show that when the recycling option is available, consumers increase usage of products (catlin et al, 2013). Put differently, the possibility to recycle a product may also serve as a way to justify increased consumption (Mukhopadhyay & Johar, 2009).

Methodology

This research is descriptive-applied, non-experimental and single sectional research. Information has been gathered through distributing questionnaire among 57 persons who are living in Tehran. The method of sampling was random. Statistical population considered people who live in Tehran and it has been tried to take 4 parts of this city to cover dwellers with different financial capability. Three variable including sex, age and housing state have been considered. Before giving questionnaire to people, they have been asked whether they are interested in taking care of houseplants or not. The questionnaire distributed among people who said yes. This questionnaire contains 9 questions which has been made by the researcher and the validity of it confirmed by experts and its reliability has been measured by Cronbach's alpha equal with 0.841.. For analyzing data descriptive statistics and inferential statistics methods have been used. In descriptive statistics part, tables and charts for describing percentages and averages have been used.

Correlation test has been applied in inferential statistics part. This research tried to answer these two hypotheses.

1) Preserving appearance and lead to decrease discarding flower.

2) Applying metal and material with more financial value lead to decrease discarding flower.

Analyze

In questionnaire 63.2 percent of respondents were women and 36.8 percent were men. 59.6 percent were owner and 40.3 were tenant. 5.3 percent of age respondent were between 20-30, 61.4 between 30-40, 28.1 between 40-50 and 5.3 percent of them were between 50-60. Other result details out of the questionnaire has followed.

Descriptive statistics

Table No.1 and chart No.1 shows the percentage of people who are taking care of houseplants in their home.

Table number 1: the percentage of people who are taking care of houseplants

question	number	percentage
interested in taking care of houseplants	8	14.0
uninterested in taking care of houseplant	49	86.0
sum	57	100.0

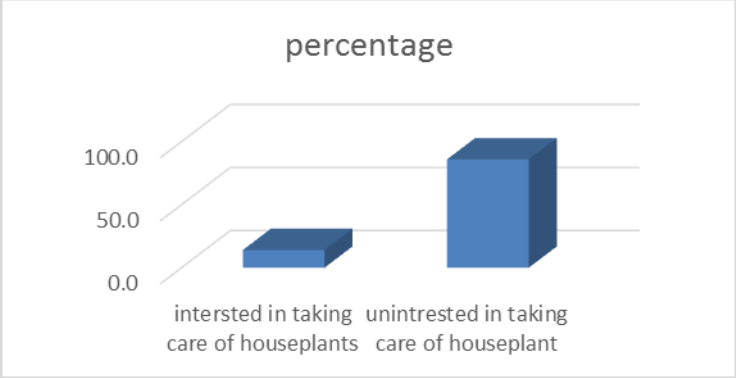

Chart NO.1: the percentage of people who are taking care of houseplants

Table No.2 and chart No.2 shows the percentage of different types of pots that people had.

Table number 2: the percentage of different types of pots

pot type	number	percentage
Ceramic	22	44.9
PE	23	46.9
high quality ceramic	4	8.2
metal	0	0.0
	49	100.0

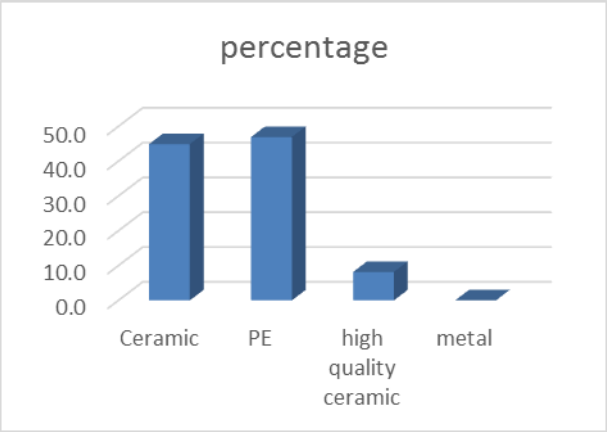

Chart NO.2: the percentage of different types of pots

Table No.3 and chart No.3 shows the percentage of main criteria in choosing pot.

Table number 3: the percentage of main criteria in choosing pot

selection criteria	number	percentage
price	13	13.7
durability	16	16.8
weight	11	11.6
Aesthetics	40	42.1
recyclable	15	15.8
sum	95	100.0

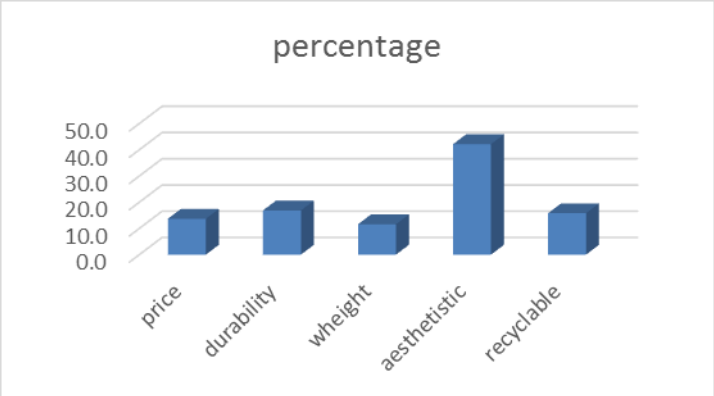

Chart NO.3: the percentage of main criteria in choosing pot

Table No.4 and chart No.4 shows the percentage of time duration of keeping a pot and using it.

Table number 4: the percentage of time duration of keeping a pot

duration of use	number	percentage
under 6 month	1.0	2.0
6 month to one year	10.0	20.4
one year to two years	30.0	61.2
more than two years	8.0	16.3
sum	49.0	100.0

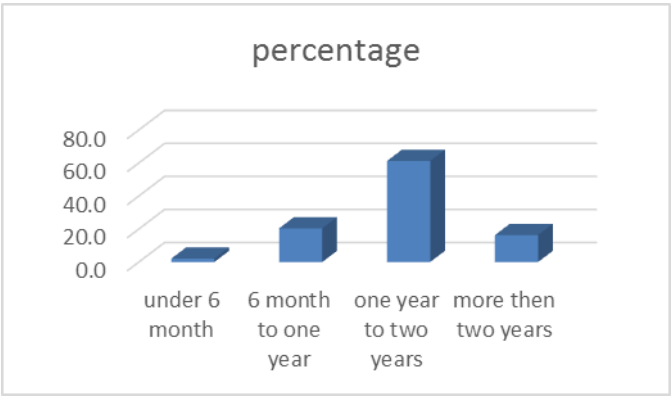

Chart NO.4: the percentage of time duration of keeping a pot

Table No.5 and chart No.5 shows the percentage of replacement reason of pot.

Table number 5: the percentage of replacement reason of pot

substitute reason	number	percentage
be broken and not usable	8	16.3
changing color and loosing face	22	44.9
become old fashioned	8	16.3
pot gets small	11	22.4
sum	49	100.0

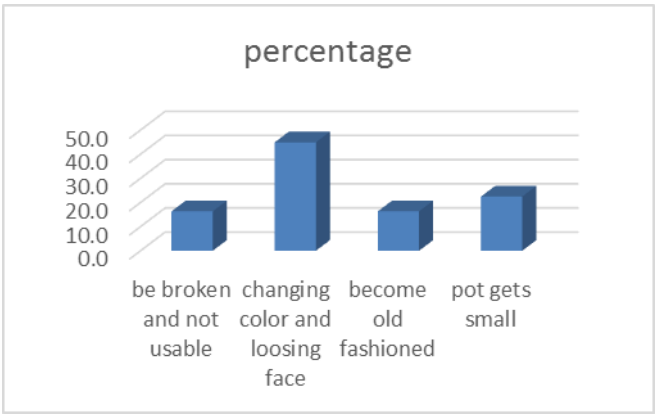

Chart NO.5: the percentage of replacement reason of pot

Table No.6 and chart No.6 shows the percentage of different answer to this question that what would you do if pot had good appearance and it still is fashionable?

Table number 6: the percentage of different decision about pot

make a decision about the pot with good appearance and fashionable	number	percentage
keeping it for next usage	21	42.9
giving it as a gift	10	20.4
replace it in a flower pot shop	16	32.7
throwing away	2	4.1
sum	49	100.0

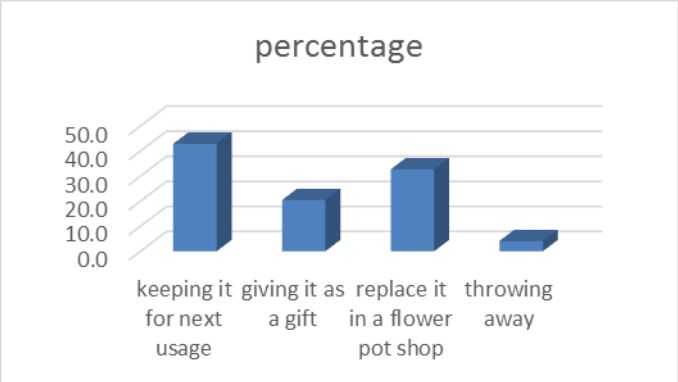

Chart NO.6: the percentage of different decision about pot

Table No.7 and chart No.7 shows the percentage of different answer to this question that why wouldn't you give it as a gift to someone else if it has an acceptable appearance?

Table number 7: the percentage of different idea

not giving it as a gift reason	number	percentage
have not a good feeling because of the bad appearance	24	49.0
time consuming process/not having possibility	11	22.4
pot is worthless	14	28.6
sum	49	100.0

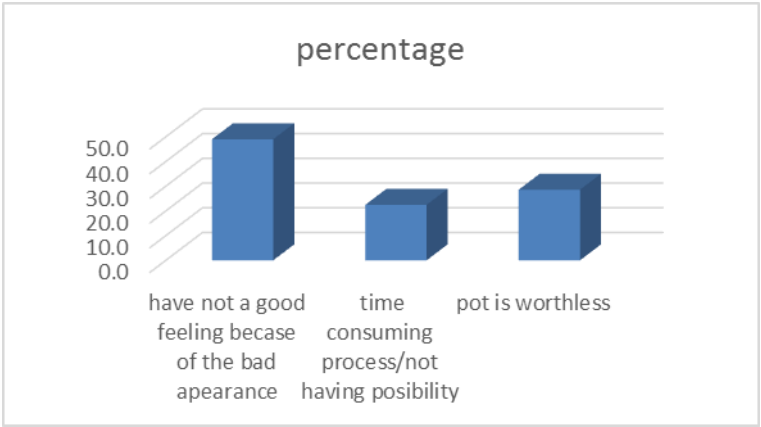

Chart NO.7: the percentage of different idea

Table No.8 and chart No.8 shows the percentage of different answer to this question that if the material of pot was valuable like metal, what would you do?

Table number 8: the percentage of different decision when the material is valuable

decision provided high price material	number	percentage
keeping it for next use	31.0	63.3
giving it as a gift	16.0	32.7
replacing it in pot shop	2.0	4.1
throwing away	0.0	0.0
sum	49.0	100.0

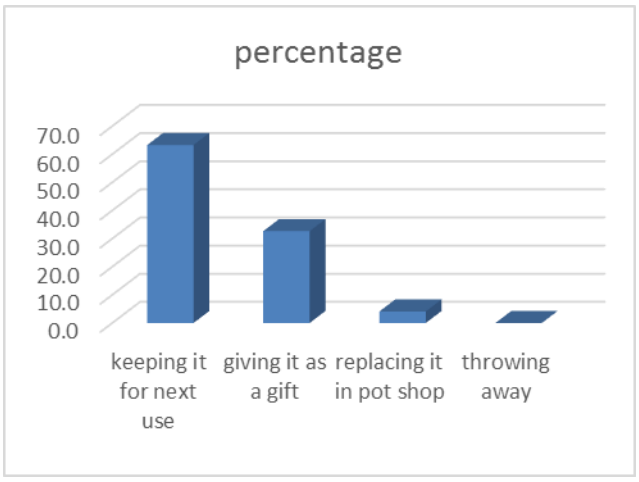

Chart NO.8: the percentage of different decision when the material is valuable

Table No.9 and chart No.9 shows the percentage of different answer to this question that if pot gets replaced quickly without making things dirty, what would you do?

Table number 9: the percentage of different reaction when pot gets change quickly

decision provided quick changing	number	percentage
Great! testing it for other houseplants	23.0	46.9
not interested in this facility	1.0	2.0
changing pots time to time to experience different view	17.0	34.7
exchanging it with my friends and families	8.0	16.3
sum	49.0	100.0

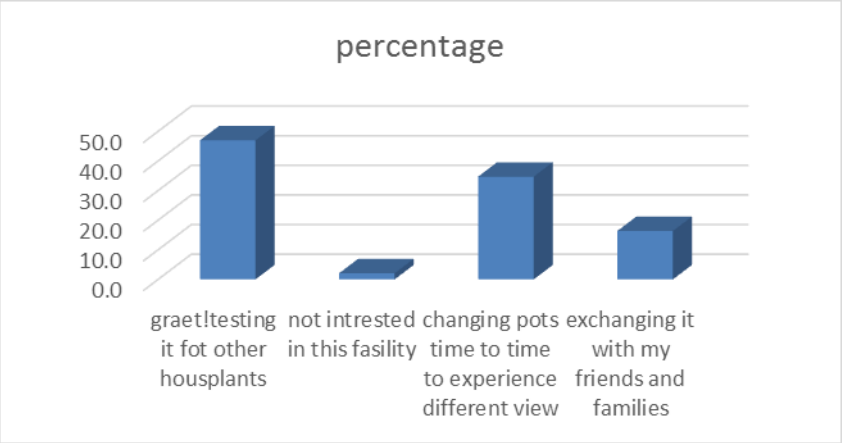

Chart NO.9: the percentage of different reaction when pot gets change quickly

Table No.10 and chart No.10 shows the percentage of different answer to this question that if pot gets replaced quickly without making things dirty while it got small too, what would you do?

Table number 10: the percentage of different reaction when pot got small and it gets change quickly

decision provided quick changing while pot got small	number	percentage
throwing away	0	0.0
put it away as a recyclable item	0	0.0
keeping it for next usage	24	49.0
giving it as a gift	25	51.0
sum	49	100.0

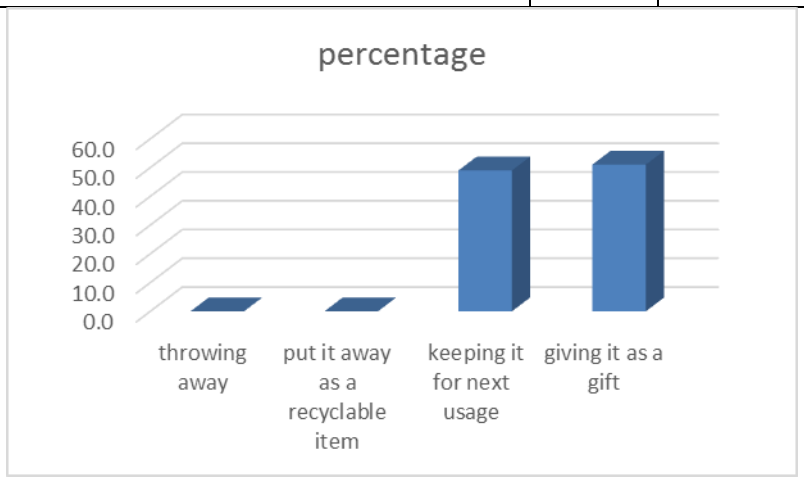

Chart NO.10: the percentage of different reaction when pot got small and it gets change quickly

Inferential statistics

Hypothesis number 1: Preserving appearance quality and lead to decrease discarding flower.
Table No.11 shows the result of Correlation test for examine of the hypothesis No.1

Table number 11: examination of hypothesis No.1 Correlation test

Correlations

		Preserving appearance quality	Duration of use
Preserving appearance quality	Pearson Correlation	1	.792**
	Sig. (2-tailed)		.000
	N	٤٩	49
Duration of use	Pearson Correlation	.792**	1
	Sig. (2-tailed)	.000	
	N	٤٩	49

**. Correlation is significant at the 0.01 level (2-tailed).

Results emerged from table No.11 confirm the hypothesis No.1. Correlation coefficient 0.792 shows the positive and strong relationship between Preserving appearance quality and Duration of use.

Hypothesis number 2: Applying metal and material with more financial value lead to decrease discarding flower

Table number 12: examination of hypothesis No.2 Correlation test

Correlations

		Applying Valuable material	Duration of use
Applying Valuable material	Pearson Correlation	1	.416**
	Sig. (2-tailed)		.000
	N	49	49
Duration of use	Pearson Correlation	.416**	1
	Sig. (2-tailed)	.000	
	N	49	49

**. Correlation is significant at the 0.01 level (2-tailed).

Results emerged from table No.12 confirm the hypothesis No.2. Correlation coefficient 0.416 shows the positive and strong relationship between applying valuable material and Duration of use.

Design

Conclusion

Considering previous studies around sustainable development especially eco-design and consequently importance of preserving resources and use recyclable material, it's obvious that in environment design using the least resources and applying approaches by which can increase the lifespan must the at the top of the agenda.

Also, promotion the consumerism spirit merely relying on this fact that this material is recyclable is somehow against eco-design approach. Taking this factor into account and paying attention to problems and meeting the needs of users, we can say that we are approaching to sustainable design aspects which are the main approach of this research. Based on this research findings, problems such as being inappropriate pot because of the loosing appearance quality and lack of financial value to keeping it eventually lead to dispose the pot by user or in optimistic state it will dispose as a recyclable material.

Given by these research findings, if flower pot preserves the primer appearance quality its lifespan will enhance. Moreover, applying valuable material such as metal as pot material is effective on pot lifespan. In this research the main reason which would influence on appearance and make it deteriorate was found the contact between soil and pot. As it has been shown in the final design, the soil contact with pot shell has been eliminated and as a result the appearance of pot will be the same even after using it.

In this research it had been tried to focus on increasing pot lifespan in addition to recycling possibility of primer material.

These research findings can be consider as a reference for researchers who are working on sustainable and eco-design and it can followed with searching for new factors which are effective on product lifespan.

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