



A STUDY OF E-WASTE AWARENESS AND ITS MANAGEMENT AMONG UNDERGRADUATE STUDENTS

DR. ANJUM AHMED
Assistant Professor
Department Of Education,
Aligarh Muslim University,
Aligarh-202002 (UP) INDIA

MS. RUKHSAR
M. Ed. Student
Department Of Education,
Aligarh Muslim University,
Aligarh-202002 (UP) INDIA

ABSTRACT

Today's technology has taken a revolutionary change and it has helped human being in developing and saving of money and time. But despite the benefits of technology it has created a huge waste of electronic and gadgets which is adversely effecting the environment and the life of people. Toxic of e-waste creates various type diseases among human beings. It can be preventing by providing awareness of e-waste and how to manage a large collection of e waste. The study will throw a light on how aware the senior secondary students are about e-waste and its disposal and management. This will help in future to include and emphasis e-waste topics in their textbook and curriculum. Environment education plays a significant role in the formal education system. The sample of the study consisted of 300 higher secondary students (150 girls and 150 boys) from Aligarh and Agra district. The tool used for the present study was 'E-waste Awareness Scale', which was developed by the investigator himself. The data was collected using two point scale and it was analyzed through simple statistical techniques like frequencies and percentages with respect to objectives framed for quantitative data. The results and implications of the findings are discussed in the paper.

Key words: e-waste, e-waste management, electronic wastage

INTRODUCTIUON

The progress of nation in diverse fields ultimately depend upon the quality of environment and good civic in which, in turn, depends upon how well aware the youngster about their surrounding environment and it can be provided by quality of good education, teachers, and parents.

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Due to rapid growth of new invention and technology has changed people lifestyle and their thinking towards environment and society. Nowadays people have a very selfish approach towards their lives and the decisions being made are of short term duration benefiting them only. That's why they are using more technology without caring of society welfare how a large technology becomes a huge e-waste and it can effect the human environment.

Today's technology has taken a revolutionary change and it has helped human being in developing and saving of money and time. But despite the benefits of technology it has created a huge waste of electronic and gadgets which is adversely effecting the environment and the life of people. Toxic of e-waste creates various type diseases among human beings. It can be preventing by providing awareness of e-waste and how to manage a large collection of e waste. It is the duty of our teachers who are nurturers of our nation to provide environmental knowledge among students about e-waste which is a major part of our urban pollution. So this concept should be made familiar to the senior secondary students.

E-Waste

E-waste or electronic waste is broadly described as a loosely discarded, left-over, out-of-date, broken, electrical or electronic devices. It includes mobile phones and charging adapters; computer and its accessories such as monitors, printers, keyboards and central processing units; remotes; CDs; headphones; batteries; LCD TVs; air conditioners; refrigerators and other household appliances. E-waste has many harmful metals/elements present which require immediate treatment or they can have detrimental effects on human health and the environment. Therefore there is an urgent international call for action against e-waste. The soaring international demands for electric and electronic products are fueling a global rise in e-waste, which is set to reach 65.4 million tons annually by 2017. To put that into context, the global volume of discarded e-waste by 2017 will weigh almost equivalent to 200 Empire State Building. Globally only 40 per cent e-waste is collected for recycling, the rest ends up in landfills.

According to the 'Global E-waste Monitor 2014', a report by the United Nations University (UNU), India is now the *fifth* largest producer of e-waste and the *third* largest in Asia after China (6.0 Million tons/Mt) and Japan (2.2 Mt) producing around 1.7 million tons (Mt) of e-waste in 2014. The UNU report cautions that the production will grow by 21 per cent (by volume) by 2017. A government report mentioned that in India e-waste constitutes **70 per cent** of the landfills. E-waste problem in India is twofold. One is the growing demand for electronic products each year with increasing mobile phone penetration and Internet usage. Second, India like other developing countries has become dumping grounds for e-waste.

E-waste management



There is no unique or ideal model for e-waste management in developing countries, each of which has its own specific environmental, social, technological, economic and cultural conditions. Environmentally sound management of Waste of electrical and electronic equipment (WEEE) recognizes three Rs i.e. **Reduce, Reuse and Recycle**. The aim is to reduce the generation of e-waste through smart manufacturing and maintenance, reuse of electronic equipments by someone else and recycle those components that cannot be repaired.

Significance of the Study

In present life, technology has taken revolutionary growth due to human efforts for getting more benefit but apart from this revolution's benefit, the problem of disposing of e-waste reigns, as humans know how to use the gadgets but not to dispose them. The environment pollution caused by the e-waste is irreversible and is yet to be realized by the masses, particularly in developing countries. Based on a survey carried out by the central pollution control board, CPCB (2005), the generation of e-waste in the country was assessed at 1.46 lakh tonne, 8 lakhs tonnes in 2012 and as per the United Nations University (UNU) report 17 lakh tonnes of e-waste generated in the country in 2014. So, e-waste is a wide problem in country and cause of people's suffocation from e-waste's hazardous problem.

The study is conducted because healthy environment is a part of our life. The problem can be solved only by instilling awareness in people about e-waste and management of electronics. The study includes sample from Agra and Aligarh city. because along with Delhi, Bangalore, Mumbai and other metropolitan cities, Agra and Aligarh are also affected by e-waste's hazardous problem. According to the state pollution control board (SPCB) sources, in 2014 Agra produced nearly 10100 tonnes of e-waste: mostly computer parts, wireless telephones, refrigerators, etc. This shows that people are not aware of its management. In Aligarh city also, the e-waste problem is because most of the people are using electronic gadgets but they do not have proper knowledge of its management and disposal. It is felt that they are unaware of the harmful effect of e-waste accumulation. Government has implemented many programmes, conferences and policies regarding the protection of environment and e-waste problem in many institutions all over the country. There are laws, articles and acts made by the government to solve the problem of e-waste which is prevalent in our country but this action is not enough as most of the people are not aware about the government activities involved in keeping the environment healthy.

- Students are the future consumers and future citizen.
- Use of technology should not be in a selfish manner.
- Sustainable development.
- It is felt that old generations are not technologically friendly. It is the present and our future generation that needs to change the attitude.

- Youth are indulging in having a tech savvy life basically for social approval and status recognition. But they are not taking responsibility for their actions.

Hence, it is the duty of the teacher to create awareness among young generation about e-waste and its harmful effects. The teacher should provide the knowledge of proper disposal method of discarded electronic materials and its management. The study will throw a light on how aware the senior secondary students are about e-waste and its disposal and management. This will help in future to include and emphasis e-waste topics in their textbook and curriculum. Environment education plays a significant role in the formal education system. It aims to produce a healthy sustainable environment for us to live in, and this is only possible if the future generation is active participants in teaching learning process and the practical education imparted to them mitigate the problem of e-waste and make our environment friendlier for all living organisms.

Operational Definitions of the terms

Operational definitions have a special significance in research and a researcher cannot work with a variable unless he/she defines it operationally. Therefore to avoid any kind of confusion regarding key terms namely e-waste, awareness, management and senior secondary students, are defined below:

E-waste consists of two word '*electronics*' and '*waste*'. **Electronics:** "The study of the properties and behavior of electrons under all conditions especially with reference to technical and industrial application" (**New International Webster's dictionary**)

E-wastage: 'E-waste refers to a discarded electronic appliance such as mobile phones, computer and television'. (**Oxford Dictionary**)

"E-waste is a term used to cover item of electronic and electronic equipment (EPEE) and its parts that have been discarded by the owner as waste without the intention of re-use". (**Solve the e-waste problem, STEP 2014**)

The most widely accepted definition of e-waste is as per European commission directive 2002/96/EC: "electrical or electronic equipments, which is waste including all components, subassemblies, which are part of the product at the time of discarding."

Definition of electronic waste according to WEE directive:

- Larger house hold appliance (ovens, refrigerators etc.)
- Small household appliances (toasters, vacuum cleaners etc.)
- Office & communication (PCs, printer, phones, faxes etc.)

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- Entertainment electronics (TVs, portable CD players etc.)
- Lighting equipment (mainly fluorescent tubes)
- E-tools (drilling machines, electric lawnmowers etc.)
- Medical appliances and instruments.
- Surveillance equipments.
- Automatic issuing systems (ticket issuing machine etc.)

Awareness: “Knowledge that something exists, or understanding of a situation or subject at the present time based on information or experience.” (**Cambridge University**)

Management: “Management as a set of activities (including planning and decision making, organizing, leading and controlling) directed at an organization’s resources (human, financial, physical and information) with the aim of achieving organizational goals in an efficient and effective manner” (**Griffin 2002**).

Senior Secondary Student: Senior secondary students refers to the students who are studying in 11 and 12 class between the age group of 16 and 18.

Variables

In this study, for measuring the e-waste awareness, the variable ‘*E-waste Awareness*’ will be studied under the following dimensions:

- Category of electronic waste products.
- Sources of electronic waste.
- Effects of e-waste.
- Disposal method of electronics waste products.
- Recycling of electronic equipments.
- Government laws and policies and individual responsibilities.
- Management of e-waste

Objectives of the study

The objectives formulated for the study are:

1. To find out the awareness of senior secondary students regarding the different categories of e- waste products.
2. To find out the awareness of senior secondary students regarding the sources of e- waste.

3. To find out the awareness of senior secondary students regarding the effects of e-waste.
4. To find out the awareness of senior secondary students regarding disposal methods of electronics waste products.
5. To find out the awareness of senior secondary students regarding the awareness of recycling of electronic equipments.
6. To find out the awareness of senior secondary students regarding government laws and policies formulated and their responsibilities as an individual.
7. To find out the awareness of senior secondary students regarding management of e-waste.
8. To find out the awareness of e-waste among senior secondary boys and girls of Agra and Aligarh cities.
9. To find out the awareness of e-waste among senior secondary boys and girls of AMU, CBSE and UP Boards.
10. To find out the awareness of e-waste among senior secondary boys and girls students of CBSE boards in Agra and Aligarh cities.

Sample

The sample of the study consisted of 300 higher secondary students (150 girls and 150 boys) from Aligarh and Agra district. The sample was selected through proportionate stratified random sampling technique giving due representation to the subsamples based on gender and board.

Tool

The tool used for the present study was 'E-waste Awareness Scale', which was developed by the investigator himself. The investigator validated the tool from five different expertise. Appropriate modifications were made as per the suggestions of the experts. The tool contains total **43 items** all **positive** statements. By Cronbach Alpha's coefficient method reliability of this tool is **0.76** and validity is **0.87**.

Statistical Techniques

The data was collected using two point scale was analyzed through simple statistical techniques like frequencies and percentages with respect to objectives framed for quantitative data.

Delimitations of the study

The delimitations of the present study are as following:

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- The sample considered for the study is only 300 senior secondary students.
- Population of the present study consists of senior secondary schools of Aligarh and Agra city.
- The study took up only AMU, UP and CBSE board senior secondary students.
- The sample drawn is restricted to the senior secondary students of Agra and Aligarh schools only.
- The study focuses on senior secondary school level. Other higher and lower levels of formal education are ignored.
- The research has restricted to one variable study that is the awareness of e-waste.
- The researcher has limited the statistical analysis to percentage analysis only.

After the collecting of the data, the investigator interpreted the data to justify the findings of the study.

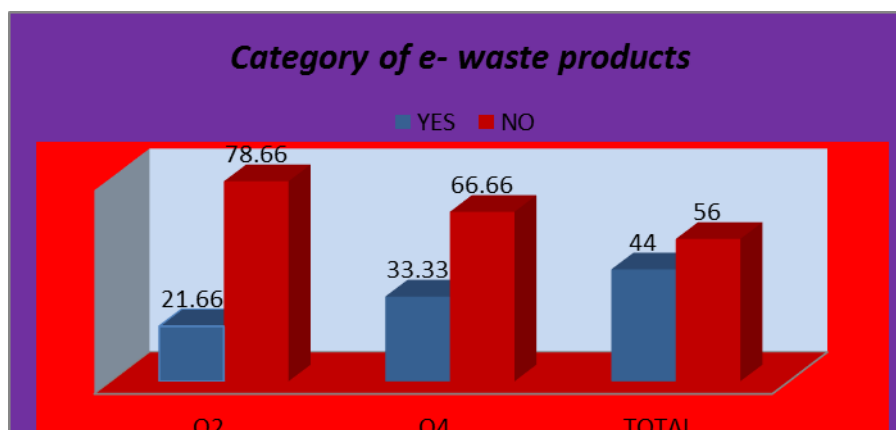
Objective 1: *To find out the awareness of senior secondary students regarding the category of e- waste products.*

Table 1 *Category of e-waste products*

S. NO	STATEMENTS	YES	NO
1	Cooler, TV, refrigerator.	61%	39%
2	Mobile, laptop, printer.	21.66%	78.66%
3	Video games & electronic toys.	63%	37%
4	Metal, glass, wood & rubber.	33.33%	66.66%
5	It contains valuable rare material such as gold.	37.3%	62.66%

Interpretation

Table 1 reveals that in the first dimension students were asked which of the material (such as mobile, laptop, printer, refrigerator, cooler, video game etc) were considered as an electronic waste product. Most of the students were aware about that refrigerator, cooler and video games comes under the category of e-waste but 78.66% of respondents did not know that laptops, mobile and printer also come under the category of e-waste. Around 33.3% of the students were aware that metal, wood, glass and rubbers are also categorized as e-waste. The startling result was that around 62.66% respondents did not know that e-waste also contains precious and rare materials like gold, and platinum. In dimension 1 "*Category of e- waste products*", 56% respondent 'Yes' and 44% responded 'No'.



Graph 1- Awareness of senior secondary students regarding the category of e-waste products.

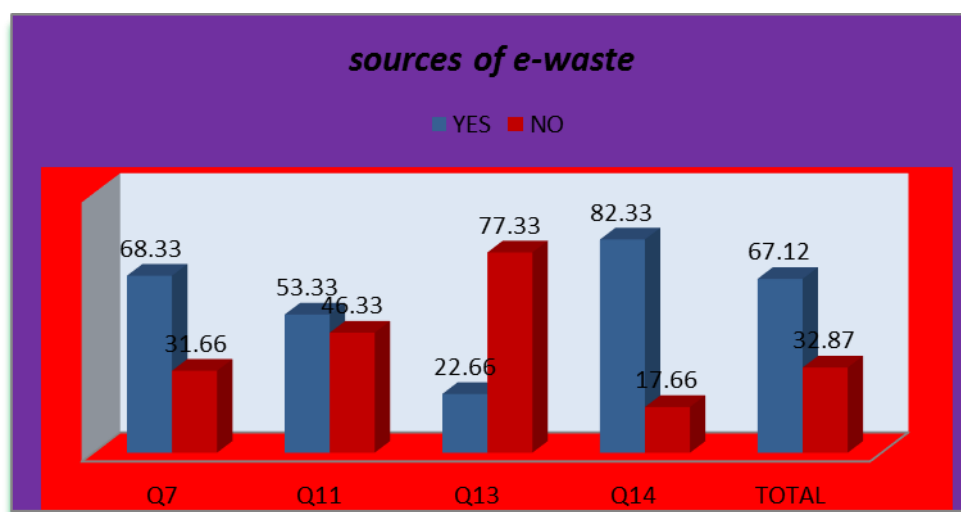
Objective 2: To find out the awareness of senior secondary students regarding the sources of e- waste.

Table 2 Sources of e-waste

S. NO	STATEMENTS	YES	NO
7	Urbanization	68.33%	31.66%
8	Export of electronics by develop countries	73.66%	26.33%
9	Dependency on technology	62.33%	37.66%
10	Storing of old electronics.	56.66%	43.33%
11	Giving old electronic to children	53.33%	46.33%
12	Lack of interest in recycling	62.66%	37.33%
13	Competition in different companies.	22.66%	77.33%
14	Online shopping	82.33	17.66%

Interpretation

Table 2 reveals that for second dimension ‘Sources of e-waste’, there were eight statements which were related with different sources of electronic waste. In dimension 2 around 67.12% students were aware about the sources of e-waste but 32.87% were not aware of the sources. Urbanization as a source was well known to the student as 68.33% responded as ‘Yes’. Giving old electronics to children to use resulted in e-waste accumulation at home was responded by 53.33%. The interesting fact revealed is that around 82.33%, the highest percentage, students knew that online shopping is the major cause of e-waste accumulation. The highest percentage of students, 77.33%, did not know that competition among different companies is also the source of e-waste stockpiling.



Graph 2- Awareness of senior secondary students regarding the sources of e-waste.

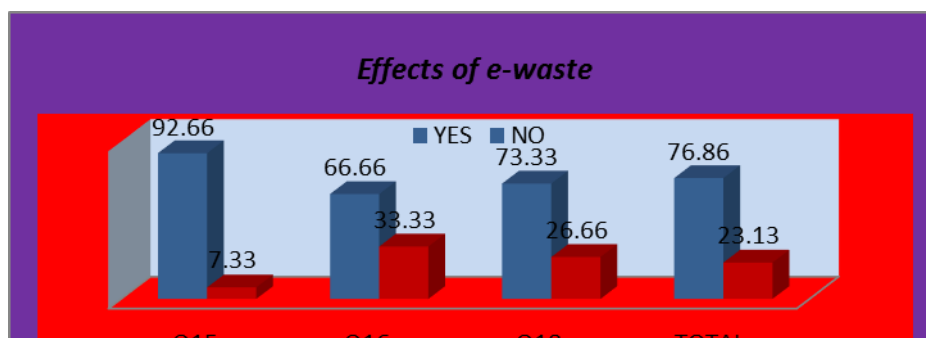
Objective 3: To find out the awareness of senior secondary students regarding effects of E-waste.

Table 3 Effects of e-waste

S. NO	STATEMENTS	YES	NO
15	Use of computer effect on your eyes	92.66	7.33
16	e-waste is the cause of cancer, brain disorder etc.	66.66	33.33
17	Burning of wires is the production of carbon dioxide.	83.33	16.66
18	Mobile phone has adverse effect on children intelligence.	73.33	26.66
19	Fertility of soil is reduced by e-waste.	68.33	31.66

Interpretation

Table 3 gives a snapshot of the third dimension '*Effects of e-waste*'. They were five statements in this dimension. The dimension focuses on the awareness of students regarding the effects of e-waste. The result revealed that 76.86% of students were aware about e-waste effects and 23.13% were ignorant about the effects. Majority of the students, 92.66%, knew that computers and laptops effected and strained our eyes. Researchers have proved that use of mobile phone affected the children's intelligence; this was known to 73.33% of the students. Among the statements of this dimension the least percentage, 66.66%, students knew the adverse effect of e-waste on human health in the form of cancer, brain disorder, asthma, tumors etc.



Graph 3- Awareness of senior secondary students regarding the effects of e-waste.

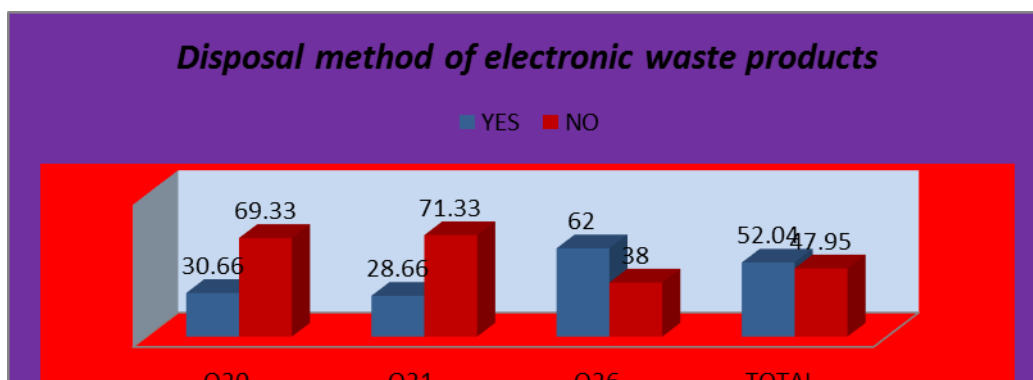
Objective 4: To find out the awareness of senior secondary students regarding disposal methods of e-waste products.

Table 4 Disposal methods of e-waste products

S. NO	STATEMENTS	YES	NO
20	Disposed outdated video game by throwing outside	30.66	69.33
21	Disposal of electronics mean to burn in open area	28.66	71.33
22	I stored my non-functional pen drive.	46	54
23	Purchase new mobile by selling old one.	75.33	24.66
24	Parents keep old electronics in storeroom.	53.66	46.66
25	I disposed my electronics by sending to recycling center	62.66	37.33
26	Sell to old electronics to kabaadiwala.	62	38

Interpretation

Table 4 furnishes that in fourth dimension '*Disposal methods of e-waste products*', there were seven statements which focused on disposal methods of electronics waste product. It shows that 69.33 % of students do not throw away the outdated games. Even the parents stored the old appliances at home as responded by 53.66% students. Interestingly 71.33% students did not approve, the most common method practiced, of disposing electronics by burning the waste in open areas. 75.33% agreed to sell their old gadgets to buy new and latest ones. We have websites which sell second hand materials at attractive prices. It is worth noting that 62.66% of students are inclined in disposing off their gadgets in recycling centers and 62% are selling their e-waste to local Kabaadiwala (Waste Collectors).



Graph 4- Awareness of senior secondary students regarding the disposal method of e-waste products.

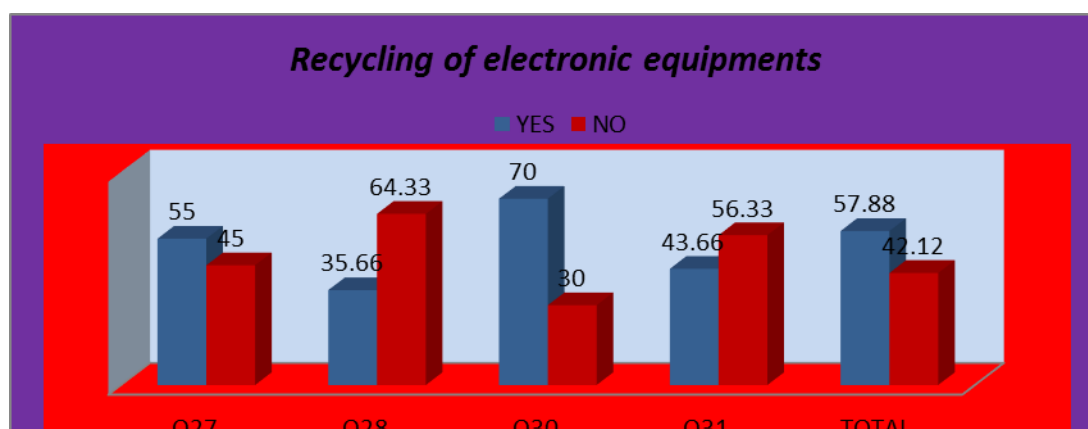
Objective 5: To find out the awareness of senior secondary students regarding recycling of electronic equipments.

Table 5 Recycling of electronic equipments

S. NO.	STATEMENTS	YES	NO
27	Better to buy new to replace old one.	55	45
28	Recycling of equipment is not economical.	35.66	64.33
29	Reselling old gadget help to people who can't afford.	84.66	15.33
30	Indians use unscientific method in recycling.	70	30
31	E-waste word heard from my parents.	43.66	56.33

Interpretation

Table 5 shows that in fifth dimension '*Recycling of electronic equipments*', there were five statements which are related with awareness of recycling of electronics. The result revealed that 57.8% students were aware about the importance of recycling facilities. 35.66% of students did not find recycling economical but 84.66% agreed that reselling will help those individuals who cannot otherwise afford to buy new electronics. 70% of the students agreed that in India we use unscientific means to recycle the e-waste which has affected human health, agricultural produce, underground water and air. Majority of the students, 56.33% did not hear about e-waste or its recycling procedures from their parents.



Graph 5- Awareness regarding the recycling of electronic equipments among senior secondary students.

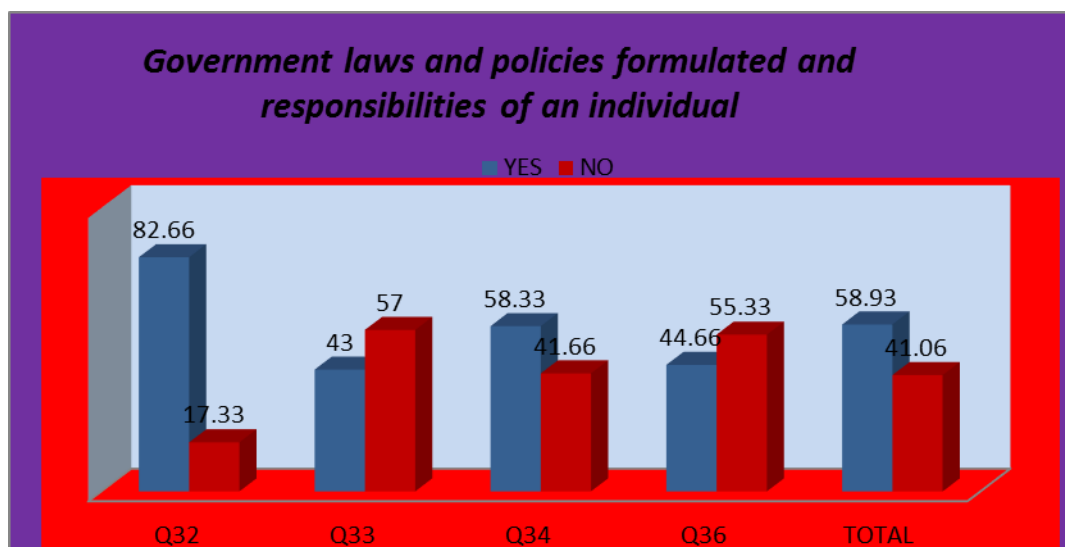
Objective 6: To find out the awareness of senior secondary students regarding government laws and policies formulated and their responsibilities as an individual.

Table 6 Government laws and policies formulated and responsibilities of an individual.

S. NO	STATEMENTS	YES	NO
32	It is duty of my school to create awareness about e-waste.	82.66	17.33
33	Do not have e-waste chapter in textbook.	43	57
34	It is not my duty to manage electronic discarded.	58.33	41.66
35	We have law for environment protection.	66	34
36	Special law framed for e-waste.	44.66	55.33

Interpretation

Table 6 highlights the sixth dimension i.e awareness regarding ***‘government laws and policies formulated and responsibilities of an individual’***, in which there were five statements which checked the students awareness regarding their individual role and government policies and law. According to the result 58.93% students were aware about governmental laws and policies of e-waste. 82.66% students agreed that school is the best agency in providing the information regarding e-waste. 57% of students revealed that they did not learn about e-waste from their textbooks. Moreover 41.66% students did not agree that it is their duty to manage discarded electronic. 55.33% were unaware that government has made any special laws or policies regarding e-waste.



Graph 6 E-waste awareness of senior secondary students regarding government laws and policies formulated and responsibilities of an individual.

Objective 7: To find out the awareness of senior secondary students awareness regarding management of e-waste.

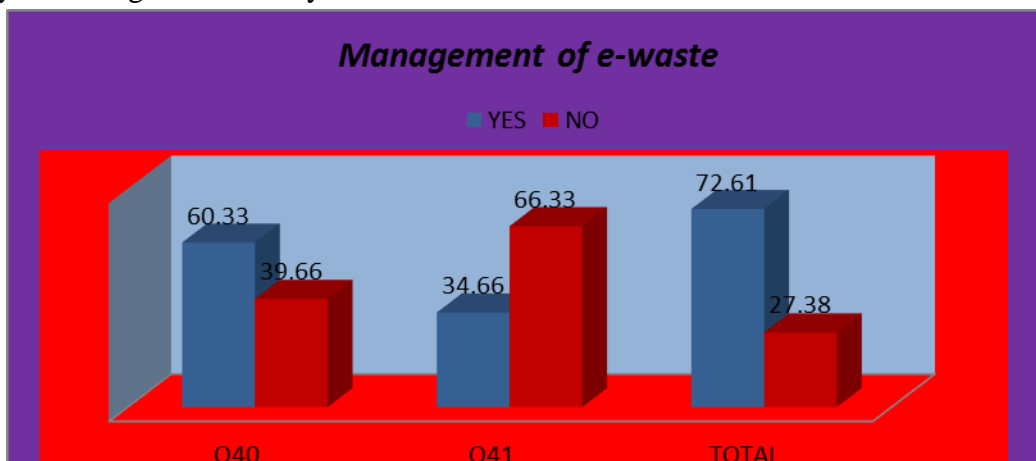
Table 7 Management of e-waste

S. NO	STATEMENTS	YES	NO
37	Recycling is best way to conserve resource.	86	14
38	Government should regulate industrial activities.	79.33	20.66
39	Repairing of old electronics can save energy for future need.	79	21
40	I feel difficult to manage my old electronics.	60.33	39.66
41	E-waste management training received from school.	34.66	65.33
42	Penalty should be charge who have not e-waste management plan.	84.66	15.33
43	E-waste management will help to reduce e-waste problem.	84.33	15.66

Interpretation

Table 7 is the seventh dimension ‘*management of e-waste*’, there are seven statements which are related with awareness regarding management of electronic waste. 72.61% of the total sample is aware about the management of the e-waste. 60.33% students find it hard to manage the domestic e-waste on their own. Only 34.66% agreed that e-waste management training should start from the schools. 84.66% of students agreed that heavy penalty should

be paid by the offenders or anyone who is breaking the law. 84.33% students agreed that e-waste management is the effective mean to reduce e-waste accumulation. Lastly 71% students were inclined towards repairing the old electronics as it will help in conserving energy and using it sustainably.



Graph 7- E-waste awareness of senior secondary students regarding the awareness of management of e-waste.

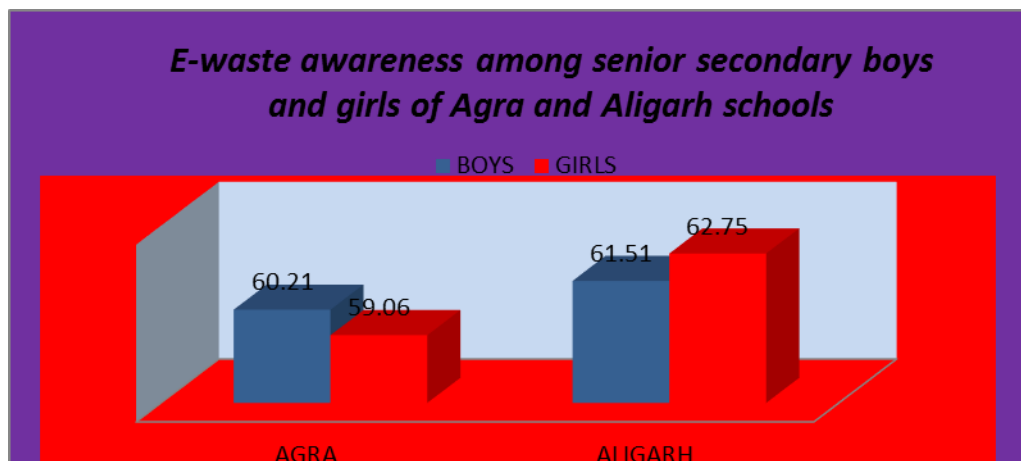
Objective 8: To find out the awareness of e-waste among senior secondary boys and girls of Agra and Aligarh cities.

Table 8 Awareness of e-waste among senior secondary boys and girls of Agra and Aligarh cities.

No. of the students	City	Boys score in %	Girls score in %
150	Agra	60.21%	59.06%
150	Aligarh	61.51%	62.75%

Interpretation

Table 8 shows that in Agra city students are comparatively less aware than the students of Aligarh city. The senior secondary boys of Aligarh and Agra differ by .8% in e-waste awareness. However the senior secondary girls studying in Aligarh have 3.69% more awareness than the senior secondary girls in Agra city.



Graph 8- E-waste awareness among senior secondary boys and girls of Agra and Aligarh schools.

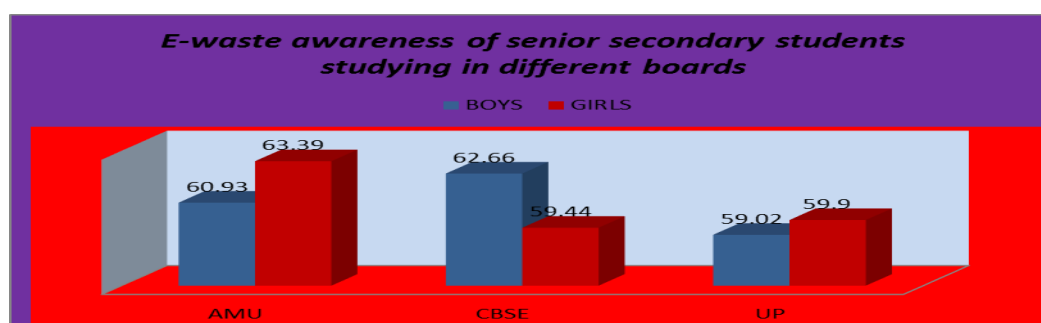
Objective 9: To find out the of e-waste awareness among senior secondary boys and girls of AMU, CBSE & UP Boards.

Table 9 E-waste awareness among senior secondary boys and girls of different boards.

No.of students	Boards	Boys scores in %	Girls score in %
100	AMU	60.93%	63.39%
100	CBSE	62.60%	59.44%
100	UP	59.02%	59.90%

Interpretation

Table 9 reveals that senior secondary students studying in AMU board are more aware regarding e-waste. The senior secondary boys of CBSE board (62.60%) are more aware than AMU board (60.93%) and UP board (59.02%). On the other hand senior secondary girls studying in AMU board (63.39%) are more aware than CBSE board (59.44%) and UP board (59.90%). The lowest awareness was found in UP board were both boys scored (59.02%) and girls scored (59.90%) regarding e-waste awareness.



Graph 9- E-waste awareness of senior secondary students studying in different boards

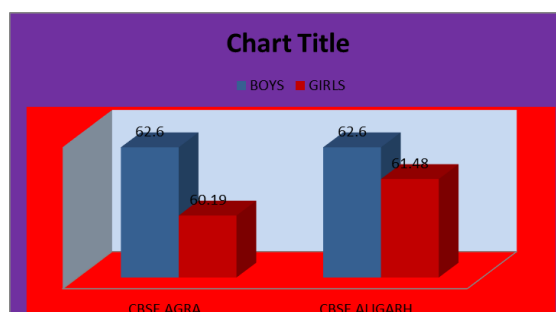
Objective 10: To find out the awareness regarding e-waste among senior secondary boys and girls of CBSE boards in Agra and Aligarh cities.

Table 10 E-waste awareness of senior secondary boys and girls of Agra and Aligarh CBSE Schools.

No. of students	City	Board	Boys score in %	Girls score in %
50	Agra	CBSE	62.60%	60.19%
50	Aligarh	CBSE	62.60%	61.48%

Interpretation:

Table 10 shows that senior secondary boys of CBSE board have similar awareness in both the cities (62.60%). The difference is felt in the senior secondary girls of CBSE board studying in Agra, where they are less aware (60.19%) than the girls of similar board in Aligarh city (61.48%). The difference is less because the girls have not scored well on the categories of the e-waste and recycling of the e-waste dimensions.



Graph 10- E-waste awareness of senior secondary boys and girls of Agra and Aligarh CBSE Schools.

Discussion based on the findings of the study

The major findings of the study are as following:

1. After analyzing the percentage score of having heard the word ‘e-waste’. Majority of the students had not heard this term at home or in the school. They were totally ignorant about this word. Present study showed that there is a serious lack of awareness about e-wastes and its management among the student. In this era of cybernetics, young generation is being influenced by ‘cyberphilia’ (extreme love and

fondness for technology). As a result, worldwide e-wastes are generated uncontrolled and unchecked.

2. Most of the students were aware about that refrigerator, cooler and video games comes under the category of e-waste but very few of students made a shocking revelation that they did not know that laptops, mobile phones and printers also came under the category of e-waste. Around 33.3% of the students were aware that metal, wood, glass and rubbers are also categorized as e-waste. The startling result was that around 62.66% students did not know that e-waste also contains precious and rare materials like gold, and platinum.
3. Urbanization as a source was well known to the student .Giving old electronics to children to use resulted in e-waste accumulation at home was responded by majority of the students. The interesting fact revealed that around 82.33%, the highest percentage, students knew that online shopping is the major cause of e-waste accumulation. In spite of this knowledge we find that now the trend of shopping is shifting at a very fast pace from local shops to branded showrooms to lavish and exorbitant malls to online shopping.
4. The highest percentage of students, 77.33%, did not know that competition among different companies is also the source of e-waste stockpiling.
5. Most of the students do not throw away the outdated games. They like to store their games and this is because they themselves observe their parents storing old appliances in their storerooms. Interestingly 71.33% students did not approve, the most common method practiced, of disposing electronics by burning the waste in open areas. This study revealed a most noteworthy and an eye opening situation prevailing in families i.e. throwing household domestic and e-wastes outside their premises to be burned in open air. It demands a major shift in people's selfish attitude, not concerned about the serious negative impact on the ambience of residential neighbourhood. Nipping in the bud this environmental abuse, is the need of the hour.
6. 75.33% agreed to sell their old gadgets to buy new and latest ones. We have websites which sell second hand materials at attractive prices. It is worth noting that 62.66% of students are inclined in disposing off their gadgets in recycling centers and 62% are selling their e-waste to local Kabaadiwala (Waste Collectors).
7. Almost half of the sample were aware about the importance of recycling facilities. 35.66% of students did not find recycling economical but 84.66% agreed that reselling will help those individuals who cannot otherwise afford to buy new electronics. 70% of the students agreed that in India we use unscientific means to recycle the e-waste which has affected human health, agricultural produce, underground water and air.
8. Students are aware about governmental laws and policies of environmental protection but they lack the knowledge regarding the special laws framed exclusively for e-waste and its handling. Students with better awareness towards social duty are more

aware towards environmental awareness (Astalin, 2011). Another significant finding is large chunk of the respondent are seeing garbage piled up on roadside while coming to school, which proves the filthiest condition of the roads and the severity of improper waste management.

9. Most of the students agreed that school is the best agency in providing the information regarding e-waste. Findings revealed that they did not learn about e-waste from their textbooks nor from their parents. Moreover 46% students did not agree that it is their duty as an individual to manage discarded electronic.
10. Findings bring attention to how students were not sure what they did with their CD's and DVD's, when not functioning. Majority of students were not aware of the correct disposal method of CD's and DVD's. Same can be said about pen drives that majority of students would store their pen drives at home as they were not aware of it disposal methods.
11. Students found it hard to manage the domestic e-waste on their own. And there was a serious drawback in the practicing of proper waste management among senior secondary school students. This may be due to insufficient motivation from parents and teachers at this stage of growth period when they are preoccupied with preparation of qualifying examinations for future studies.
12. Only few agreed that e-waste management training should start from the schools. Students agreed that heavy penalty should be paid by the offenders or anyone who is breaking the law. Moreover they agreed that e-waste management is the effective mean to reduce e-waste accumulation. Lastly 71% students were inclined towards repairing the old electronics as it will help in conserving energy and using it sustainably.
13. The findings furnishes that majority of the students were aware about the harmful components of cell phone, very few number of students were not aware of any harmful components of cell phone. This shows that maximum number of students were in favor not to discard or dispose the batteries of the cell phones in open areas because they knew that lead in batteries have a devastating effect on human health.
14. The senior secondary boys of Aligarh and Agra differ by .8% in e-waste awareness. However the senior secondary girls studying in Aligarh have 3.69% more awareness than the senior secondary girls in Agra city. The male students have more e-waste awareness in comparison to female students because the male students of senior secondary level are normally more exposed to the practical life in the society and they can contemplate how an individual's reckless activities can damage the health of the environment and of fellow human beings. But we find that the adolescents of our society get easily derailed by glamour and social status recognition by using latest up to date technologies.
15. The senior secondary boys of CBSE board are more aware than AMU board and UP board. On the other hand senior secondary girls studying in AMU board are more aware than CBSE board and UP board. The lowest awareness was found in UP board



in both boys and girls regarding e-waste awareness as compared to CBSE and AMU board. Because the rich educational climate of both AMU and CBSE schools which makes the students more actively involved in the issues related to environmental conservation.

Educational Implications

At present time world is facing with many problems related with environment such as global warming and pollution which is affecting us adversely. This study focuses on e-waste which is also a major cause of environment deterioration. The educational implications of the study are as follows:

1. As majority of students were not even aware of 'e-waste' term so it is the responsibility of the teacher to impart the basic knowledge related to e-waste.
2. Senior secondary curriculum should be revised in terms of environmental education and it should include e-waste chapter in senior secondary textbook.
3. Educating students about 3 Rs that is Recycle, Reduce and Reuse. Emphasizing on the economic, social and environmental benefits of recycling, reducing and reusing.
4. Informing students and users to check out whether the manufacturers of products take any responsibility for recycling at the end of its life cycle.
5. Encouraging the students and community members to donate their old computers, mobile phones, printers etc. to non-profit organization or charities center.
6. Teacher should organize some extra curricular activity which will practically guide the students. So they will be become familiar with their responsibilities regarding environment.
7. World developments are depending on students so they should be familiar about environmentally harmful element.
8. Teacher should distribute project work amongst the students which will help all the students to participate in environmental activity and they will be learning about environment in collaboration. This task should be undertaken to produce more positive result with the cooperation of media and other organization.
9. Teacher should include nature visit programs to nearby areas where they will encounter the problems of their immediate surrounding and its effect on their environment.
10. Collection Booths in the universities can take initiative towards installing e-waste disposal bins at their campuses for easy collection of e-wastes, which due to lack of proper collection mechanism end up being disposed in a manner posing serious environmental and health hazards.
11. It is duty of the teacher to cater the affective domain of the students by instilling and arousing social and moral values among students regarding e-waste.



12. Teacher should encourage the student to manage their discarded electronic materials by recycling or reselling to others.
13. The teachers should sustain their attitude to look for the positive development in the students belonging to different socio-economical groups rather than the acquisition of bookish information.
14. Students are influenced by out of school and non-formal environments to a great extent. Therefore large projects that will involve the parents are required. Work should be undertaken to produce more positive results with the cooperation of media and other organizations.
15. Educational policy maker should be reform the curriculum offered in the arts and science stream textbooks. The curriculum offered in UP board schools should also be changed according to CBSE schools system. The textbook should be interactive with supplement CDs attached for various activities in the class and at home.
16. Various activities related to environmental education like essay writing, science clubs, fairs, excursions etc. can be arranged in schools. Organizing awareness campaigns about environment related issues in rural and urban areas. Youngsters could be sensitized by bringing awareness in them through different activities, charts, newspapers, magazines, seminars, debates, speeches, street play, drama, public meetings, different media like television, Internet and social media like facebook and whatsapp.
17. The youth waste management practices is crucial because this tech savy generation contributes to the waste menace and they are also responsible in providing creative solutions to solve the near future environmental waste issues. Children need to have the appropriate orientation, the required skills, positive attitude and commitment to take the initiative towards solving existing environmental problems and preventing new ones to arise in other to live sustainably.

CONCLUSION

It is the birth right of every citizen to live in a pollution free environment, to get good air to breathe and to have safe water to drink. As long as these basic rights are denied or a conducive atmosphere is not created, a nation cannot claim of its amazing and sustainable development.

Our country faces significant challenges in protecting the environment from further damage. Population growth and consumerism make the task all the more difficult for the Indian Government. The Indian Government's ability to safeguard the country's environment depends on policies and educational systems. Disposal of e-waste is one of the major challenges facing the world today. Hence, human beings are asked to reduce, reuse and recycle their waste. Even the most learned people are oblivious about the segregation of

objects to reduce, reuse and recycle. These three words if followed by each and every person would be helpful to protect our environment.

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