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ECO SMART BACKPACK

Aliyah Syafiya Abdul Rahman, Nur Adila Mansor, Siti Zuhairah Hazwani Zulkifli,
Nur Syuhada Norizan, Fadhilah Zainal Abidin, Noordiana Sukur*

Universiti Teknologi MARA, Cawangan Melaka, Kampus Bandaraya Melaka

dianasukur@uitm.edu.my

ABSTRACT

The backpack is a perfect travel companion for any journey because it is designed to replace all other luggage, which is frequently used by hikers, casual travellers and backpackers. Backpack is very necessary when traveling because it can make it easier and lighter for traveller to carry their belongings. However, there are some common backpacking problems; from unexpected weather conditions and equipment failures to navigation issues and safety concerns. Therefore, a product named Eco Smart Backpack was created to solve these problems. Furthermore, by integrating the recycle concept into this product, it is not only benefitting traveller but also the environment. In the long term, this product indirectly enables us to support a circular economy and minimise waste and landfill building. The objective of Eco Smart Backpack is to create a multi-function backpack from recycle materials and household items that assist traveller during their trips. In the process, several additional parts have been added to the used backpack. Every component has a distinct purpose; the pocketed GPS tracker, a safety whistle, a one-step poncho, a hiking stick and a used backpack. The ideal consumers for this Eco Smart Backpack are travellers, outdoor enthusiasts, novice hikers, and backpackers. We hope that this innovation product also helps us to protect our environment by recycling the used materials for a new purpose.

Keywords: backpack, recycle, GPS tracker, safety whistle, poncho, hiking stick

1. INTRODUCTION

A backpack is very necessary when traveling because it can make it easier and lighter for tourists to carry their belongings such as clothes, shoes and other equipment. According to Dillon (2023) this backpack is great as a travel companion for any trip, it is ultimately made to replace all of your other luggage. Backpacks are often used by backpackers, casual hikers and travellers for different needs and purposes.

However, it is difficult to find multifunction backpacks that work for a range of situations, so users would typically buy several to cover all of their needs (Jonsson, 2018). This further leads to overconsumption, and the product produced from unsustainable material, manufacturing, and processing choices will increase environmental impact (Jonsson, 2018). It was reported that, more than 1 billion umbrellas were discarded each year (Umbrella, 2023). Concern with environmental impacts, one of the components of this Eco Smart Backpack is made from the used umbrellas. The used umbrellas were recycled into poncho raincoat. Hence, this innovation aims to propose multifunction backpack that suitable for leisure traveller and beginner hiker that integrated with the concept of environmental sustainability.

2. LITERATURE REVIEW

2.1 Backpack

Backpacks have been quite popular for a long time since they allowed customers to carry items with their hands free (Ray, Puntabeekar, & Singh, 2020). Since it first designed in 1877 for the U.S military, it was evolved and innovated to fulfil certain needs and requirements (Ray et al., 2020).

According to Eagle, Z. (2016), backpacks were grouped into two categories: general use backpacks and special application backpacks. General use backpacks are designed daily use activities such as a school bag, a day-trip bag, or a supplemental bag while special application backpacks are designed to cater specific purposes such as recreational backpacks, travel backpacks or military backpack (Eagle, 2016)

2.2 Recycling

Recycling includes activities that unwanted/or waste materials are reused for the reproduction of new products - the unwanted materials can be plastics, metals, papers etc (Mwanza, 2021). Recycling is part of the components in the Waste Pyramid Hierarchy - Reduce, Reuse, and Recycle (Brin, 2023, NSW EPA, 2022).

3. METHODOLOGY

3.1 Materials

There are 6 main items used for the innovation of Eco Smart Backpack (Figure 1.0). The list of the items as per below;

- A medium sized hiking bag made from oxford material, with a strong wear resistance, and water repellent quality is selected.
- A plastic GPS pocketed used to provide information about a person's whereabouts.
- Metal safety was chosen because metal material is durable and not easily damaged.
- Five recycled polyester umbrellas were suitable for making the poncho. Polyester is a waterproof material that use for daily purposes.



Figure 1: Items and materials use for the innovation of Eco Smart Backpack

3.2 Product making process

The first design sketch started with a reference made from a jacket design by Knoblauch in 2022 (Figure 2). It was determined from the study that every human will naturally reach out both of their hands to cover their head during rainfall and to shelter from heat or cold.



Figure 2. Weather wear jacket design by Knoblauch in 2022

A miniature replica was created from an A5 notebook paper. Then, the design transferred to a real-life scale on mahjong papers and sellotape, then changes were made due to some technical issues (Figure 3).



Figure 3. A life sized replica made from mahjong papers and Sellotape.

The changes are mostly on the application of the poncho's handle, to make it more user friendly. Then, the process of preparing a prototype started with placing the order for a mini-sized GPS (Figure 4), a metal safety whistle and a backpack suitable for travellers and casual hikers (Figure 5).



Figure 4. GPS tracker pocket



Figure 5. Detachable safety whistle

Following that, used umbrellas from different colours and size were collected from friends and families. The seams of the used umbrella were carefully removed, followed by transferring the sewing pattern onto the fabric. In an effort to make use of every part of the umbrella, a hiking stick from the umbrella's rod was included in the design for the hiking stick. Afterward, the fabric is cut to size for the whistle holder, GPS pocket and the poncho. The cut-up fabric was then meticulously sewn together using a home sewing machine and cotton threads (Figure 6). With a few more testing and improvements to the product, Smart backpack was born (Figure 7).



Figure 6. One step poncho

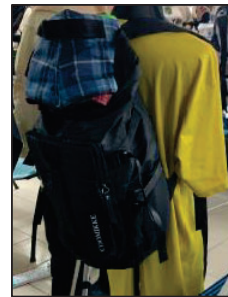


Figure 7. Eco Smart Backpack final design

4. RESULTS & DISCUSSION

4.1 Commercialization

This product will be marketed through trustworthy e-commerce shopping sites such as Shopee, TikTok shop, Lazada, Instagram market and Facebook shop. It will be easily promoted through the platform itself, for example the Shopee live session, TikTok live and for you page, Instagram feed and

advertisements and Facebook feed. After Covid19 outbreak, people have become used to shopping online and prefer to shop on social media platforms compared to shopping in stores.

This Eco Smart Backpack has a potential to be successful in the market for having a GPS tracker, poncho raincoat, and a whistle. Eco Smart Backpack will be the best choice for those who cares for their safety as well as supporting a greener future. This Eco Smart Backpack comes with the necessary equipment when hiking such as hiking stick, a one-step poncho, also known as a raincoat placed on the top of the bag can be used when it rains, the whistle on the side of the bag can be used in case of an emergency and the pocketed GPS tracker inside the bag also works if there is emergency. Hence, the target markets for this product are; leisure traveller, casual hiker or beginner hikers and outdoor recreationists.

4.2 Market review

Table 1 summarised the respondents' feedbacks on Eco Smart Backpack innovation idea. From the table, in general the idea and design were acceptable by majority of the respondents. However, there were also a few suggestions on what and how to improve the Eco Smart Backpack prototype. For example, the open-ended questions asked about "what important features can we put on this product?". 23.1% suggested flashlight. While for this question "what do you think about the smart backpack design?". 38.5% stated that the product is good, while another 23.1 % responded that this is an interesting product

Table 1: Respondents feedback on Eco Smart Backpack

Questions	Responses		Total responses
	Yes (%)	No (%)	N
Is RM60 suitable for this product?	12	1	13
Is our product useful	13	0	13
Do you want to recommend this product to others?	13	0	13
Do you think the detachable tracker is suitable for this product?	13	0	13
Do we need to improve this product?	8	5	13

5. CONCLUSION & RECOMMENDATION

In conclusion, the innovation of Eco Smart Backpack help businesses to create new products and services, improve existing products and services, reduce costs and protect the environment by recycling the used material to reproduced the new product. In the future, the product should upgraded in terms of its design, colour and materials.

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