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A Study on Awareness Creation of Sustainable Waste Management among High School Students

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ABSTRACT:

Sustainable Waste Management (SWM) means reducing and avoiding the amount of single use plastic products and other materials along with the amount recycled. The main components of sustainability are waste prevention, reuse, recycling and waste disposal. Waste management is one of the challenges that educational institutions have to face in achieving the sustainability goals. But at the same time schools can provide excellent educational opportunities for creating awareness about waste and waste management. Also, enhancing the spirit of waste reduction initiatives in the minds of school students can certainly help saving natural environment and energy besides improving the economic and environmental performance of schools. This study has been carried out on 100 students of boys and girls in class IX and X and of rural and urban areas in order to assess the awareness, practice and attitude of school pupils toward the existing waste management programs which are ongoing among rural urban students.

Keywords: Sustainability, Waste Management, Opportunities, Environmental performance, Pupils.

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1. Introduction

After the home, school constitutes the next most important place of learning and where children spend most of their time, in particular indoors for study and outdoors while at play. The educational institutions care about and promote the main components of sustainability in our society. Waste management is one of the challenges that the educational institutions have to tackle the situations in accomplishing sustainability goals. Education influences environmental awareness in pupils. Most students in the developing countries do not have the practical knowledge to enable the practice of appropriate waste management in their school and at home, to impact their family's knowledge due to the lack of teacher's knowledge.

Environmental education in recent years has been taught at the curriculum level of the education in most of the developing countries but the practical knowledge from teachers to students is minimal. As a result a gap has been created that lead to lower standard in managing waste for sustainability in most of the developing countries.

Being one of the developing countries, India has increased waste generation matching its dramatic growth of population, urbanization and enhanced standard of living. Improper waste disposal has been a major contributing factor to the environmental degradation. Hence, an effective waste management system ought to be introduced.

It is estimated that 1, 60000 MT (Metric Tonne) of municipal solid waste is generated daily in India. According to the 2001 census, per capita waste generation in India is 0.5 Kg/day (Vinod & Venugopal, 2010). Waste management activities generate potential environmental benefits if managed properly (Gentil et al, 2009). There has been hardly any effort in the past to create community awareness, either about the likely perils due to poor waste management or the simple step(s) that every citizen takes. This could have helped in reducing waste generation and promoting effective waste management. But this scenario has changed. Nowadays more and more people are taking interest in environmental issues, as they have started experiencing the ecological ill-effects. Now environmental education is welcomed by all categories of people. It is an attempt to reorient education so that environmental competence is restored as one of its basic aims along with personal and social competence (Shobeiri et al, 2007).

Sustainable Waste Management:

Sustainable waste management refers to the collection, transportation, valorization and disposal of various types of waste, in a manner that does not jeopardize the environment, human health or future generations. It includes any activity involved in the organization of waste management, from production to the final treatment.

Sustainable waste management is a key concept of the circular economy and offers many opportunities and benefits to both the economy, the society and the environment. Sustainable waste management involves collecting, sorting, treating, recycling, and when properly facilitated providing a source of energy and resources. It, therefore, creates jobs, improves waste management methods, and lessens the impact of human activities on the environment, thereby, improving the air and water quality. It also reduces food wastage and heavy environmental costs at bay, and prevents some human health hazards, thereby improving the overall human life.

The goal of sustainable waste management is to reduce the amounts of natural resources consumed, reusing the materials taken from nature as much as it is possible, and creating as minimal waste as possible. It is our responsibility to maintain sustainability for the benefit of our environment as well as future generations. A well-functioning sustainable waste management system, should incorporate feedback loops, processes, embody adaptability and divert wastes from the disposal.

Barriers to Sustainable Waste Management in Schools:

Implementation of sustainable waste management at schools in the developing countries encounters several major barriers. Some of these challenges include the lack of resources, absence of qualified administrators or trained teachers, logistics, and the nonexistence of students' commitment, interest, and sustainability awareness. The lack of resources affects time and money. Schools and institutions in the developing countries lack the funds to support significant and meaningful sustainable interventions. This is because the institutions and governments in most developing countries do not prioritize sustainability activities. Hence, schools need to work effectively on SWM with sufficient funds for effective practice.

Another barrier for SWM implementation in school is the absence of teachers and administrators to support sustainability. Sustainability cannot fully be implemented in schools and institutions unless administrators and teachers work hard to promote it. Due to the lack of specialized teachers for effective teaching of sustainability in the developing countries, the practice of SWM leading to Cleaner production, will be delayed. The logistical barrier also affects the implementation of SWM in school. Most schools in developing countries do not have access to any tools and materials, such as data tracking systems, bin sorters, and other items necessary to improve an effective SWM.

Lastly, there is a lack of commitment from teachers and experts to engage and create a sense of awareness, knowledge, and attitude toward students' interest in sustainability which is one of the main barriers in developing countries. As change in attitude is difficult, leaders in developing countries' institutions or schools must work toward sustainable development by introducing citizens to sensitizing environmental research and promoting sustainability activities.

Objectives:

- 1) To study and comprehend the awareness, practice and attitude of high school students of rural-urban areas towards sustainable waste management (SWM).
- 2) To assess and enhance the awareness, practice and attitude of high school boy and girl students on SWM and suggest recommendation suitably, if any required.

Hypotheses of The Study:

The hypotheses have been formulated based on the objectives:

- 1) **H01:** There is no significant difference between rural and urban students in respect of awareness on SWM.
- H11:** There is significant difference between rural and urban students in respect of awareness on SWM.
- 2) **H02 :** There is no significant difference between rural and urban students in respect of their practice on SWM.
- H12:** There is significant difference between rural and urban students in respect of their practice on SWM.
- 3) **H03:** There is no significant difference between rural and urban students in respect of their attitude towards SWM.
- H13:** There is significant difference between rural and urban students in respect of their attitude towards SWM.
- 4) **H04:** There is no significant difference between boy and girl students in respect of their awareness about SWM.
- H14:** There is significant difference between boy and girl students in respect of their awareness about SWM.
- 5) **H05:** There is no significant difference between boy and girl students in respect of their practice on SWM.

H15: There is significant difference between boy and girl students in respect of their practice on SWM.

6) H06: There is no significant difference between boy and girl students in respect of their attitude towards SWM.

H16: There is significant difference between boy and girl students in respect of their attitude towards SWM.

2. Methodology

The study has been carried out at rural and urban schools in Purba Bardhaman District. Ausgram High School is a rural co-education school, Guskara PP Institution and Guskara Girls School are urban Schools of which one is a Boys' School and the other is a girls' school. One questionnaire to each student altogether a total of 100 questionnaires were given to 100 students of class IX and X with a request to fill up the questionnaire and return it. Survey method has been employed to attain its objectives and data collected by adopting stratified random sampling from 50 rural and 50 urban students including 25 boys and 25 girls from each area i.e. a co-education rural school and two urban schools (one Boys' school and one Girls' school).

The instrument of research was a validated self-administered questionnaire of 25 questions and that was designed to assess students' awareness, practice and attitude on Sustainable waste management for both rural and urban areas' boy and girl students.

Living areas of students served as the basis for comparison. It was categorized as rural and urban as well as boy and girl students. The result in these categories were analyzed by descriptive statistics and student independent t-test using SPSS version-23. The p-values less than 0.05 are considered significant.

3. Results and Discussion

The study involved 100 respondents consist of 50 student from rural and 50 student from urban areas between the class of 9 and 10. In that 25 students were boys and 25 students were girls from each area i.e. 50 boy students and 50 girl students.

The result shows that most of the students (93%) are well aware of waste management and principle of waste minimization. 64% of total respondents attend the awareness programme conducted by local authority or school. They know about segregation of waste and importance of segregation. As they have environmental studies in their curriculums the maximum students (89%) are aware of the complication of improper waste management and eager to know about environmental problem. Students of both areas lacked about e-waste disposal (Table-1).

Regarding practice of proper West management maximum students have proper ideas and practice of waste segregation(70%) and minimization (75%). They avoid throwing the waste outside their premises and use the dustbin (95%) regularly Table- 2).

Towards attitude, students believe that household waste management is not only a sole responsibility of their parents, School administrators and local authority, but also it is students responsibility for waste generation and minimization (Table- 3).

Table- 1. Awareness on Sustainable Waste Management (100 students):

SL. No.	Questions	Yes	No	P-value
1	Are you aware the waste management?	93	7	0.00**

2	Do you know the principle of solid waste characterization?	84	16	0.00**
3	Do you know the principle of solid waste minimization?	60	40	0.00**
4	Do you know about segregation of waste?	74	26	0.00**
5	Do you think segregation is important in the school or household?	90	10	0.00**
6	Do you use kitchen waste as compost?	73	27	0.00**
7	Do you know the complications of improper waste management?	58	42	0.00**
8	Are you aware of e-waste?	74	26	0.00**
9	Do you know how to dispose the e-waste?	37	63	0.00**
10	Do you have environmental topic in your curriculums?	88	12	0.00**
11	Is the waste polluting the atmosphere in any way?	93	7	0.00**
12	Is improper waste disposal threat to environment?	89	11	0.00**
13	Did you ever attend any awareness program conducted by local authority or school regarding household waste management?	64	36	0.00**
14	Waste material are collected according to the schedule in school or home?	75	25	0.00**
15	Are waste materials collected during weekends and even during holidays?	65	35	0.00**

Source: Primary Data

Table- 2. Practice on Sustainable Waste Management (100 students):

Sl. No.	Questions	Yes	No	p-value
1	Do you segregate solid waste in school or home?	70	30	0.00**
2	Are you committed to minimize the waste?	75	25	0.00**
3	Do you throw your solid waste outside your room or household?	32	68	0.123*
4	Do you see garbage on roadside while coming to school?	79	21	0.00**
5	Are you use dustbin in school or household?	95	5	0.00**

Source: Primary Data

Table- 3. Attitude on Sustainable Waste Management (100 students):

Sl. No.	Questions	Yes	No	p-value
1	Is any role of students in waste management?	93	7	0.00**
2	Household waste management is the sole responsibility	6	94	0.00**

	of your parents?			
3	Is household waste disposal the sole responsibility of the local authority?	8	92	0.00**
4	Are you also responsible for generation of household waste?	95	5	0.00**
5	Do you also have to a role to minimize the household waste?	99	1	0.00**

Source: Primary Data

Hypothesis- 1:

Awareness of Sustainable Waste Management between rural and urban students-

Variable	Sample size(N)	Mean	Std. Dev	Mean Difference	SED	Critical Ratio	p-value
Rural Students	50	26.40	2.642	0.460	0.575	0.8005	0.2119
Urban Students	50	25.94	3.087				

As per the above table, the value of 't' calculated does not belong to critical region, therefore, H01 is accepted at a 0.05 significance level. So the researcher(s) accepted the null hypothesis that there is no significant difference between rural and urban students in respect of awareness of SWM.

Hypothesis- 2:

Practice of Sustainable Waste Management between rural and urban students-

Variable	Sample size(N)	Mean	Std. Dev	Mean Difference	SED	Critical Ratio	p-value
Rural Students	50	8.60	0.948	0.18	0.185	0.9706	0.1660
Urban Students	50	8.42	0.906				

As per the above table, the calculated 't' value is less than 't' value at 0.05 level of significance which is 1.96, therefore, H02 is accepted. So the authors accepted the null hypothesis that there are no significant difference between rural and urban students in respect of SWM practices.

Hypothesis- 3:

Attitude of Sustainable Waste Management between rural and urban students-

Variable	Sample size(N)	Mean	Std. Dev	Mean Difference	SED	Critical Ratio	p-value
Rural Students	50	8.06	0.314	0.10	0.112	0.8929	0.1867
Urban Students	50	7.96	0.727				

As per the above table, the value of 't' calculated does not belong to critical region, therefore, H03 is accepted at a 0.05 significance level. So accepted the null hypothesis that there is no significant difference between rural and urban student in respect of attitude of SWM.

Hypothesis- 4:

Awareness of Sustainable Waste Management between boy and girl students-

Variable	Sample size(N)	Mean	Std. Dev	Mean Difference	SED	Critical Ratio	p-value
Boys	50	25.42	3.296	-1.5	0.556	-2.6968	0.0036
Girls	50	26.92	2.146				

As per the above table, the calculated 't' value is more than 't' value at 0.05 level of significance. The 't' value belongs to the critical region, therefore, H04 is rejected. So the investigators reject the null hypothesis that there is no significant difference between boy and girl students in respect of awareness of Sustainable Waste Management. The awareness of sustainable waste management by girl students is higher than boy students.

Hypothesis- 5:

Practice on Sustainable Waste Management between boy and girl students-

Variable	Sample size(N)	Mean	Std. Dev	Mean Difference	SED	Critical Ratio	p-value
Boys	50	8.26	1.065	-0.5	0.179	-2.7897	0.0027
Girls	50	8.76	0.687				

As shown in the above table, the calculated 't' value is more than 't' value at 0.05 level of significance. The 't' value belongs to the critical region, therefore, H05 is rejected. So we reject the null hypothesis that there is no significant difference between boy and girl students in respect of practice of Sustainable Waste Management. The practices of sustainable waste management is more in girls compared to boys.

Hypothesis- 6:

Attitude of Sustainable Waste Management between boy and girl students-

Variable	Sample size(N)	Mean	Std. Dev	Mean Difference	SED	Critical Ratio	p-value
Boys	50	7.90	0.580	-0.22	0.11	-1.9953	0.0233
Girls	50	8.12	0.521				

As appears in the table above, the value of 't' calculated belongs to the critical ratio, therefore, H06 is rejected at a 0.05 significant level. So, we the researchers reject the null hypothesis

that there is no significant difference in the attitude of boy and girl students about SWM. The attitude of girl students towards SWM is comparatively higher than boy students.

Findings:

The main finding of the study are-

- 1) The awareness on Sustainable Waste Management among high school students is very high of Guskara PP institution, Guskara Girls School and Ausgram High School in Purba Bardhaman district.
- 2) There is no significant difference in awareness, practices and attitude on Sustainable Waste Management between students of rural and urban areas in the study area.
- 3) The awareness, practices and attitude on Sustainable Waste Management among the girl students is higher than the boy students.

Suggestions:

- The government should create awareness about numerous problems of Domestic Solid Waste Management through environmental education in schools as well as in the community.
- The government should introduce collaboration programmes with school students in order to enable them to find the generation and collection of waste in and around schools surroundings.
- From the primary level itself the importance of segregation of waste, reduction and prevention should be inculcated in the students.
- The multiple benefits of recycling should be made aware through means of communication. Eg. Making paper from waste pulp rather than virgin pulp saves 50 % energy. Every ton of recycled glass saves energy equal to 100 litres of oil.
- Environmental Education should enable the students to acquire new skills for controlling Domestic Waste and new ways of garbage disposal.
- The students should be encouraged to implement the 4R's of waste management-Reduce, Reuse, Recycle and Recovery.
- The schools should equip the students with most efficient methods for the Domestic Waste Management and also to implement them.
- The schools should enable the students to learn about the dangers of the different types of Domestic Waste in the community and in the environment. This will enable them to minimize the effect of waste in the community.

4. Conclusions

Waste Management related to overall environmental issues is an important solution in most developing countries. It is found that sustainable waste management could be achieved in developing countries when environmental awareness, environmental knowledge and environmental attitude are incorporated as important components in curriculum and the teachers assigned to teach the students in formal education. The research further indicates that there is a significant difference between awareness, attitude and practice when it comes to boy and girl students. It is clearly mentioned that girl students are more concerned about them boy students. There is no significant difference on Sustainable waste management between rural and urban students. Awareness program of Sustainable waste management is greatly needed for parents and teachers also. This can be given in the schools during parent-teacher meeting or in community base programs. For this purpose, Education Department of the states or country be implement environmental education programs to the teachers at all levels of education.

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