UNIVERSITI TEKNOLOGI MARA

THE IMPACT OF 3R's ELEMENT CREATION ON ECOLOGICAL FORM OF ECODESIGN IN MALAYSIA

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ABSTRACT

Human activities reveal the global warming, pollutions and instability of our ecological systems: a greater global industrialism contribute to the unparalleled social environment. In previous decades, the earliest researches have established the *Sustainable Designs* through the scientific research. Thus, they preferred to use the environmentally friendly product design or ecodesign product to solve this global issue. However, when considering the specific field, multiple questions were raised and the industrial designers (as part of practicing designers in R&D group) were unable to define the industrial cycle or ecological cycle methodology. This were classified by three points – problematic, issues and gap since the *Reduce, Recycle,Reuse* (3R's) method practiced in the Malaysian furniture manufacturing industry. Thus, this research covers the three points mentioned, where the environmental elements such as the 3R's method in addressing an ecological form of ecodesign. Using the *qualitative methodology with empirical approaches*, the application of SPSS software is very significant in measuring the raw data into data analysis by using the Descriptive Study I (DS-I): Design Research Methodology (DRM). This research has applied two points of research approaches in methodological triangulation tradition: In this study, (1) survey was conducted among 38 practicing designers from the actual 43 correspondents needed (small group of sample size) that was represented by 7 categories of office furniture manufacturers from 426 population in Selangor state. Then, it was randomly clustered (cluster-stage sampling) from the 3 districts within 4 cities by *area sample* as Selangor state representative as the whole of Malaysia. On the other hand, (2) the qualitative data analysis is the preferred interpretation of the 3R's method phenomenology by coding structured; open-ended response concept generated purely from primary data collection based on the interview protocol (purposive sampling) that this study drew the *significant statements*. Due to the limitation of the study, only 3 practicing designers (senior and expert levels) out of total 5 correspondents that were interviewed using this qualitative approach. There were challenges in data analysis where the three kinds of empirical or statistical testing method models such as (1) Descriptive Statistical: Frequencies Distribution, (2) Spearman's Rho Correlation: Monotonic Function and (3) Chi Square Test: Independence were conducted and it turned out to be very complex. However, the DRM conceptual framework preferred to apply the pilot test study that has assisted to drive precise design theories in achieving the design research roadmap. Finally, the "cantilever principle"and "3R's loop cycle" are the two major findings that answered the research questions in *formulation of ecodesign*. However, this design theory interpretation must be focused and scaled under the ecodesign concept. Therefore, this basic qualitative structure output has matched the researcher's hypothesis statement that "3R's method succeeded to address an ecological form of ecodesign within it industrial cycle or ecological cycle methodology; by cantilever design concept, it transmitted formgiving concept at wider sustainable designs knowledge, methodology lesson and processes holistically". Hence, the research outcome delivered and exposed the potential improvement of resource recovery and material waste management to save our planet's ecological systems.

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CHAPTER ONE
INTRODUCTION

1.0 BACKGROUND OF THE STUDY

The earth's climate, as presented in the environmental indicators in the 21st century, reveals a host of international challenges. According to *Environmental Indicators Report* (UNEP / SCOPE, 1995 and WRI, 1995) around 1990 until 1995, the climate changes (CC) and global warming potential (GWP) were highlighted in a serious light. In 1997, one designer group led *The Journal of Sustainable Product Design* and it was the first expose for the industrial design field in addressing environmental concerns. It was released by *The Centre for Sustainable Design* (CfSD), an initiative of The Surrey Institute of Art and Design University College, United Kingdom (now formally known as University for the Creative Arts-UCA). The paperwork was successfully compiled in ten issues until July 1999. After a decade, the *sustainable design* has increasingly been vital. It presented the true definition such that is crucial in minimizing environmental impacts when applied in design process development using the three main pillars: environmental, social and economic influences (Howarth and Hadfield, 2005). Blizzard and Klotz (2012) found many terms of methodologies and there were around 13 terms raised in literature search in different fields, such as engineering, architecture, and planning disciplines pertaining to sustainable design. This means that the awareness of the sustainability is being performed at all times within the specific fields respectively.

In 2009, the Malaysian Government introduced the National Green Technology Policy (NGTP) to promote green technology in the national economic and sustainable development as national fundamental concept. Under the Malaysian Government, the Ministry of Energy, Green Technology and Water (KeTTHA) is one of the established ministries that is responsible in monitoring the functions and supporting the green technology policy based on the four principles: (1) energy; (2) environment; (3) economy; and (4) social. One of KeTHHA's contributions was its initiative to organize the first International Greentech and Eco Products Exhibition and Conference Malaysia 2010 (IGEM 2010). More than 25 countries gave positive