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Recent Trends in E-Waste Management in Higher Education

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Abstract

Higher education in India is witnessing a massive growth. Due to the rapid pace of progress and increasing dependence on electronic devices, there has been a significant increase in electronic waste (e-waste) in every higher education institution. Even higher education institutions that make extensive use of technology are facing a huge challenge in managing their e-waste. Currently, as per the National Education Policy 2020, there is a huge increase in the use of electronic devices in higher education institutions. This research paper provides a detailed analysis of the recent trends in e-waste management in colleges of higher education, a detailed analysis of the various methods and policies adopted by colleges in the current situation to address the environmental and social impacts of e-waste. This research paper describes in detail various aspects of e-waste management. Various senior colleges maintain e-waste records in the institution. This paper focuses on the challenges faced by higher education institutions, current trends in e-waste management, and the role of higher education institutions in promoting sustainable e-waste management practices. It highlights emerging innovations in e-waste management and the role of education and awareness in promoting sustainable practices in educational settings. The research paper also outlines recommendations for effective e-waste management.

Keywords: *E-waste, higher educational institutions, Colleges, Electronic Device, NEP 2020, recycle etc.*

Introduction

E-waste is the unused and discarded electronic devices, such as computers, smartphones, televisions, laptops, UPS, keyboards and other electronic gadgets, which have reached the end of their useful life. The rapid growth of e-waste is a result of the rapid development of technology and its increasing use. Higher education institutions have seen a significant increase in the use of technology for teaching, research and administration post-COVID-19. Therefore, e-waste is increasing day by day in higher education institutions. E-waste management has become a serious issue in these higher education institutions, which requires comprehensive policies to reduce, recycle and responsibly dispose of obsolete electronic devices.

Problems of the Study

E-waste management in higher education institutions such as senior colleges presents several challenges that hinder the effectiveness of recycling and disposal efforts. These challenges include Storage, logistical, financial, technical, and behavioural issues, and addressing them is crucial for creating sustainable e-waste management practices on campuses for maintaining all E- Waste materials.

Objectives of the study

1. To examine the current trends in e-waste management in higher education institutions.

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2. To study the challenges faced by higher education institutions in e-waste management.
3. To study the role of higher education institutions in promoting sustainable e-waste management practices.
4. To provide recommendations for improving e-waste management in higher education.

Scope of the Study

The scope of a study on e-waste management in higher education encompasses various aspects of how colleges handle the lifecycle of electronic devices, from procurement to disposal and recycling on college campus. This scope is broad and can address multiple dimensions, including environmental impact, financial costs, infrastructure requirements, policy frameworks, and community engagement etc.

Limitations of the study

While studying e-waste management in higher education offers valuable insights, several limitations can affect the depth and accuracy of the findings. These limitations must be acknowledged to understand the scope and constraints of the research.

1. Higher education institutions such as senior colleges vary widely in their infrastructure, policies, and approaches to e-waste management.
2. The way e-waste is handled in colleges in different countries or regions can be influenced by local regulations, cultural norms, and economic conditions.
3. Research may not fully account for these limitations or may not offer practical solutions that align with the financial realities of smaller or underfunded colleges.
4. The research study considers only senior colleges for e- waste material.

Research Methodology

The data collection purely depends on secondary data. The research methodology of this study on e-waste management in higher education institutions specially focus in senior colleges affiliated to Savitribai Phule Pune University, Pune. The present research deals with various policies, challenges and innovative practices related to e-waste management. Secondary data from reports, institutional documents and other articles have been used for research paper.

Current Trends in E-Waste Management in Higher Education Institutions

As the digitalization of academic and administrative functions increases on a large scale, higher education institutions are facing the challenges of electronic waste (e-waste) management. With regular updates in technology in various courses, resulting in a large amount of obsolete electronic devices being generated on campus, the issue of e-waste management is becoming more urgent. Higher education institutions are adopting various trends and best practices to address the growing problem of e-waste. These trends are focusing on reducing waste generation, promoting recycling, educating students, and integrating sustainability into campus operations.

1. Comprehensive E-Waste Recycling

Many colleges are implementing comprehensive e-waste recycling programs the collection, recycling, and disposal of unused electronics equipment's.

2. Repair Training

Repair and reuse are becoming popular options for recycling in colleges. Repair programs focus on extending the lifespan of electronic devices before they are discarded, thus not only reducing e-waste but also conserving resources to a large extent in the future.

3. Campus Sustainability Initiatives

Management is increasingly integrating sustainability goals into broader campus sustainability efforts, with many colleges developing sustainability goals that include reducing electronic waste and improving recycling rates.

4. Student Engagement and Education

Colleges seem to be placing increasing emphasis on educating students about e-waste and involving them in e-waste management efforts

5. Adopting Economy Models

The concept of a circular economy in which products are reused, refurbished, and recycled rather than disposed of has found a place in e-waste management at Colleges.

6. Coordination with external partners

In addition to internal policies, many colleges are collaborating with external partners to improve their e-waste management practices.

7. Tracking and Reporting

Another emerging trend in e-waste management in higher education is the extensive

use of technology to track and provide detailed reporting on e-waste.

8. Consolidation of all policies

Many colleges are undertaking a large-scale review of Extended Producer Responsibility (EPR) policies, which encourage electronics manufacturers to collect and recycle their products.

- **Higher education institutions faced by various Challenges in e-waste management.**

1. Lack of Awareness and Knowledge

There is very little awareness among colleges about the environmental impacts of e-waste and the importance of proper disposal methods, and lack of knowledge is a major challenge in the case of e-waste.

2. Logistical Challenges

Various colleges have set up separate departments for e-waste collection as well as a separate department, but the availability and accessibility of these points appears to be a major barrier to proper and effective recycling.

3. Financial Barriers

Recycling of e-waste often requires significant financial investment required by various colleges. This makes it difficult to fund e-waste management programs or invest in the necessary infrastructure for collection and recycling in the respective colleges. Therefore, the financial barrier is huge**.**

4. Data Security

Many colleges often store sensitive information in electronics such as computers and hard drives. Also, organizations struggle to securely destroy information before disposal or recycling, greatly increasing the complexity of e-waste management.

5. Regulatory and Legal Aspects

While some countries and regions have enacted regulations for e-waste recycling, many colleges face significant challenges due to the lack of consistent, clear regulations governing the disposal of e-waste in higher education.

6. Attitudinal Barriers

Some students, parents, management, and staff in colleges may be reluctant or unwilling to participate in e-waste recycling programs due to inconvenience, lack of understanding, or apathy.

7. Long-term Planning and Policy

Some colleges did not appear to have clear, formal policies on e-waste management. Without a long-term policy or commitment from senior leadership, e-waste management initiatives appeared to be fragmented, underfunded, or inconsistent across departments or campuses.

8. Sustainability Goals

Colleges are increasingly setting ambitious sustainability goals. However, e-waste management often appears to be a secondary priority compared to other sustainability initiatives such as waste reduction.

9. E-waste Tracking

Effective tracking of e-waste is essential to measure the success of college recycling programs, monitor compliance, and report progress on sustainability goals. However, many colleges lack the tools and systems to accurately track the disposal and recycling of electronic devices.

Role of higher education institutions in promoting sustainable e-waste management practices

Various Colleges within higher education institutions play a vital role in promoting sustainable e-waste management practices by appropriately utilizing their resources, influence, and commitment to sustainability.

1. Awareness Raising

The University Grants Commission and the university level are working to provide planning and guidelines to colleges regarding e-waste. They can also include e-waste management, sustainability and many other topics in their curriculum. College students can help to reduce the environmental and social impacts of e-waste by understanding them. Awareness raising can be done well by organizing special courses, research projects and workshops on e-waste management.

2. Sustainable e-waste management policy and implementation

Colleges can partner with other small schools and other certified e-waste recycling companies to set up e-waste collection centres around the college campus

3. Creating good opportunities for new research and innovation

Colleges need to develop new recycling technologies and use sustainable product designs as

well as alternative disposal methods. Colleges are encouraging research to a large extent on innovative ideas for managing e-waste.

4. Increase student and staff involvement

E-waste collection campaigns should involve students and staff in the responsible disposal of old electronics in colleges. E-waste collection campaigns encourage participation in sustainability efforts.

5. Recycling and Refurbishment

In colleges, IT departments or student-run organization programs can provide refurbished devices to students and faculty, reducing the need for new purchases and reducing e-waste. Old but functional electronics are donated to underserved communities, non-profit organizations, or other educational institutions in need, extending the life cycle of the products.

Result & Discussions

E-waste Management in Higher Education Institutions Colleges have a wide range of electrical equipment used in the day-to-day functioning of these institutions. These includes Computers, Printers, Fax machines, CD players, Televisions, Telephones, Microwave etc. ICT equipment i.e. computers, printers, copiers, laboratory equipment i.e. refrigerators, ovens, incubators, various electronic meters and teaching aids i.e. projectors. E-waste management has become a growing concern in higher education institutions such as senior colleges as the demand for electronic devices increases after covid 19 as well as NEP 2020 40% online credit can earn from various platform. Many Universities and colleges are increasingly focused on developing sustainable solutions to handle the significant amounts of electronic waste generated.

Recommendations

Improving e-waste management in higher education institutions requires a comprehensive, sustainable approach that addresses the entire lifecycle of electronic devices.

1. E-Waste Management Policy

The college affiliated with the university should develop a formal e-waste management policy that outlines the procedures for collection, recycling, and disposal of electronic waste. This should include protocols for secure data destruction, recycling guidelines, and compliance with environmental standards. Clear responsibilities for e-waste management should be assigned to specific departments (e.g., IT, Facilities Management, Office of Sustainability) to ensure that there is a central point of contact for handling e-waste.

2. Awareness Raising

The college should initiate campus-wide campaigns to create awareness about the importance of responsible e-waste disposal, involving all students, faculty, parents, and staff, and make extensive use of posters, social media, workshops, and events to educate them about the environmental and social impacts of e-waste.

It would be very effective to integrate e-waste management and sustainability into courses across disciplines such as environmental science, engineering, business, and policy studies by including e-waste topics in the curriculum.

3. Create convenient collection points

The college should create easily accessible e-waste collection points on campus (e.g., in dormitories, libraries, administrative offices, and student organizations). Consider offering incentives such as discounts or campus store vouchers to encourage participation.

4. Partner with e-waste recyclers

Work with certified e-waste recycling companies that ensure proper handling of hazardous materials and environmentally friendly recycling practices. Stay away from unverified or unregulated recyclers to avoid improper disposal and environmental harm.

5. Implement secure data destruction protocols

Ensure that all devices, especially computers, smartphones, and hard drives, are securely erased before recycling or disposal, and that organizations establish data destruction processes that meet legal and regulatory standards to avoid future legal challenges.

6. Promote recycling

A program should be created to repair and refurbish old but functional electronics.

7. Device refurbishment

Refurbished devices can be redistributed across campus, donated to underserved communities for use, or sold to students and staff at a discounted rate for use.

8. Adopt green procurement policies

Making the college energy efficient, sustainable and recyclable helps in future benefits. The college should implement a green procurement policy that prioritizes the purchase of electronics. Electronics designed for longevity, repairability and recyclability should be used in the college to reduce the generation of e-waste.

Conclusion

E-waste management in colleges is a major issue in higher education. E-waste management requires a positive approach, which includes policy changes, technological innovations, active participation of higher education institutions and students. Recent trends in colleges show that various campaigns are being implemented in colleges to promote recycling programs, repair, reuse initiatives and awareness campaigns. Colleges are adopting effective sustainable practices to manage e-waste. However, major challenges such as lack of awareness, financial constraints and information security remain. By continuing to innovate and collaborate in colleges in higher education, colleges are playing a key role in reducing e-waste and enhancing sustainability in the academic sector.

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Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References:

1. Jatindra P., Sudhir K. (2009), E-waste management: a case study of Bangalore, India Research Journal Environmental and Earth Sciences, 1 pp. 111-115.
2. Rahman M.A. (2017), E-waste management: A study on legal framework and institutional preparedness in Bangladesh The Cost and Management, 45 pp. 28-35.
3. María-Jesús Rodríguez- Guerreiro and Verónica Torrijos (2024) “A Review of Waste Management in Higher Education Institutions: The Road to Zero Waste and Sustainability”, 11(12), 293
4. Majeti Narasimha Vara Prasad, and Meththika Vithanage. Handbook of Electronic Waste Management: International Best Practices.
5. Andarani, P., & Goto, N. (2014). Potential E-waste generated from households in Indonesia using material flow analysis. Journal of Material Cycles and Waste Management, 16(2), 306–320
6. Andarani, P., & Goto, N. (2014). Potential E-waste generated from households in Indonesia using material flow analysis. Journal of Material Cycles and Waste Management, 16 (2), 306–320
7. Chen, J., & Huang, S, Bala Murugan, S. & Tamizharasi, G.S. (2021). Artificial intelligence-based e-waste management for environmental planning, Environmental Impact Assessment Review, Volume 87.
8. Chowdhury, A., & Patel, J. (2017, April). E-Waste Management and its Consequences: A Literature Review, e-. Journal of Management Research, 4(1).
9. Chowdhury, A., & Patel, J. (2017). E-Waste Management and its Consequences: A Literature Review, e-. Journal of Management Research, 4 (1).
10. Maricel G. Dayaday and Fredelino A. Galleto, Jr (2022) Electronic Waste (E-Waste) Management of Higher Education Institutions in South Central Mindanao, Philippines, Environment and Natural Resources Journal 20(5): 534-542
11. Andarani, P., & Goto, N. (2014). Potential E-waste generated from households in Indonesia using material flow analysis. Journal of Material Cycles and Waste Management, 16(2), 306–320
12. https://www.mpcb.gov.in/sites/default/files/electronic-waste/related documents/ewastereport1.pdf