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Awareness of Green Computing and sustainable IT

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Abstract :-

Information and communication Technology (ICT) has transformed work, learning, and interaction, improving productivity and employment opportunities. However, rapid ICT growth raises environmental concerns due to high energy use, greenhouse gas emission, and electronic waste throughout device lifecycles. Green computing addresses these challenges through energy-efficient hardware, eco-friendly design, responsible manufacturing and effective e-waste management. Despite increasing awareness, adoption remains limited by high costs and lack of standardization. This paper examines the level awareness of green computing and proposes strategies that organization can adopt to minimize environmental impact while reducing operational cost, emphasizing the importance of standardization for a sustainable digital future.

Introduction

The rapid growth of industrialization worldwide has had a significant impact on the natural environment. Along with traditional industries, the expansion of Information and Communication Technology (ICT) has become a major contributor to environmental problems such as increased energy consumption, depletion of natural resources, and the generation of hazardous electronic waste. The production, operation, and disposal of computers and electronic devices require large amounts of electricity, raw materials, chemicals, and water, all of which contribute to rising carbon dioxide (CO_2) emissions. Since CO_2 is the primary greenhouse gas produced by human activities, its increasing concentration in the atmosphere is a major cause of global warming and climate change.

Although carbon dioxide is a natural part of the Earth's carbon cycle, human activities have disrupted this balance by releasing excessive emissions and reducing natural carbon sinks. Industrial development and the growing dependence on ICT infrastructure have accelerated this problem. Even a single personal computer can generate nearly one ton of CO_2 annually through its lifecycle and energy use. These emissions lead to serious environmental consequences, including rising global temperatures, melting ice caps, sea-level rise, extreme weather events, and damage to ecosystems and agriculture.

In today's digital era, ICT is essential for modern life, but it also increases environmental challenges. To address these concerns, green computing and sustainable IT practices aim to

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reduce energy consumption, lower carbon emissions, minimize e-waste, and promote environmentally responsible technology use for a sustainable future

Objective

1. To identify key factors influencing the adoption of green computing and sustainable IT solutions in organizations and educational institutions.
2. To examine the environmental impact of current IT practices in terms of energy consumption, carbon emissions, and e-waste generation.
3. To analyse the role of sustainable IT in reducing operational costs and improving energy efficiency.
4. To study user attitudes and behaviour toward eco-friendly computing practices.
5. To evaluate existing green IT policies and initiatives implemented by organizations and governments.
6. To propose practical recommendations for improving awareness and implementation of green computing strategies.

Hypothesis :

H1.What is the main goal of green computing ?

This, applying The Formula $x^2=\Sigma(Oi-Ei)^2/Ei$

Here, Oi=Observed Frequency (Response collected from survey),

Ei=Expected Frequency(Expected Response)

	Oi	Ei	Oi-Ei	$(Oi-Ei)^2$	$(Oi-Ei)^2/E$
Reduce environmental impact	47	33.75	13.25	175.56	5.20
Increase computer speed	46	33.75	12.25	150.06	4.45
Improve gaming performance	30	33.75	-3.75	14.06	0.42
Increase software cost	12	33.75	-21.75	473.06	14.02
Total	135	135	0		24.09

$\Sigma(Oi-Ei)^2/E = 24.09$

Degree of freedom=4-1=3

Calculated $x^2=24.09$

Tabulated $x^2=2$

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Since 24.09>7.815

H2.Do you thing green computing helps in saving energy ?

This, applying The Formula $x^2=\Sigma(Oi-Ei)^2/Ei$

Here, Oi=Observed Frequency (Response collected from survey),

Ei=Expected Frequency(Expected Response)

	Oi	Ei	Oi-Ei	$(Oi-Ei)^2$	$(Oi-Ei)^2/E$
Yes, significantly	61	33.75	27.25	742.56	22.00
Yes, to the same extent	42	33.75	8.25	68.06	2.02
Very little	21	33.75	-12.75	162.56	4.82
Not at all	11	33.75	-22.75	517.56	15.34
Total	135	135	0		44.18

(Oi-Ei)2/E =44.18

Degree of freedom=4-1=3

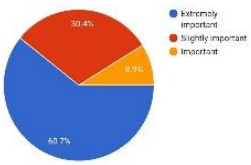
Calculated $x^2=44.18$

Tabulated $x^2=2$

Since 44.18>7.815

Data analysis :

1. How important is sustainable IT for future generation ?



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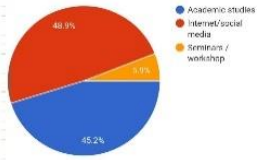
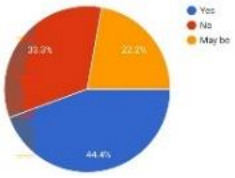
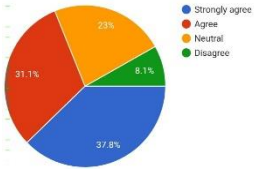
2. What is your main source of information about Green computing?



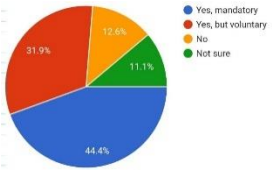
3. Are you willing to adopt Green IT practices in daily life?



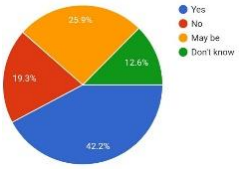
4. Green Computing should be included in academic curriculum?



5. Should IT organization be forced to follow Green computing standards?



6. Do you believe cloud computing supports green computing?



Conclusion:

The transition toward green computing represents a critical evolution in the IT sector, moving beyond simple hardware performance to prioritize energy efficiency and environmental responsibility. While modern advancements allow for better monitoring of power consumption

and data centre cooling, the industry still faces significant hurdles. To achieve true sustainability, society must improve public understanding of green initiatives, strictly adhere to international environmental standards like ISO-14000, and develop formal government-led frameworks for the recycling of electronic waste.

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