Chapter 3
Navigating the E-Waste Crisis Through Sustainable Education and Awareness

ABSTRACT

As digital technology continues its rapid evolution, the convenience it brings is coupled with significant environmental challenges, especially in the form of electronic waste (e-waste). The increasing rate at which devices become obsolete has led to alarming global levels of e-waste, posing unique risks due to hazardous materials and often inadequate recycling methods. Addressing these challenges is essential for a sustainable future, and this chapter argues that education has a critical role in equipping individuals to navigate the complexities of e-waste and promoting sustainable consumption behaviors.

INTRODUCTION

As we navigate an era marked by swift technological progress, electronic devices have woven themselves into nearly every facet of daily life, offering unprecedented levels of convenience, communication, and connectivity. However, this reliance on technology has also given rise to a critical environmental issue: electronic waste, or e-waste. E-waste, which includes discarded electronic devices, contains various hazardous materials such as heavy metals and toxic chemicals. If not properly

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managed, these substances can leach into soil and water, threatening ecosystems and human health (Widmer et al., 2005).

Despite efforts by numerous countries to implement e-waste management policies, major challenges persist in recycling capacity and safe disposal methods. In several regions, e-waste often ends up in informal recycling sectors where inadequate regulations can result in significant environmental damage and health risks for local populations (Kiddee, Naidu, & Wong, 2013). Such conditions underscore the urgent need for comprehensive strategies to minimize e-waste's impact, especially given that current recycling processes recover only a small portion of these waste materials (Forti et al., 2020).

Education offers a promising approach to addressing the e-waste crisis, equipping students and future generations with the knowledge needed to adopt sustainable practices. Education for Sustainable Development (ESD) offers a foundation for integrating environmental responsibility into academic programs, encouraging students to adopt conscious consumption habits and support sustainable practices (UNESCO, 2017). By incorporating topics like responsible usage and disposal into educational programs, students can develop a sense of environmental stewardship that encourages sustainable behavior throughout the technology lifecycle (Chakraborty et al., 2019).

This chapter examines the complex challenges posed by e-waste, focusing on the role of education in promoting sustainable behaviors. Divided into three sections, the chapter first explores e-waste's environmental impact, detailing its categories, hazardous components, and the limitations of current management approaches. Next, it presents a global analysis, using statistical data to illustrate the scale of e-waste generation and uncover gaps in existing disposal and recycling frameworks. Finally, the chapter examines the transformative potential of education, discussing how sustainability-focused curricula can empower students to adopt responsible consumption habits and support a culture of environmental stewardship.

This study highlights the importance of education in cultivating sustainable perspectives on technology use, advocating for the inclusion of e-waste awareness in academic curricula. It concludes by offering recommendations for educators, institutions, and policymakers to work together in fostering a future where technological advancement aligns with environmental responsibility.

LITERATURE REVIEW

The global e-waste crisis has garnered increasing scholarly attention, driven by the rapid expansion of the digital economy and the short lifespan of electronic devices. According to Forti et al. (2020), the world generated a staggering 53.6 mil-