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Textile waste management cognizance: Creating awareness among women entrepreneurs

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Abstract

Textile waste is a major environmental problem, as it takes up space in landfills, contributes to greenhouse gas emissions and pollutes the environment. The most feasible approach to reduce the waste is reprocessing of waste material into new or reusable product, in a manner that on the one hand some burden of solid waste on our ecosystem is lessened and on the other hand sustainability is achieved through replenish able resources. The present study was an attempt towards cognizance of pre and post-consumer textile waste by encouraging the perspective women entrepreneurs for sustainable recycling with a focus on utilization of textile waste generated at household level for development of different type of bags. Paper patterns of fifteen different types of bags were prepared and trainings were imparted to the women entrepreneurs on use of paper patterns for product development. After the trainings, gain in knowledge of respondents was studied and it was observed that the respondents succeeded in acquiring knowledge about utilization of textile waste for product development and use of paper patterns for cutting and stitching of different type of bags. The trainees found paper-patterns very helpful and easy technique to develop products (WMS 2.92), utilizing textile waste for product development is an innovative and cost effective idea (WMS 2.77) and money can be earned by developing diversified products from textile waste (WMS 2.40).

Keywords: Textile waste, paper patterns, product development, gain in knowledge

Introduction

Textiles are the second most important need of a human being to live and be protected from different weather conditions. However, with increasing population, the consumption of textiles increased and subsequently the textile waste increased. Textile waste is any material of textile origin which is not considered suitable for its end user. The end user could be a garment manufacturer, upholstery designer, carpet manufacturer or the consumer. It could be also any industrial waste generated while manufacturing of fibers, yarns, fabrics or garments or the household waste created after usage of garments or textile material by end consumers. Almost all of the industrial wastage and a majority of household wastage are recyclable and disposing off the same as wastage should be our last resort. Textile waste can be classified as either pre-consumer or post-consumer. Pre-consumer textile waste is usually clean waste it comes in the form of leftovers or textile by-products which is generated by processing of fibers, production of finished yarns and textiles, technical textiles, nonwoven, garment and footwear, including off-cuts, selvages, shearings and rejected materials, unsold merchandise. Post-consumer textile waste is the waste of fleece, flannel, corduroy, cotton, nylon, denim, wool and linen, which have passed through the consumer market. It consists of any type of garment or household textiles such as sheets or towels which are discarded by the consumers for the reasons that they are worn out, damaged, outgrown, or have gone out of fashion (Kamble *et al.*, 2022; Prabhakar and Lokhande, 2023) [2, 4].

Textile waste can be managed in a variety of ways quite successfully so that the usage of our resources can be minimized by reusing/ recycling of textile waste. Reusing an item for another purpose instead of the one for which it was produced and initially utilized. Recycling involves recovering of raw material from the waste and utilizing the raw material to create new products. Reuse of textile material reduces air and noise pollution by saving the raw material resources and processes required for making new items and saves money on purchase as well as disposal of textile products. The biodegradable and absorbent cotton fabric can be recycled to make rags, wiping cloth, napkins or foot mats and can also be used to produce new high quality paper thus reducing need of cellulose from wood to create paper. The embroidered or zari patches from old sarees have been traditionally used to create quilts, cushion covers and are still in demand for their aesthetic and rustic appeal and can be a source of income as well (Kapila and Dhillon, 2019) [3].

As the fashion industry continues to grow, the need for

sustainable, recycling and ethical practices is becoming present-day need of our society to sustain the environment. Keeping the above rationales in mind the present study was conducted to disseminate the knowledge about sustainable recycling practices to reduce waste, conserve resources, create entrepreneurial opportunities and preserve cultural traditions.

Methodology

Development of products: Twelve (12) products were selected to be developed out of collected pre and post-consumer textile waste as per the size of available material. The selected products were replicated to utilize the collected textile waste and total 48 articles comprising of 17 apparel and 31 utility articles/ accessories were prepared. Cost of each developed product was estimated on the basis of actual cost of raw materials, labour charges and finishing expenses.

Development of paper-patterns of selected utility articles/accessories: To impart trainings to perspective entrepreneurs regarding development of products using textile waste, paper-patterns of fifteen different type of bags were prepared with the help of CorelDRAW software. The complete information about size, cutting and stitching was mentioned on each pattern.

Imparting trainings to perspective entrepreneurs: To acquaint the women entrepreneurs about product development from textile waste and to ascertain the impact of training in terms of gain in knowledge, three trainings of two days duration each were imparted to eighty respondents of three different groups. During the trainings, the trainees were made acquainted to use paper-patterns for cutting and stitching of different type of bags. The grading of paper-patterns for product development as per the availability of fabrics was also demonstrated.

Assessment of pre and post knowledge of trainees regarding utilization of textile waste: To create awareness regarding utilization of textile waste for product development, different products prepared using pre and post-consumer textile waste were shown to the trainees. The technical knowhow on product development utilizing textile waste was imparted with the help of paper patterns. In order to obtain the knowledge scores, self-structured knowledge test was used. The prepared knowledge test was administered on the respondents before and after exposure to training. The pre-exposure and post exposure scores were computed separately. The difference between pre and post exposure scores so obtained was taken as gain in knowledge. For measurement of significance of gain in knowledge paired "t" test was used.

Assessment of market potential of developed products

The selling price range for each product was computed and percent profit was calculated using the following formula:

$$\text{Percent Profit} = \frac{\text{Selling price} - \text{Actual cost}}{\text{Actual cost}} \text{ X } 100$$

The developed products were put on sale at different exhibitions to assess their market potential.

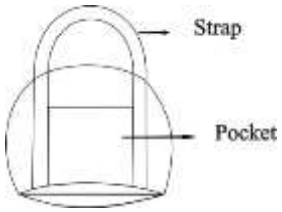
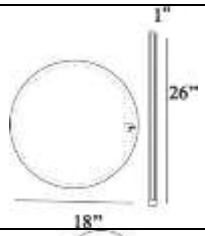
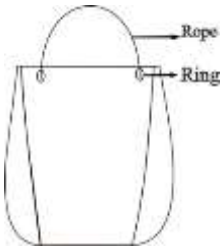
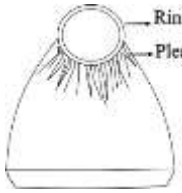
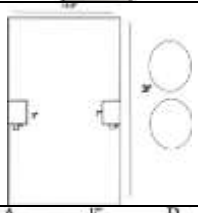
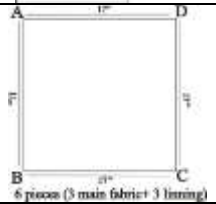
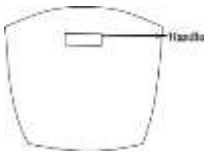
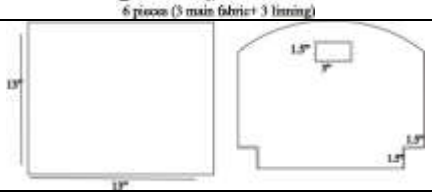
Results

Development of products: Forty-eight products comprising of *lehanga choli*, evening gown, skirt-top, ladies suit, tunic, frock, wall pocket, mobile kit, shopping bag, foot mat, *chapati* holder and hand bag were developed using the collected pre and post-consumer textile waste. The developed products are presented in Plate- 1and 2.

Plate 1: Developed Apparel Articles

Plate 2: Developed Utility Articles/ Accessories

Development of paper-patterns: Patterns are helpful in streamlining the product development process by reducing the fabric wastage and time required for preparation of a product. With the help of patterns, not only the beginners but also the experts can construct a product easily by duplicating the same style. Further, the risk of wrong cutting of fabric is also reduced and the patterns can be saved for future use. The prepared paper-patterns of fifteen different type of bags are presented in Plate 3.

S. No.	Name	Design of Bags	Patterns
1.	Stylish Bag		
2.	Rope Bag		
3.	Ring Bag		
4.	Origami Bag		
5.	Hand Bag-1		

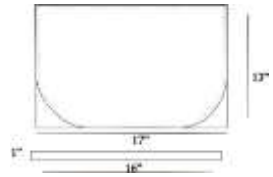
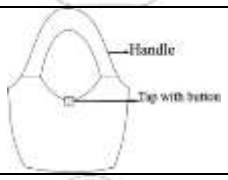
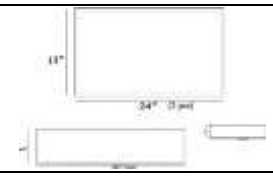
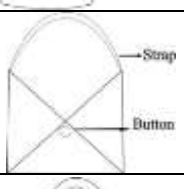
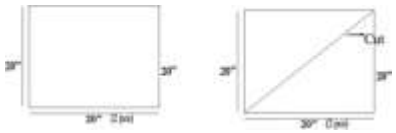
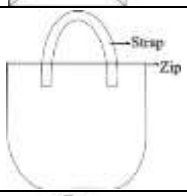
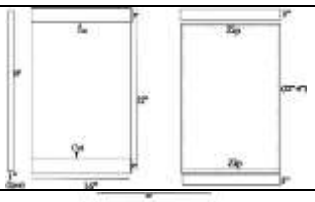
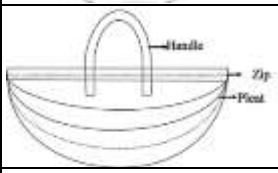
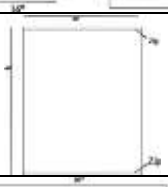
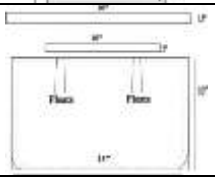
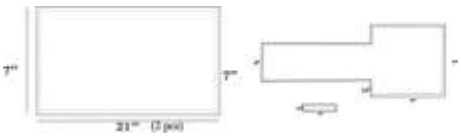
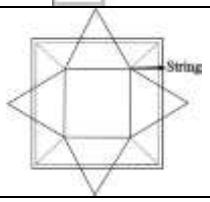
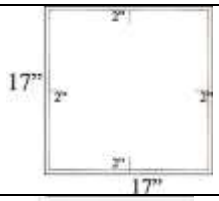
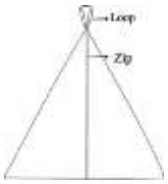
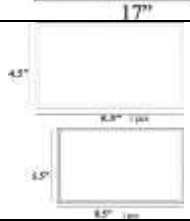
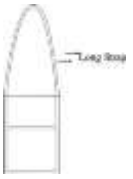
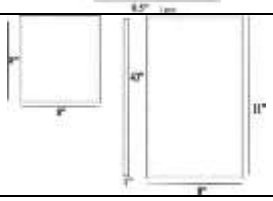
6.	Hand Bag-2		
7.	Hand Bag-3		
8.	Shoulder Bag		
9.	Shopping bag		
10.	Pleated Bag-1		
11.	Pleated Bag-2		
12.	Sling Bag		
13.	Ceremony Bag		
14.	*Potli* Bag		
15.	Mobile Kit		

Plate 3: Paper-patterns of bags

Gain in knowledge of trainees regarding utilization of textile waste: The gain in knowledge refers to the difference between the knowledge possessed by the respondents before and after training regarding utilization of

pre and post-consumer textile waste. To compare the effectiveness of trainings, knowledge gained by the respondents to prepare products from pre and post-consumer textile waste was computed on the basis of pre and post exposure. The data pertaining to gain in knowledge of respondents are presented in Table 1.

Table 1: Gain in knowledge of the respondents regarding utilization of textile waste for product development n=80

S. No.	Knowledge statements	Pre knowledge	Post knowledge	Gain in knowledge	't' values
		Mean	Mean	Mean	
1	Reusing/ repurposing of textile waste is an eco-friendly technique helpful in environment protection	0.15	0.95	0.80	19.36*
2	Do you know that the following articles can be prepared out of textile waste: Bags	0.28	0.92	0.64	12.18*
	Wall pockets	0.10	0.90	0.80	16.72*
	Foot mat	0.22	0.78	0.56	15.67*
	Mobile kit	0.12	0.88	0.76	22.23*
	Chapati holder	0.11	0.91	0.80	19.36*
3	Textile waste generated at household/ community level can be minimized by utilizing it for development of diversified products	0.05	0.97	0.92	35.79*
4	Utilizing textile waste for development of diversified products is a creative way to utilize leisure/ spare time	0.15	0.92	0.77	17.94*
5	Development of diversified products using textile waste can be a source of income generation at household level	0.06	0.95	0.89	27.77*
6	Textile waste can be potential resource for establishing small scale enterprise on product development	0.01	0.90	0.87	24.52*
7	Recycling of textile waste is helpful in conservation of natural resources	0.03	0.91	0.80	19.36*

Low: 0.00-0.33; Medium: 0.34-0.66; High: 0.67-1.00, *Significant at 0.05% level of significance

The data presented in the table clearly highlight the facts that respondents succeeded in acquiring knowledge after training. High gain in knowledge was recorded for each statement *viz*. "Textile waste generated at household/ community level can be minimized by utilizing it for development of diversified products (MS 0.92)", "Development of diversified products using textile waste can be a source of income generation at household level (MS 0.89)","Development of diversified products using textile waste can be a source for establishing small scale enterprise (MS 0.87)", "Reusing/repurposing of textile waste is an eco-friendly technique helpful in environment protection" and "Recycling of textile waste is helpful in conservation of natural resources (MS 0.80 each)". Regarding product development using textile waste it was observed that gain in knowledge was high for *chapati* holder and wall pocket (MS 0.80 each) and mobile kit (MS 0.76) the whereas it was observed medium for bags (MS 0.64) and foot mat (MS 0.56). The medium gain in knowledge for bags and foot mat might be due to the reason that a good number of respondents were already preparing these articles but it was reported that during trainings they learnt new designs as well use of paper-patterns. The 't' values indicated significant gain in knowledge for all the knowledge statements.

Opinion of trainees regarding training: The data incorporated in Table 2 pertaining to opinion of respondents about training on product development using textile waste reveal that the trainees found „paper-patterns very helpful and easy technique to develop products (WMS 2.92) followed by utilizing textile waste for product development is an innovative and cost effective idea (WMS 2.77) and money can be earned by developing diversified products utilizing textile waste (WMS 2.40).

Table 2: Attitude of the respondents regarding training on product development n=80

S. No.	Attitude statements	Strongly agree (3)	Agree (2)	Somewhat agree (1)	Weighted scores	WMS
1.	It is an innovative and cost effective idea to utilize the textile waste	66	10	04	222	2.77
2.	It is easy to develop diversified products from textile waste	21	37	22	159	1.98
3.	One can earn money by developing diversified products utilizing textile waste	46	20	14	192	2.40
4.	It is easy to create new designs for different products	05	06	69	96	1.20
5.	It develops confidence in stitching innovative products and encourage creativity	63	11	06	173	2.16
6.	Paper patterns are very helpful and easy technique to develop products	74	06	--	234	2.92
7.	Understanding the techniques of product designing and development without training is difficult task	32	28	20	172	2.15
8.	Product development from textile waste is not a profitable venture	05	08	67	98	1.22

WMS: Weighted Mean Score; Strongly agree: 2.34-3.00; Agree: 1.67-2.33; Somewhat agree: 1.00-1.66

Further the trainees opined that without training it is difficult to understand the techniques of product design and development (WMS 2.15) and the trainings develop confidence and encourage creativity in stitching innovative products (WMS 2.16). However, the trainees did not find it easy to develop diversified products from textile waste (WMS 1.98) and create designs for new products (WMS 1.20) without training. Weighted mean score of 1.22 for the

statement „Product development from textile waste is not a profitable venture" indicate that it can be a profitable venture for income generation. Thus it is deduced that trainings were helpful in creating awareness and imparting technical knowhow on use of paper-patterns for product development by utilizing textile waste. Market potential of the developed products: The data contained in Table 12 indicate that probable profit for developed apparel articles was quoted from 33 to 100 percent whereas it was 10 to 60 percent for utility articles. The quoted profit margin of developed products varied for each product depending on the design and embellishments.

The results are in accordance to Arya and Singh, 2018 [1] that paper patterns helped the trainees to learn the techniques of cutting and stitching as paper pattern technique was found time saving in comparison to drafting technique.

Market potential of the developed products: The data contained in Table 3indicate that probable profit for developed apparel articles was quoted from 33 to 100 percent whereas it was 10 to 60 percent for utility articles. The quoted profit margin of developed products varied for each product depending on the type, size, design and embellishment of the articles.

Table 3: Market potential of the products developed from textile waste

Developed products	Probable profit	
	(₹)	%
Apparel articles		
Lehanga choli	800-1200	67-100
Evening gown	700-900	54-70
Skirt-top	50-150	100
Ladies suit	200-400	33-67
Tunic	50-150	100
Frock	00-100	66
Utility articles		
Shopping bag	10-110	10-55
Hand bag	20-70	20-47
Wall pocket	30-80	30-53
Chapati holder	40-60	50-60
Mobile kit	20-40	25-40
Foot mat	40-60	40-50

The developed products were put on sale at different exhibitions and all the products got sold. Hence, it can be concluded that the products developed from textile waste have good market potential and the pre and post-consumer waste can be effectively utilized for product development.

Conclusion

The products crafted from textile waste possess significant market potential, and both pre-consumer and post-consumer textile waste can be efficiently utilized for development of varied products. Paper patterns proved to be helpful tool in learning cutting and stitching of bags. Significant gain in knowledge of the respondents on know-how of paper patterns for product development proved that the trainings were effective and successful. The trainings were helpful in enhancing entrepreneurial traits of women entrepreneurs which can lead to adoption of technology as an enterprise in rural area.

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