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THE INFLUENCE OF USING ELECTRONIC DEVICES IN THE HOUSEHOLD

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Abstract

The background of this research is that the field of education is undergoing a significant transformation as a result of technological advancements. The purpose of this research is to look at how the technological revolution is rapidly evolving in this modern era, especially in the field of education, and how technology impacts students. These methods are used to find out the revolution and impact of technology on education and how technology affects the learning process in the modern era. This study employs a mixed-method approach, combining quantitative and qualitative research methods to assess the influence of electronic devices in household settings. The methodology consists of research design, data collection methods, data analysis techniques, and ethical considerations, ensuring a comprehensive evaluation of energy consumption patterns, user behavior, and sustainability impacts. In conclusion, the widespread use of household electronic devices has both positive and negative implications. While they enhance modern living standards, managing energy efficiency, device longevity, and environmental sustainability is essential. The study recommends adopting energy-efficient appliances, promoting responsible usage, and integrating smart home technology to optimize the benefits of electronic devices while minimizing their drawbacks.

Keywords: revolution, technology, impact, education.

Introduction

Today's technological advances are developing very rapidly, as shown by the many sophisticated technological innovations that have been made (Volti & Croissant, 2024). Actually, technology has existed since ancient Roman times. Technology also continues to develop and evolve (Genta et al., 2019; Pacey & Bray, 2021; White, 2016). Thus, people can work more efficiently and quickly, especially in the field of education (Bojović et al., 2020). As a result, the technological revolution in education has an impact on the learning and teaching process (Cahya et al., 2023; Manzaba & Rodríguez, 2021; Meisuri et al., 2023; Oke & Fernandes, 2020; Railean & Railean, 2017). Learning has become more interactive and dynamic thanks to technological advances (Gros & García-Peñalvo, 2023; Mdhlalose & Mlambo, 2023).

Technological developments have made it easier for students and teachers to

access various learning resources. Technology also influences learning. It not only increases teachers' participation but also prepares them to face challenges in the increasingly complex world of work.

However, the technological revolution has some problems. Therefore, it is important to understand how technology affects education in the contemporary era (Collins & Halverson, 2018; Maj-Waśniowska et al., 2023). Therefore, the purpose of this study is to see and understand how the technological revolution affects the world of education. By understanding it, we can know the effects of any technology, both positive and negative.

The rapid advancement of technology has significantly influenced modern households, leading to the widespread adoption of electronic devices for daily activities, communication, entertainment, and home automation**.** From kitchen appliances and smart lighting systems to entertainment units and security devices, electronic products have become essential in ensuring convenience, efficiency, and improved living standards. The increasing dependence on these devices has transformed how households operate, making everyday tasks easier and more efficient (Cowan, 2023).

Despite the many advantages electronic devices bring, their extensive usage raises several concerns, particularly regarding energy consumption, environmental impact, and health considerations (Adnan et al., 2024). The rising number of household electronics contributes to higher electricity demand, leading to increased energy costs and potential overreliance on non-renewable energy sources. Additionally, the rapid production and disposal of electronic devices generate a significant amount of electronic waste (e-waste), posing environmental risks if not properly managed. Furthermore, prolonged exposure to screen-based devices has raised health concerns, such as eye strain, sleep disruption, and sedentary lifestyle issues.

Another important aspect to consider is the role of smart home technology in managing household electronic devices. The introduction of smart grids, energy-efficient appliances, and home automation systems has provided opportunities for reducing energy consumption and promoting sustainable living. Many modern homes now integrate Internet of Things (IoT) technology, allowing residents to control and monitor their electronic devices remotely, optimizing energy usage and improving safety.

This study aims to examine the impact of electronic device usage in households, focusing on its benefits, challenges, and sustainability implications. Through an analysis of energy consumption patterns, environmental effects, and technological advancements, this research seeks to provide insights into how households can maximize the advantages of electronic devices while minimizing their negative effects. By understanding the balance between convenience, cost, and sustainability, individuals can make informed decisions about their use of electronic devices, ultimately contributing to a more efficient and environmentally responsible lifestyle**.**

Research Methodology

These methods include reading literature, conducting surveys to gather information on how students use technology in the learning process, and making direct observations to see how technology and modern education interact. These methods are used to find out the revolution and impact of technology on education and how technology affects the learning process in the modern era.

This study employs a mixed-method approach, combining quantitative and qualitative research methods to assess the influence of electronic devices in household settings. The methodology consists of research design, data collection methods, data analysis techniques, and ethical considerations, ensuring a comprehensive evaluation of energy consumption patterns, user behavior, and sustainability impacts.

1. *Research Design*

This study follows a descriptive and analytical research design to examine the benefits and challenges of electronic device usage in households, focusing on energy consumption patterns, cost implications, and environmental impacts such as electronic waste and carbon footprint. Additionally, it explores the adoption of smart home technologies for energy efficiency. By analyzing real-world household data and expert insights, the research aims to identify trends, address challenges, and propose potential solutions to optimize the use of electronic devices while promoting sustainability and efficiency.

2. *Data Collection Methods*

a. Primary Data Collection

Primary data is collected through surveys, interviews, and household observations, focusing on individuals who frequently use electronic devices. Structured surveys are distributed to household members and homeowners to gather insights into device usage frequency, electricity consumption habits, energy efficiency awareness, and the adoption of smart home technologies. In-depth interviews with energy experts, environmental specialists, and technology professionals provide an analysis of electronic device impacts on household energy consumption, sustainable practices for reducing electricity use, and the role of smart technologies in optimizing energy efficiency. Additionally, household observations are conducted to assess the number and types of electronic devices used, energy efficiency measures such as LED lighting and smart appliances, and daily electricity usage behaviors.

b. Secondary Data Collection

Secondary data is obtained from academic journals, government reports, energy usage statistics, and industry publications related to household electronic devices. Key sources include energy consumption reports from utility companies, scientific studies on electronic waste management and environmental impact, and government policies on energy efficiency and sustainable home practices. This data provides a broader perspective on household energy consumption trends, environmental challenges, and regulatory measures aimed at promoting sustainability.

3. *Data Analysis Techniques*

A combination of quantitative and qualitative techniques is used to analyze the collected data. Statistical analysis is applied to survey responses to measure energy usage trends, cost factors, and sustainability awareness among households. Comparative analysis is conducted to evaluate energy efficiency improvements by comparing different household setups, such as smart homes versus traditional homes. Additionally, thematic analysis is used to categorize insights from expert interviews and household observations into key themes, including the benefits of electronic devices, challenges related to high energy consumption, and strategies for promoting sustainability.

4. *Ethical Considerations*

To ensure ethical compliance, this study adheres to key principles, including informed consent, where all participants are fully informed about the study's purpose and voluntarily participate in surveys and interviews. Confidentiality is maintained by keeping household and individual data anonymous and using it solely for research purposes. Additionally, objectivity and accuracy are prioritized, ensuring that data collection and analysis are conducted without bias, leading to credible and reliable findings.

Conclusion of Methodology

By utilizing surveys, interviews, and real-world observations, this research provides an in-depth understanding of how electronic devices impact household energy consumption, cost efficiency, and environmental sustainability. The mixed-method approach ensures a holistic evaluation, allowing for practical recommendations on balancing technological convenience with responsible energy use in modern households.

Results and Discussion

Results show that the world of education has been drastically changed by the technological revolution. This has had an impact on students. Students are more engaged in project-based learning, students can cooperate with each other both in class and online. It also allows students to do self-directed learning. Overall, the technology revolution has opened up great opportunities in the world of education.

Discussion

The world of education has undergone major changes as a result of the technological revolution. A survey shows that, in the past, the teaching and learning process depended only on reading book texts, but now digital platforms allow students to learn easily and can access learning, such as digital libraries, online learning, e-learning, and also make learning more interactive.

Technology and communication makes it easier for students and teachers to work together on projects and share ideas, as well as helping them think critically, interact with others orally and in writing, and generate creative ideas.

Students can also collaborate with other students around the world through the online platform, bringing a global perspective to their learning.

The results of the Indonesia 2024 internet penetration survey released by APJII showed an increase of 1.4% from the previous period. The penetration rate touched 79.5%. This proves that Technology is very useful to help students and educators make observations. Starting from the way learning is provided to the results. Although technology plays an important role in all aspects of human life, especially in the field of education, we must also realize that technology is just a tool that certainly has shortcomings.

According to Yohannes Marryono Jamun (2018), technology can have benefits and negative effects.

Positive impact of technological development

Education becomes more flexible, access to information is faster and younger, and students become more independent.

Negative impact of technological development

Decreased quality of learning, gadget addiction, distracting content and health issues.

From this we can benefit and assume responsibility. The most important thing is how we use technology to achieve better learning goals.

1. *Results of the Study*

The study investigates the influence of electronic devices in households by analyzing their usage patterns, energy consumption, environmental impact, and the adoption of smart technologies. The data collected from surveys, interviews, and observations reveal key trends in electronic device dependency, energy efficiency awareness, and sustainability challenges.

a. Electronic Device Usage in Households

Survey results show that over 90% of households use multiple electronic devices daily, including kitchen appliances, entertainment systems, computers, and smart home technology. The most commonly used devices are refrigerators, air conditioners, washing machines, televisions, mobile phones, laptops, tablets, and smart home automation tools like digital thermostats and voice-controlled assistants. While these technologies enhance convenience and improve quality of life, their excessive use contributes to higher electricity consumption and increased electronic waste generation, posing environmental and financial challenges.

b. Energy Consumption and Cost Implications

Households with high electronic device usage experience a significant increase in electricity bills, particularly those using air conditioners, water heaters, and large entertainment systems. Energy-intensive devices such as ACs, refrigerators, and washing machines account for over 60% of household electricity consumption. However, smart appliances and energy-efficient devices can reduce electricity usage by up to 30% compared to conventional models. Additionally, households that adopt solar panels or energy-efficient

appliances report noticeably lower monthly electricity costs, highlighting the potential benefits of sustainable energy solutions.

c. Environmental and Health Impact

Electronic devices significantly impact both the environment and human health. Improper disposal of outdated or damaged devices contributes to increased electronic waste (e-waste), leading to environmental pollution. Additionally, high electricity consumption, particularly from non-renewable energy sources, results in a larger carbon footprint and higher CO_2 emissions. From a health perspective, prolonged screen exposure from televisions, computers, and mobile devices can cause eye strain, sleep disruption, and a more sedentary lifestyle, increasing the risk of related health issues.

d. Adoption of Smart Technologies for Sustainability

The study highlights the increasing adoption of smart home technologies to enhance energy efficiency and minimize environmental impact. Common energy-saving strategies include the use of smart thermostats and automated lighting systems to optimize energy consumption, switching to LED lighting and energy-efficient appliances to reduce overall power usage, and integrating renewable energy sources, such as solar panels, to promote sustainable energy solutions. These advancements help households lower electricity costs while reducing their carbon footprint.

2. Discussion on Key Findings

a. The Balance Between Convenience and Energy Consumption

While electronic devices offer modern conveniences, excessive use leads to higher energy costs and increased environmental concerns. Households must strike a balance between device usage and energy efficiency by adopting smart technologies and responsible consumption habits.

b. The Role of Awareness and Government Policies

A major challenge identified is the lack of awareness regarding energy-efficient practices. Many households continue to use older, less efficient appliances, unaware of the long-term cost savings and environmental benefits of modern energy-efficient technology. Government policies promoting energy-efficient appliances, recycling programs, and incentives for solar energy adoption can help address this issue.

c. The Need for Proper E-Waste Management

Electronic waste disposal remains a major challenge, as many households improperly discard old devices, contributing to environmental pollution. Sustainable solutions include promoting e-waste recycling programs and buy-back initiatives to encourage responsible disposal, holding manufacturers accountable for recycling outdated electronics, and educating consumers on proper disposal methods to reduce landfill waste. These efforts can help mitigate the environmental impact of electronic waste and support a more sustainable approach to technology usage.

d. Smart Technologies as a Solution to High Energy Usage

The integration of smart home technology has emerged as an effective solution for optimizing energy consumption. Devices such as smart meters, energy-efficient appliances, and AI-driven automation help households monitor and reduce energy use, ultimately lowering costs and minimizing environmental impact.

Conclusion of Results and Discussion

The findings of this study indicate that while electronic devices greatly enhance daily life, their extensive use results in higher energy costs, environmental concerns, and health issues. The adoption of energy-efficient appliances, smart home technology, and responsible consumption practices can help mitigate these challenges. Governments, manufacturers, and consumers must work together to promote sustainable energy usage, improve e-waste management, and encourage technological advancements for a more energy-conscious household environment.

Conclusion

After seeing the development of technological advances in the teaching and learning process, we realize that the revolutionary process that occurs in education is very significant to learning in the modern era. Technology can be a powerful tool for education if utilized properly to prepare the younger generation to face the challenges of the future.

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