

E-waste Knowledge and Disposal Behaviour: The Role of E-waste Information

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Abstract

Electronic waste (e-waste) is an increasing environmental and public health concern due to the hazardous substances released through improper disposal. This study examined the relationship between e-waste knowledge and awareness and disposal behaviour and assessed the moderating role of e-waste information among community members. A quantitative cross-sectional design was employed, with data collected through an online questionnaire from 215 respondents. Data were analysed using descriptive statistics, Cronbach's alpha, Pearson correlation, and Hayes' PROCESS Model 1. The constructs demonstrated acceptable to good reliability ($\alpha = .765-.827$). Knowledge and awareness ($M = 3.39$) had the highest mean, followed by disposal behaviour ($M = 3.15$) and e-waste information ($M = 3.01$). Knowledge significantly predicted disposal behaviour ($B = .510, p = .002$), while e-waste information also had a significant positive effect ($B = .739, p < .001$). The model explained 44.65% of the variance in disposal behaviour. However, the interaction between knowledge and information was not significant ($B = -.074, p = .169$). Thus, information independently predicts disposal behaviour but does not moderate the knowledge-behaviour relationship.

Keywords: e-waste, e-waste knowledge, disposal behaviour, environmental awareness, e-waste information

Introduction

The rapid development and widespread use of electronic devices have contributed to the increasing generation of electronic waste (e-waste) (Quinto et al., 2025). Mobile phones, computers, televisions, household appliances, batteries, and other electronic products are increasingly discarded as consumers replace outdated or damaged equipment (Jain et al., 2023). Although electronic devices provide substantial social and economic benefits, knowledge, digital benefit (Lamichhane et al., 2025) however their disposal presents significant environmental and public health challenges (Kavil et al., 2025).

Improperly managed e-waste can release hazardous substances into the environment. Toxic materials and heavy metals such as lead, mercury, and cadmium can contaminate soil and water (Parvez et al., 2021). Open burning of electronic waste may also release harmful fumes and contribute to respiratory and other health problems (Ankit et al., 2021). Consequently, appropriate management and disposal of e-waste are increasingly important for environmental protection and community health.

Individual knowledge and awareness may play an important role in determining how people dispose of unwanted electronic products (Khatriwada et al., 2025). Individuals who understand the environmental and health consequences of inappropriate disposal may be more likely to engage in appropriate disposal practices (Yohannes et al., 2025). Knowledge may include awareness of the hazards associated with e-waste, appropriate disposal methods, recycling options, collection centres, and the consequences of informal handling.

However, knowledge alone may not always result in responsible behaviour. Individuals may possess knowledge about e-waste hazards but still dispose of electronic products through inappropriate channels because of limited facilities, lack of convenience, insufficient information, or limited access to formal collection systems (Kariwala et al., 2023; Kosarkar & Barthwal, 2025).

E-waste information may therefore be an important factor in the knowledge–behaviour relationship (Michael et al., 2024; Lamichhane, et al., 2025). Information obtained through educational institutions, government campaigns, municipal programmes, manufacturers, and other sources may increase awareness of available disposal options (Grodzińska-Jurczak et al., 2006). Nevertheless, it remains unclear whether e-waste information actually strengthens the relationship between knowledge and disposal behaviour.

Therefore, this study examines e-waste knowledge and awareness as the independent variable, e-waste disposal behaviour as the dependent variable, and e-waste information as a moderator.

Research Objectives

1. To assess the level of e-waste knowledge and awareness, disposal behaviour, and e-waste information among community members.
2. To examine the relationship between e-waste knowledge, e-waste Information and disposal behaviour.
3. To analyze the e-waste information moderates the relationship between e-waste knowledge and disposal behaviour.

Research Hypotheses

H1: E-waste knowledge and awareness significantly predict e-waste disposal behaviour.

H2: E-waste information significantly predicts e-waste disposal behaviour.

H3: E-waste information significantly moderates the relationship between e-waste knowledge and e-waste disposal behaviour.

Conceptual Framework

The conceptual model of the study is:

E-waste Knowledge & Awareness (IV)

E-waste Disposal Behaviour (DV)

E-waste Information (Moderator) moderates the relationship between knowledge and disposal behaviour.

In statistical form:

$$\text{Disposal Behaviour} = \beta_0 + \beta_1(\text{Knowledge}) + \beta_2(\text{Information}) + \beta_3(\text{Knowledge} \times \text{Information}) + \varepsilon$$

The interaction term between knowledge and information represents the moderation effect.

Methodology

The study employed a quantitative, cross-sectional descriptive research design. The quantitative approach enabled the study variables to be measured numerically and statistically tested. Data were collected at one point in time through an online questionnaire. The study focused on community members regarding their knowledge and practices related to e-waste disposal. A total of **215 respondents** participated in the study. The respondents represented different age groups, genders, educational backgrounds, and residential locations. The study reported the use of simple random sampling. In that case, **convenience/voluntary-response sampling** would be more accurate. This should be corrected before journal submission if applicable. Data were collected using an online structured questionnaire. The questionnaire used Likert-type response scales.

Reliability Analysis

Cronbach's alpha was used to assess the internal consistency of the measurement scales.

Table 1: Reliability of Study Constructs

Construct	Number of Items	Cronbach's α	Interpretation
E-waste Knowledge and Awareness	4	.827	Good
E-waste Disposal Behaviour	5	.767	Acceptable
E-waste Information	6	.765	Acceptable

The reliability results demonstrate satisfactory internal consistency across all three constructs. E-waste knowledge and awareness had the highest reliability ($\alpha = .827$), followed by e-waste disposal behaviour ($\alpha = .767$) and e-waste information ($\alpha = .765$). All values exceeded the commonly accepted threshold of .70, indicating that the measurement items were sufficiently consistent for further analysis.

Demographic Characteristics

Table 2: Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage
Age	18–25	116	54.0
	26–35	53	24.7
	36–50	22	10.2
	51–65	13	6.0
	65+	11	5.1
Gender	Male	100	46.5
	Female	98	45.6
	Prefer not to say	17	7.9
Education	No formal education	9	4.2
	Primary school	24	11.2
	Secondary school	45	20.9
	Higher secondary/Diploma	61	28.4
	Bachelor's degree	63	29.3
	Master's degree or higher	13	6.0
Residence	Urban	108	50.2
	Semi-urban	70	32.6
	Rural	37	17.2

The largest proportion of respondents was aged 18–25 years (54.0%), followed by those aged 26–35 years (24.7%). Respondents aged 36–50 years represented 10.2%, while 6.0% were aged 51–65 and 5.1% were 65 years or older.

The gender distribution was relatively balanced, with males representing 46.5% and females 45.6%. A further 7.9% preferred not to disclose their gender.

In terms of education, bachelor's degree holders represented the largest group (29.3%), followed by higher secondary/diploma respondents (28.4%). Regarding residence, 50.2% lived in urban areas, 32.6% in semi-urban areas, and 17.2% in rural areas.

Descriptive Statistics

Table 3: Descriptive Statistics of Study Variables

Variable	N	Minimum	Maximum	Mean	SD
E-waste Knowledge and Awareness	215	1.00	5.00	3.3907	1.06408
E-waste Disposal Behaviour	215	1.00	5.00	3.1544	.89315
E-waste Information	215	1.00	4.67	3.0124	.79154

The results indicate that e-waste knowledge and awareness had the highest mean score ($M = 3.3907$, $SD = 1.0641$). E-waste disposal behaviour had a mean of 3.1544 ($SD = .8932$), while e-waste information had the lowest mean of 3.0124 ($SD = .7915$).

Overall, respondents demonstrated moderate levels of knowledge, disposal behaviour, and information concerning e-waste.

Correlation Analysis

Table 4: Pearson Correlation Matrix

Variable	1	2	3
1. E-waste Knowledge and Awareness	1	.541**	.440**
2. E-waste Disposal Behaviour	.541**	1	.584**
3. E-waste Information	.440**	.584**	1

Note. $N = 215$. ** $p < .01$, two-tailed.

The correlation results show significant positive relationships among all three study variables. E-waste knowledge and awareness was significantly positively correlated with e-waste disposal behaviour ($r = .541$, $p < .001$). This indicates a moderately strong positive relationship, suggesting that respondents with greater knowledge and awareness tended to report more responsible disposal behaviour.

E-waste knowledge and awareness was also significantly correlated with e-waste information ($r = .440$, $p < .001$).

Furthermore, e-waste information was positively correlated with disposal behaviour ($r = .584$, $p < .001$).

Thus, all three constructs were significantly associated with one another.

Moderation Analysis

Hayes' PROCESS Macro Model 1 was used to examine whether e-waste information moderates the relationship between e-waste knowledge and disposal behaviour.

Table 5: Moderation Analysis: E-waste Information as Moderator

Predictor	B	SE	t	p	LLCI	ULCI
Constant	-.0245	.5547	-.044	.965	-1.1180	1.0690
E-waste Knowledge & Awareness	.5103	.1628	3.135	.002	.1895	.8312
E-waste Information	.7390	.1950	3.790	< .001	.3546	1.1234
Knowledge $\times$ Information	-.0735	.0532	-1.381	.169	-.1783	.0314

Model: $R = .6682$, $R^2 = .4465$, $MSE = .4478$, $F(3,211) = 56.7397$, $p < .001$.

The moderation model was statistically significant, $F(3,211) = 56.740$, $p < .001$, and explained 44.65% of the variance in e-waste disposal behaviour.

E-waste knowledge and awareness significantly predicted disposal behaviour ($B = .5103$, $SE = .1628$, $t = 3.1352$, $p = .002$). The 95% confidence interval ranged from .1895 to .8312 and did not include zero. Therefore, H1 was supported.

E-waste information also significantly predicted disposal behaviour ($B = .7390$, $SE = .1950$, $t = 3.7895$, $p < .001$). The confidence interval ranged from .3546 to 1.1234. Therefore, H2 was supported.

However, the interaction between e-waste knowledge and e-waste information was not statistically significant ($B = -.0735$, $SE = .0532$, $t = -1.3811$, $p = .1687$). The confidence interval ranged from $-.1783$ to $.0314$ and included zero.

The interaction produced an R^2 change of .0050, with $F(1,211) = 1.9074$, $p = .1687$. Therefore, H3 was not supported.

Hypothesis Testing

Table 6: Summary of Hypothesis Testing

Hypothesis	Relationship	Result	Decision
H1	E-waste Knowledge $\rightarrow$ Disposal Behaviour	$B = .510$, $p = .002$	Supported
H2	E-waste Information $\rightarrow$ Disposal Behaviour	$B = .739$, $p < .001$	Supported
H3	Knowledge $\times$ Information $\rightarrow$ Disposal Behaviour	$B = -.074$, $p = .169$	Not Supported

Discussion

The study examined whether e-waste knowledge and awareness predicts disposal behaviour and whether e-waste information moderates this relationship.

The first major finding was that e-waste knowledge and awareness significantly predicted disposal behaviour. The regression coefficient was positive and statistically significant ($B = .510$, $p = .002$). The correlation analysis also showed a significant positive relationship ($r = .541$, $p < .001$).

This finding suggests that individuals with greater knowledge and awareness of the environmental and health consequences of e-waste are more likely to report responsible disposal behaviour. Knowledge about hazardous substances, environmental contamination, health consequences, and appropriate disposal methods may contribute to more responsible decisions concerning unwanted electronic products.

The second major finding was that e-waste information significantly predicted disposal behaviour ($B = .739$, $p < .001$). This indicates that access to or awareness of information about e-waste is positively associated with disposal behaviour. Information concerning collection centres, take-back programmes, recycling opportunities, and appropriate disposal methods may help individuals make better disposal decisions.

The correlation between information and disposal behaviour was also relatively strong ($r = .584$, $p < .001$), supporting the importance of information in e-waste management.

However, the study did not find evidence that e-waste information moderates the relationship between knowledge and disposal behaviour. The interaction coefficient was negative but

statistically nonsignificant ($B = -.0735$, $p = .169$). Therefore, although information independently predicts disposal behaviour, it does not significantly strengthen or weaken the relationship between knowledge and behaviour.

This distinction is important. The findings demonstrate two significant direct predictors, but not a significant interaction effect. Consequently, it would be inappropriate to conclude that information amplifies the effect of knowledge on disposal behaviour.

The overall model explained 44.65% of the variance in disposal behaviour, which indicates that knowledge, information, and their interaction collectively provide substantial explanatory power. Nevertheless, more than half of the variance remains unexplained, suggesting that other factors may influence e-waste disposal behaviour.

Such factors may include accessibility of collection centres, convenience, perceived behavioural control, environmental attitudes, subjective norms, economic incentives, availability of recycling facilities, household practices, and local government support.

Practical Implications

The findings have several implications for e-waste management.

First, environmental education should emphasize practical e-waste management knowledge. Awareness programmes should explain not only the harmful effects of e-waste but also where and how electronic waste should be disposed of.

Second, information dissemination should be strengthened. Municipalities, educational institutions, environmental organizations, manufacturers, and retailers can provide clear information regarding collection centres, recycling points, take-back programmes, and safe disposal options.

Third, knowledge and information should be supported by accessible infrastructure. People may understand proper disposal practices but still fail to implement them if collection centres are unavailable or inconvenient.

Fourth, manufacturers and retailers could establish or expand take-back programmes for unwanted electronic devices.

Finally, public awareness campaigns should be designed to convert knowledge into practical action rather than focusing solely on the environmental consequences of e-waste.

Conclusion

This study examined the relationship between e-waste knowledge and awareness and disposal behaviour and assessed the moderating role of e-waste information among 215 community members. The results demonstrated a significant positive relationship between e-waste knowledge and disposal behaviour. E-waste information also significantly predicted disposal behaviour. The overall model explained 44.65% of the variance in disposal behaviour.

However, e-waste information did not significantly moderate the relationship between knowledge and disposal behaviour. Thus, knowledge and information appear to function as independent predictors rather than information functioning as a moderator. The findings emphasize the importance of improving community knowledge, increasing access to reliable

e-waste information, and ensuring that appropriate disposal and recycling facilities are accessible.

Limitations and Future Research

The study has several limitations. First, the cross-sectional design limits the ability to establish causal relationships. Although knowledge significantly predicted disposal behaviour statistically, the findings should be interpreted as associations rather than definitive causal effects.

Second, the study used self-reported data, which may be affected by social desirability and recall bias.

Third, the sample consisted of 215 respondents and was collected through an online questionnaire. Therefore, the findings may not be fully generalizable to all community members, particularly those with limited internet access.

Future studies could employ larger samples and probability-based sampling across different geographical regions. Longitudinal studies could also examine whether improvements in knowledge actually lead to changes in disposal behaviour over time.

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References

- Ankit, Saha, L., Kumar, V., Tiwari, J., Sweta, Rawat, S., Singh, J., & Bauddh, K. (2021). Electronic waste and their leachates impact on human health and environment: Global ecological threat and management. *Environmental Technology & Innovation*, 24(102049), 102049. <https://doi.org/10.1016/j.eti.2021.102049>
- Grodzińska-Jurczak, M., Tomal, P., Tarabula-Fiortak, M., Nieszporek, K., & Read, A. D. (2006). Effects of an educational campaign on public environmental attitudes and behaviour in Poland. *Resources, Conservation, and Recycling*, 46(2), 182–197. <https://doi.org/10.1016/j.resconrec.2005.06.010>
- Jain, M., Kumar, D., Chaudhary, J., Kumar, S., Sharma, S., & Singh Verma, A. (2023). Review on E-waste management and its impact on the environment and society. *Waste Management Bulletin*, 1(3), 34–44. <https://doi.org/10.1016/j.wmb.2023.06.004>
- Kariwala, P., Kandpal, S. D., Dixit, S., Singh, A. K., Pathak, A., & Singh, S. (2023). Knowledge, attitude and practices regarding electronic waste (e-waste) management among users of electronic equipments living in Lucknow City. *Indian Journal of Community Health*, 35(1), 38–45. <https://doi.org/10.47203/ijch.2023.v35i01.008>

- Kavil, Y. N., Alshemmari, H., Alkasbi, M. M., Alelyani, S. S., Orif, M. I., & Al-Farawati, R. K. (2025). Electronic waste and environmental diplomacy: How GCC E-waste management interfaces with the Stockholm Convention. *Journal of Hazardous Materials Advances*, 17(100610), 100610. <https://doi.org/10.1016/j.hazadv.2025.100610>
- Khatiwada, B., Jariyaboon, R., & Techato, K. (2025). E-waste awareness and disposal practices among higher education students in Kathmandu Valley, Nepal. *A Bi-Annual South Asian Journal of Research & Innovation*, 12(1), 159–171. <https://doi.org/10.3126/jori.v12i1.84840>
- Kosarkar, M., & Barthwal, S. (2025). Environmentally conscious but helpless: Consumer challenges for participation in Formal e-waste collection initiatives of India. *Cleaner Waste Systems*, 12(100363), 100363. <https://doi.org/10.1016/j.clwas.2025.100363>
- Lamichhane, B. D., Acharya, K. R., Pandey, P., & Lamichhane, S. (2025). AI and Learning: A Management Perspective from College Students of Kathmandu Valley, Nepal. *Nepal Journal of Multidisciplinary Research*, 8(5), 137-150. <https://doi.org/10.3126/njmr.v8i5.89966>
- Michael, L. K., Hungund, S. S., & Sriram. (2024). Factors influencing the behavior in recycling of e-waste using integrated TPB and NAM model. *Cogent Business & Management*, 11(1). <https://doi.org/10.1080/23311975.2023.2295605>
- Parvez, S. M., Jahan, F., Brune, M.-N., Gorman, J. F., Rahman, M. J., Carpenter, D., Islam, Z., Rahman, M., Aich, N., Knibbs, L. D., & Sly, P. D. (2021). Health consequences of exposure to e-waste: an updated systematic review. *The Lancet. Planetary Health*, 5(12), e905–e920. [https://doi.org/10.1016/S2542-5196\(21\)00263-1](https://doi.org/10.1016/S2542-5196(21)00263-1)
- Quinto, S., Law, N., Fletcher, C., Le, J., Antony Jose, S., & Menezes, P. L. (2025). Exploring the E-waste crisis: Strategies for sustainable recycling and circular economy integration. *Recycling*, 10(2), 72. <https://doi.org/10.3390/recycling10020072>
- Yohannes, L., Tegegne, A. A., Genet, G., Workie Limenh, L., Mohammed Seid, A., Alemayehu, T. T., Ayenew, W., & Simegn, W. (2025). Disposal practice and determinants of unused medicines among the general public in Gondar City, Northwest Ethiopia. *Frontiers in Public Health*, 13, 1516809. <https://doi.org/10.3389/fpubh.2025.1516809>

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