

Book Transit Shelter: A Method in Developing a Zero-Waste Environment and Healthy Campus Community

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Abstract

The production of a new book requires raw materials to be extracted from the earth, published, and transported. This process uses enormous amounts of material and energy. One way to save natural resources, protect the environment, and most importantly save money is by reusing items that are utilizable. The Book Transit System is created to minimize the waste of books being thrown away, especially by final semester students of Universiti Teknologi MARA, Perak. In addition, it encourages knowledge-sharing within the community. The book transit system is designed so that it can be attached to almost any solid surface and is user-friendly. While the design of this system is flexible and varies, for the purpose of this study, a *Book Transit Shelter* has been created. An existing shelter in the campus is utilized where a glass box, complete with steel book lift-up handle is attached to the shelter. Students and/or members of the community who walk by can just drop in any size of book in the glass box. As the glass is transparent, other students are able to have a quick look at the donated books. If they are interested, they can simply lift the handle and pick up the book they want for free. This concept is adapted from the zero-waste concept, but enriched with altruism and green environmental principles.

Keywords: Books, donation, environment, knowledge-sharing, shelter, zero-waste.

1.0 Introduction

Knowledge is significant in human life for daily living and decision-making. Knowledge can be gained through experience and learning process. This research attempts to enhance the latter through university's medium. A growing body of research has accumulated in recent years on knowledge sharing and management (Davenport, *et al.*, 1998; Gagne, 2009; Lu *et al.*, 2006). However, there is a lack of research and effort on knowledge sharing among students at university level, specifically in Malaysia.

Obtaining knowledge in the modern world has become easy via digital devices with the availability of the internet. E-books, journals, and library books that can be obtained and read from the mobile for free are of choice. Nevertheless, these sources are often insufficient for in-class use and different subjects. Students are constantly seeking ways to reduce their cost and thus, textbooks and modules are sometimes being photocopied. This act is against the copyright law and imposes a risk of being accused to both the students and the university.

On the other hand, students especially in their final year often seek ways to donate their books to those interested. Therefore, this research aims to cater the demands of the students while carving a zero-waste environment within the university area by creating a system or product that can facilitate knowledge-sharing and harmony scenarios. Books are valuable source of knowledge and should be recycled in different ways for infinite benefits, rather than being shredded for paper reproducing. This practice has been widely become the custom of many universities abroad (see: book donations at Duke University, University of Virginia, Colombia University and University of Reading). Books transport students to various technologies, histories, and experience. Specifically, the current research created a mock product that enable students to donate in its simplest way which has been created and named as the Book Transit Shelter. In doing so, we hope to contribute not only to the literatures on creativity, knowledge sharing, but enhance the green environment. The next session discusses the importance and benefits of book-recycling under which donation is at its heart.

2.0 Books and our environment

Being in the university, gaining knowledge through books and other printed materials is mandatory. A book is regarded as a primary source of knowledge. Its production involves a process of steps starting from obtaining raw materials to produce the paper, typesetting, printing, binding and packaging before the finished product hits

the shelves of bookstores (Advameg Inc, 2015). Throughout the process, many natural resources are being used. It was reported in 2013 that there were more than 30 million trees being cut down per year for the production of books that are marketed only for the USA alone (Eco-Libris, 2013). This figure is part of the approximate 4 billion trees being cut worldwide each year only to produce paper (Martin, 2011). In addition to that, the report also states that 35% percent of the trees cut are for paper production. It is also disturbing to affirm that paper mills are amongst the worst polluters to air, water and land of any other industries in the USA (United States Environmental Protection Agency, 2015). This immediately necessitates research to identify ways to reduce the impact of the issue to the environment.

Natural resources are decreasing in number and if efforts to replace them are not carried out, they will deplete entirely. One common initiative to reduce the impact of trees cutting is to plant more. This can help in energy saving, increase air quality, property values, drainage and storm-water mitigation and health (see: Caseytre, 2015). For these reasons, many non-profit organisations such as The Nature Conservancy and City Plants are active in plantation to improve the quality of human life. Following this, many governments do not overlook their responsibilities into developing a green and healthy environment. For example, the Greater London Authority (2015) reported that they have planted over 10,000 trees in 28 boroughs in their Mayor's Street Tree Initiative. However, although there have been efforts to replant trees, only specific type of trees are targeted to be cut down for paper production.

E-books, e-modules, e-brochures, and many more have been seen as an interest to many in order to reduce paper usage and waste. The e-publications on the other hand, are not considered as significant by some. For example, Chiong *et.al* (2012) conducted an experiment with 32 pairs of parents and their 3-6 year old children from the pool of museum visitors. The pairs were asked to read an e-book and a printed book, which have been selected carefully considering a few criteria. The study found that children are more effective with a printed book as the focus will be on story, rather than the features found in the electronic version that interrupts reading experience. Furthermore, Chiong *et.al* highlight that the printed book encourages children to interact with their parents and thus, enhances discussion and understanding of the contents. This enlightens the detail that printed book is important in enabling students to have an effective two-ways communication and learning in the class or lecture rooms. What is more, this shows that effort to reduce the impact of trees cutting and to encourage green environment shall not only depend on limited initiatives. A variety of initiatives is clearly needed to help to save the environment in creative and cost-effective ways.

In this research, we hope to minimise the problem of trees cut down and demand of printed materials. One mean that enables lowering the need for a new book supplies is by reusing them. Zero-waste is one concept used to minimise waste and reduce consumption during production, ensuring products can be reused, repaired or repurposed for other usages and maximising efforts of recycling the product. The zero-waste philosophy covers the whole life-cycle of the product (GrassRoots Recycling Network, 2015). As its name suggests, there is absolutely no part of the product being discarded for disposal in landfills or incinerators. In conjunction to that, we adapt the book donation and knowledge sharing practices in our research to contribute to a green environment.

3.0 Research methods

This research involves a preliminary investigation using a structured question on focus group. Generally, the literature review provided a basic idea of things to look for, but the main purpose of the approach to the preliminary study was to allow the respondents to identify what they do with their books once they have complete certain courses. A preliminary question was asked during lecture as a short quiz to three classes of semester three students with a total of 94 students. A short discussion on the results was then carried out to understand more about the action of the respondents.

From the preliminary question and discussion, two questions are formed i.e.:

- How book donations can be organised so that it is user-friendly to both the donator and the receiver; and
- How to design the book donation container so that it can be placed to any solid surfaces in the campus.

Clearly, the justification of an appropriate approach for answering such questions posed some innovative challenges. This study seeks to develop a real-case product in order to achieve the aim. Thus, a brainstorming session has been carried between the authors for ideas development. A design for a single unit of the product,

named as Book Transit, is then drafted so that it could be attached at an existing shelter in the university. By using the diagram, the authors produced a mock product.

4.0 Book Transit Shelter

The result from the preliminary investigation shows that 40% of respondents throw away their books. The reasons for such behaviour are mixed. Follow up discussion reveals that some threw because they could not find a way to channel their books and some thought their juniors might not be interested. However, 15% of the respondent actually managed to donate their books to other students. Often, students wish to donate their books as throwing away books feels wrong. This also results in 5% of respondent who left their books at the hostel. The remaining 40% keep their books for future reference. The preliminary investigation shows that 60% of the respondents do not take back their books with them and this is a huge number if the total number of students in UiTM Perak is considered. This seems to indicate that a right channel shall be established to encourage book donations.

Human beings usually want a convenient outlet for doing the right thing. Book donations among university students help in knowledge-sharing, in which, according to Lee & Al-Hawamdeh (2002), should be created and nurtured. Used books being donated to others and the less fortunate could improve their education. Projects such as Global Giving, Better World Books, and Education Africa are a few examples of how donated books are being benefited. The Better World Books (2015) generate income from donated books and at the same time donating books from what they have collected. Figure 1 shows the book drop box of 4x4 feet of size created for easy donations. This drop box is normally placed near the library or locations that have been determined or requested by the donors. This process has also been practiced by many libraries especially in the European countries and the United States (US). However, donations mean that the collector/receiver need enormous time and energy in sorting, displaying, storing, and selling. What is more, the end-user often have to buy the used book, although the price is much lower than a new one. This idea is appreciated, nevertheless, a design of book donation container in this research request a quick view to the collector. The container shall be a transit of book drops, a quick view and fast collection. It shall also be designed in such a way that the students themselves deal with the donations and requires no personnel/particular group for management. In addition, the book transit shall be able to be located anywhere within the university area, at any surface.



Figure 1: BWB free Drop Box Programme (BetterWorld Books, 2015)

With the requirements on paper, a design has been drafted. Figure 2 illustrates the frame of the Book Transit container to be attached at the existing shelter in the university. The frame is designed to hold a clear box for book drops. This box is decided to be built using glass instead of any kind of clear plastics for several reasons. Glass material is durable and will not fade or brittle over time, although being exposed to rain and sun.

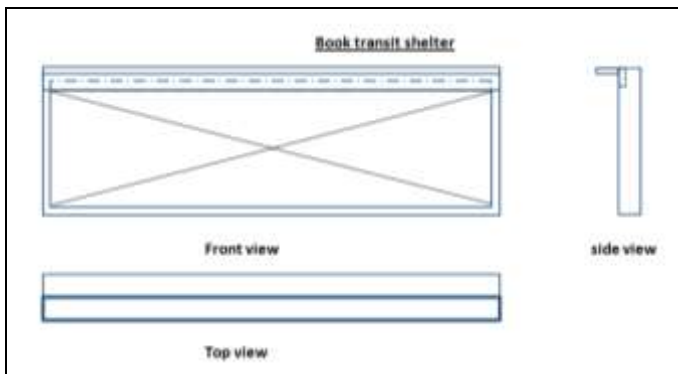


Figure 2: The views of Book Transit frame

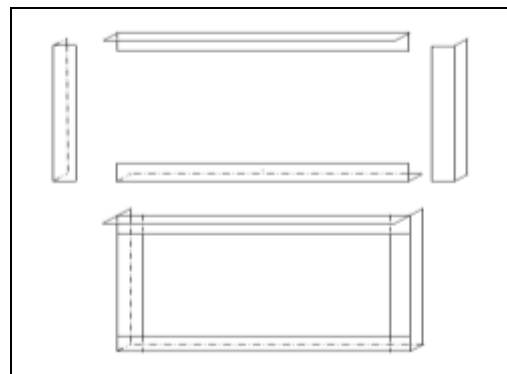


Figure 3: The design of steel book lift-up handle for book collection

As glass is easy to break, the frame design shall reduce the risk. To date, it has been more than three months that the Book Transit Shelter was attached. In addition, the shelter with the glass book transit has been transported twice within these three months for display and use within the university. The glass remains steady at its place and no cracks are found. However, there are still a lot of room for improvement, especially in terms of the frame design.

From the above ideas, another concern is about easy book collection. Hence, a book lift handle as shown in Figure 3 is designed to be incorporated in the glass box. Figure 4 demonstrates the book collection by lifting-up the steel handle. In order to reduce the impact of the handle to the glass, padding was laid at the areas of contact. Figure 5 shows the close-up of a Book Transit at a shelter and Figure 6 shows the Book Transit Shelter. It shall be noted that this is just one unit of Book Transit on a shelter and more units can be attached to same shelter at different heights and sizes.



Figure 4: Lifting-up the handle for book collection



Figure 5: A single unit of Book Transit in a shelter



Figure 6: A Book Transit Shelter

In order to obtain more input for future improvement, the idea of Book Transit Shelter was submitted for International Invention, Innovation, and Design Exhibition (INDES) 2015 and was displayed on the 13th and 14th of June 2015 at main hall, Universiti Teknologi MARA (Perak). The assessors believe that the Book Transit Shelter has benefits to the society and the ideas are genuine. Apart from that, there were many valuable feedbacks given for development and improvement. The design won a bronze medal and this indicates the standing and reliability of Book Transit to be expanded.

5.0 Discussions

Knowledge-sharing is the deliberate act in which knowledge is made reusable through its transfer from one party to another. A knowledge-sharing culture needs to be created and nurtured (Lee & Al-Hawamdeh, 2002) especially among university students. A study conducted by Roger Fullwood *et al.* (2013) discovered that knowledge-sharing will improve and extend relationships with colleagues and offer opportunities, especially in the working environment. In the narrow perspectives of study environment, one of the most well-known sources of knowledge in universities is books and printed notes. In order to create the culture of sharing in the university, according to Lee & Al-Hawamdeh, (2002) there is a need to create a knowledge-sharing environment. In conjunction to this, the Book Transit Shelter acts as a catalyser for creating such supportive environment. Additional to that, Lee & Al-Hawamdeh (2002) had attributed the impact to five factors of knowledge-sharing which one of the factors is the channel used to share the knowledge. It is agreed that unwanted and degraded old books might be appreciated by other individual or organisations. Only a few studies had been conducted on how to deal with unwanted and discarded old books and printed notes especially in the education institutions. Other than that, environmental awareness also mandates that books be re-used rather than trashed. Books and printed knowledge are part of education system where the productions of papers for that purpose are huge and uncontrolled and this kills billions of trees all over the world every single year. Therefore, a study on identifying a correct method and a catalyser towards knowledge-sharing, which in this research is referred to as book-sharing, need to be identified to promote books-sharing among university students and to support a greener sustainable environment in the future.

6.0 Conclusions and recommendations

It has been a routine of university students to end their semester with clearing their hostel room. This involves a proper planning to store all of their used lecture notes and books (e.g. *reference book, text book, and teaching modules*) during the semester break. Some students of UiTM (Perak) decided to keep those books with them for continuous references. However, 5% of them prefer to leave it unconditionally at the hostel or even worse, 40% of them just throw them away as waste. This scenario creates a long term impact to the environment and contributes to more trees being cut for new paper production. The Book Transit Shelter is created to cater the demands of the students, while carving a zero-waste environment within the university area, in which facilitates knowledge-sharing and harmony scenarios. The design has won a medal at INDES 2015 and shows that it is acceptable for zero-waste development in the university.

Given that this study is limited to the application on shelter, it can be considered as the basis for reference from which further research may be undertaken in different surface or structure. This is interesting, as the design will differ depending on the application. Cost for implementation is also important information that can be added in research. The findings of this study suggest a number of important changes that need to be made for Book Transit applications. Primarily, the frame and lift-up handle need a better design. Lastly, it is recommended that a reasonable approach by the university's decision-makers shall be considered for implementing the book donations idea by using the Book Transit.

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