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Raising Awareness on Digital Pollution: Individual and Organizational Productivity

Dijital Kirlilik Konusunda Farkındalığın Artırılması: Bireysel ve Örgütsel Verimlilik

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ABSTRACT

This study aims to raise awareness about the concept of digital pollution and to discuss strategies that can be applied at both individual and organizational levels to combat this problem. Digital pollution, which emerged as a result of digitalization, is one of the main problems of the 21st century and has a wide range of effects from individuals to organizations and from local to global dimensions. Awareness raising is a critical starting point to mitigate the effects of digital pollution. This process requires individuals and organizations to adopt digital cleaning practices and take strategic steps in this direction. Treating digital cleanliness as a corporate responsibility is an important element that can increase both individual and organizational efficiency. Education, technological solutions and sustainability policies are key tools to mitigate the effects of digital pollution. These approaches make it possible to create a more sustainable digital ecosystem. In this way, individuals and organizations will not only contribute to improving digital hygiene, but also build a healthier digital environment for future generations.

Anahtar Kelimeler:

Dijital Kirlilik, Bireysel Farkındalık, Örgütsel Farkındalık, Örgütsel Verimlilik.

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ÖZET

Bu çalışma, dijital kirlilik kavramına yönelik farkındalık oluşturmayı ve bu sorunla mücadelede hem bireysel hem de örgütsel düzeyde uygulanabilecek stratejileri tartışmayı amaçlamaktadır. Dijitalleşmenin bir sonucu olarak ortaya çıkan dijital kirlilik, 21. yüzyılın temel sorunlarından biri olup, bireylerden organizasyonlara ve yerelden küresel boyuta kadar geniş bir etki alanına sahiptir. Dijital kirliliğin etkilerini azaltmak adına farkındalık oluşturmak kritik bir başlangıç noktasıdır. Bu süreç, bireylerin ve örgütlerin dijital temizlik uygulamalarını benimsemelerini ve bu yönde stratejik adımlar atmaları gerektiğini ortaya koymaktadır. Dijital temizliğin kurumsal bir sorumluluk olarak ele alınması hem bireysel hem de örgütsel verimliliği artırabilecek önemli bir unsurdur. Eğitim, teknolojik çözümler ve sürdürülebilirlik politikaları, dijital kirliliğin etkilerinin hafifletilmesinde temel araçlardır. Bu yaklaşımlar sayesinde daha sürdürülebilir bir dijital ekosistem oluşturulması mümkün hale gelmektedir. Böylelikle bireyler ve kurumlar, yalnızca dijital hijyenin geliştirilmesine katkıda bulunmakla kalmayacak, aynı zamanda gelecek nesiller için daha sağlıklı bir dijital çevre inşa edebilecektir.

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1. INTRODUCTION

With the continuation of technological developments on a digital basis, important developments have been recorded in many fields from science to health. In addition to many features that make life easier, digitalization has also brought along a number of problematic issues. One of the most important of these is the concept of digital pollution. It is seen as an important problem that cannot be calculated and not yet realized that each e-mail sent will accumulate and multiply as a digital waste depending on a server located anywhere in the world.

The digitalized environment, increased use of electronic devices and many other technological devices negatively affect global warming and climate change. It is known that these uses, which are among the factors that increase the pollution of the atmosphere due to carbon dioxide (CO2) due to greenhouse gas emissions, have also revealed a new concept. This situation, which is expressed as "carbon footprint", is the occurrence of environmental damage due to carbon emissions due to the use of electronics, especially heating and communication (Gökçek, Bozdağ, & Demirbag, 2019). The issue of "footprint", which environmental scientists have been working on for the last years, is known as a measurement tool for how much natural resources are used by humans. This measurement is usually handled in three dimensions: carbon footprint, ecological footprint and water footprint. Carbon footprint gains importance in terms of sustainability, especially when it is considered in relation to digital pollution. The carbon footprint emerges in relation to how much of nature we use and how much we protect nature, and as a result, digital pollution comes into question. Digital waste, which is an output of digitalization, is the visible face of digital pollution. Digital pollution is a specific concept that contains both a problem and a solution to the problem, along with many unknowns. For this reason, it is an issue that needs to be researched, awareness-raising and, more importantly, serious measures should be taken.

The rapid increase in digitalization, the widespread use of electronic devices and the increasing use of other technological devices in our lives have negative effects on global warming and climate change. In this process, the increase in the amount of carbon dioxide (CO2) in the atmosphere due to greenhouse gas emissions is among the important factors that increase environmental pollution. The production and use processes of electronic devices have major environmental impacts on energy consumption and waste management (Gökçek, Bozdağ, & Demirbag, 2019).

The materials used in the production of digital devices and the energy required for their operation are often derived from carbon-intensive sources such as fossil fuels. This increases the level of carbon dioxide in the atmosphere, contributing to the greenhouse effect and global warming. For example, the production of each new smartphone, on average, releases 80-90 kilograms of CO2 equivalent greenhouse gases (Greenpeace, 2017).

The environmental impact of electronic devices is not limited to carbon emissions. The rare metals and other toxic substances used in their production processes can damage soil and water resources. In addition, electronic waste generated at the end of the life of these devices can cause serious damage to the environment. When electronic waste is not recycled or disposed of properly, it has negative impacts on both the environment and human health (Ercan, 2020).

Minimizing unnecessary data storage and processing contributes to reducing digital pollution. Data management and security strategies ensure that data is managed effectively and securely. These strategies include data classification, deleting unnecessary data, and backing up data regularly (Demir, 2021). In addition, data integrity and confidentiality can be protected by protecting data against unauthorized access through data security policies.

Digital pollution can also negatively affect the productivity of organizations. Digital pollution causes loss of time and productivity by making it difficult to access information. For example, employees' inability to access the information they need quickly and easily leads to a slowdown in business processes and a decrease in work quality (Kara, 2020). In addition, digital pollution can prevent the organization from achieving its strategic goals by complicating decision-making processes (Acar, 2019).

Organizational efficiency refers to an organization's ability to achieve its goals by using its resources efficiently and effectively. Productivity is directly related to the performance of employees, the efficiency of business processes and the overall performance of the organization. Digital pollution can negatively affect this efficiency and reduce the competitiveness of the organization (Doğan, 2018).

Examining the impact of digital pollution on organizational productivity is important for organizations to combat this problem and increase their productivity. By adopting the aforementioned strategies to reduce digital pollution, organizations can improve information and data management and thus increase their productivity

While the rapid increase in digitalization provides great convenience in our daily lives, it also increases its impact on the environment. In this context, carbon footprint and digital pollution are of great importance for environmental sustainability. Carbon footprint refers to the total amount of greenhouse gases released into the atmosphere as a result of the activities of individuals or organizations. Digital waste, which emerges as a result of digitalization, is the most prominent face of digital pollution and these wastes have serious negative impacts on the environment (Gürbüz, 2021).

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Examining the impact of digital pollution on organizational productivity is important for organizations to combat this problem and increase their productivity. By adopting the aforementioned strategies to reduce digital pollution, organizations can improve information and data management and thus increase their productivity. The study tries to reveal the consequences of digital pollution. In order to find solutions to the consequences of this concept, which has just taken its place in the literature, it is important to know what to do both individually and in terms of organizational awareness. In this context, what needs to be known makes a significant contribution to organizational awareness.

2. CONCEPT AND DEFINITION OF DIGITAL POLLUTION

Digital pollution is a concept that reveals the opportunities offered by digitalization as well as the negative effects of this process. Basically, it includes problems such as information pollution, environmental impacts and mental burden caused by unnecessary and excessive production and consumption of digital content. With the rapid advancement of digital technologies, this concept has become a global issue rather than just an individual problem (Hilty & Aebischer, 2015).

The environmental dimensions of digital pollution can be analyzed in terms of carbon emissions and electronic waste, especially during the production, use and disposal of digital devices. According to the International Energy Agency (IEA), the carbon footprint of information and communication technologies accounts for 4% of total carbon emissions worldwide. This is equivalent to the carbon emissions of the global aviation industry and is increasing rapidly. In particular, the energy consumption of data centers and the increase in the use of cloud computing services are the main causes of environmental impacts (IEA, 2021).

In addition, information pollution represents the mental and social dimensions of digital pollution. The proliferation of unnecessary content on digital platforms makes it difficult for individuals to access information and causes loss of time and attention (Montag & Diefenbach, 2018). This situation brings psychological problems such as digital burnout syndrome. At the same time, for organizations, excessive accumulation of data and unnecessary digital processes can lead to inefficiencies in workflows.

Digital pollution should be addressed as a multidimensional problem that prevents individuals, businesses and societies from gaining maximum benefit from digitalization. Being more conscious in the production and consumption of digital content, adopting energy-efficient technologies and implementing sustainable digital policies will play a critical role in reducing the impacts of this problem (Boztepe, 2020; EEA, 2022).

2.1. Digital Pollution and Carbon Footprint

Digital pollution is a wide-ranging problem that occurs as a result of the excessive and unnecessary use of digital technologies and negatively affects both environmental and mental health. In this context, the concept of carbon footprint is an important indicator to measure the environmental impacts of digital pollution. Carbon footprint allows us to quantify the effects

of human production and consumption activities on nature and is one of the indicators of environmental sustainability.

The carbon footprint, which emerges as an output of digitalization, refers to the carbon emissions caused by the use of electronic devices. These emissions arise directly from the energy consumption of devices and indirectly from their production processes. Carbon footprint is a concept that measures the total amount of greenhouse gases released into the atmosphere as a result of the activities of individuals or organizations and is of great importance in terms of environmental sustainability (Öztürk, 2021).

Digital pollution is the uncontrolled accumulation of data and information in the digital world. This makes it difficult to access information, leading to loss of productivity. Digital pollution is not only a problem but also a specific concept that contains solutions. Therefore, it is necessary to investigate digital pollution, raise awareness and take serious measures (Yılmaz, 2018).

2.1.1. The Carbon Footprint of Digital Pollution

Digital pollution leaves a carbon footprint from the production of digital devices to their use and eventual disposal. Energy and resources consumed during the production and use of digital devices and waste management play an important role in this process. When tackling digital pollution, it is necessary to ask the question "How much damage are we causing to nature from the production of our digital devices to their use and waste management?". Carbon footprint analysis measures the impact of human activities on nature while seeking an answer to this question.

2.1.2. Digital Pollution and Resource Consumption

As we go about our lives, the use and consumption of digital devices also leads to resource consumption and waste generation. Every digital device consumed, and every digital waste produced requires a certain amount of fertile land, water and energy. With the carbon footprint of digital pollution, we can actually ask "How much natural resources are consumed to produce a smartphone? How much energy is used to cool data centers? How much space is required for the disposal of end-of-life digital devices?".

2.1.3. Carbon Footprinting and Digital Pollution

Digital pollution includes elements such as information pollution, energy consumption and the management of electronic waste. Each of these elements can be assessed through carbon footprint measurements. For example:

- **Information Pollution:** Unnecessary data storage and information pollution in the digital environment increases energy consumption, which leads to more carbon emissions (Bawden & Robinson, 2009).
- **Energy Consumption:** The energy consumption of digital devices and data centers accounts for a large part of the carbon footprint of digital pollution (Lepawsky, 2018).
- **Electronic Waste:** Waste management of end-of-life digital devices is critical for environmental sustainability (European Environment Agency, 2019).

To reduce digital pollution, it is important to raise awareness and take necessary measures at the individual and organizational level. These measures should include digital literacy trainings, digital hygiene practices, energy efficiency improvement strategies and e-waste management policies.

3. DIMENSIONS OF DIGITAL POLLUTION

Digital pollution is a type of pollution that shows that digitalization has both benefits and harms, and leads to an increase in carbon emissions. With the rapid advancement of digital technology, the concept of digital pollution has become an important issue. Digital pollution includes information pollution, environmental impacts and mental burden caused by unnecessary and excessive digital content. By focusing on the individual and organizational dimensions of digital pollution, ways to raise awareness and solutions are important.

Digital pollution is a set of negative effects caused by the excessive and unnecessary use of digital devices and content. Digital pollution is a multidimensional problem resulting from the excessive and unnecessary use of digital technologies and content. This paper addresses the different dimensions of digital pollution, focusing on the main categories of information pollution, environmental pollution and mental pollution.

- **Information Pollution:** The dissemination of false, misleading or unnecessary information on the internet.

- **Environmental Pollution:** Environmental damage related to the production and waste of digital devices.
- **Mental Pollution:** Mental fatigue and distraction caused by overuse of digital media and content.

The benefits of technologies that develop with digitalization cause a database and piles of information over time. Since the vast majority of this information is idle, it creates pollution. For this reason, digital cleaning is required with conscious use against digital pollution. After knowing how much energy consumption even an e-mail causes, conscious users are at the top of the list of things to do about digitalization.

3.1. Information Pollution

Information pollution occurs when false, misleading or unnecessary information is disseminated in the digital environment. Such pollution makes it difficult for individuals to access accurate information and negatively affects the level of social knowledge (Bawden & Robinson, 2009).

- **Misinformation:** The intentional or unintentional dissemination of false information (Hameleers, Van der Meer & Vliegenthart, 2020).
- **Disinformation:** The deliberate dissemination of false information, usually for political or commercial purposes.
- **Information Overload:** Information overload makes it difficult for individuals to distinguish important information and negatively affects decision-making processes (Bawden & Robinson, 2009).

3.2. Environmental Pollution

The production, use and waste management of digital devices cause environmental pollution. This is related to the consumption of natural resources and the release of harmful substances into the environment.

- **E-waste (Electronic Waste):** The disposal of digital devices that have reached the end of their useful life and the environmental damage caused by this waste (European Environment Agency, 2019).
- **Resource Consumption:** Intensive use of rare metals and other resources required for the production of digital devices.

- **Energy Consumption:** High energy consumption of digital devices and data centers (Lepawsky, 2018).

3.3. Mental Pollution

Excessive use of digital media can negatively affect individuals' mental health. This leads to problems such as distraction, mental fatigue and stress.

- **Attention Fragmentation:** Constant notifications and multitasking lead to reduced attention span.
- **Mental Fatigue:** Excessive information consumption and constant connectedness lead to mental fatigue (Carr, 2010).
- **Stress and Anxiety:** The constant consumption of social media and digital content can cause stress and anxiety in individuals (Lanier, 2018).

3.4. Economic Pollution

Digital pollution also has economic impacts. In particular, data management and maintenance costs of digital devices create an economic burden.

- **Data Storage Costs:** Storing and managing unnecessary data imposes a cost burden on businesses.
- **Digital Device Maintenance and Refurbishment:** Frequent replacement and maintenance of digital devices leads to inefficient use of economic resources (McAfee & Brynjolfsson, 2017).

4. AWARENESS DIMENSION IN DIGITAL POLLUTION

4.1. Individual Awareness

Digital pollution is a wide-ranging problem that occurs as a result of excessive and unnecessary use of digital technologies and negatively affects both environmental and mental health. Both individuals and organizations have important roles in preventing this pollution. Individuals and organizations can adopt specific strategies and practices to reduce digital pollution. It is important for individuals to be aware of digital pollution and take measures against it. The following steps can be suggested to increase individual awareness:

4.1.1. Digital Awareness and Education

- Digital Literacy: It is important to increase individuals' digital literacy levels to ensure that digital content is used correctly and efficiently (Bawden & Robinson, 2009).

- Combating Information Pollution: In order to prevent the spread of false and misleading information, conscious internet use and the habit of obtaining information from reliable sources should be developed (Hameleers, Van der Meer & Vliegenthart, 2020).

4.1.2. Digital Hygiene and Personal Management

In order to reduce digital pollution, there are some measures that can be achieved through personal management in the name of digital hygiene. One of these measures is the concept of digital detox. Cleaning and avoiding unnecessary content are also a solution.

- Digital Detox: It is recommended that individuals maintain mental health by staying away from digital devices for certain periods (Carr, 2010).
- Avoiding Unnecessary Content: It is possible to reduce information pollution by filtering unnecessary content on social media and other digital platforms (Lanier, 2018).

4.1.3. Environmental Sensitivity

Environmental sensitivity cannot be achieved only through physical sensitivity. While technology and digitalization are so close, it is only possible to take precautions by acting responsibly towards the digital environment as in environmental awareness.

- E-waste Management: It is important to properly recycle end-of-life digital devices and raise awareness on waste management (European Environment Agency, 2019).
- Energy Saving: Digital devices should be used in an energy-efficient way and unnecessary energy consumption should be avoided (Lepawsky, 2018).

4.2. Organizational Awareness

Organizations play an important role in combating digital pollution. Digital pollution is an environment of complexity and chaos caused by the unorganized and uncontrolled accumulation of digital information and data. This makes it difficult to access information and leads to loss of productivity. Organizational efficiency refers to an organization's ability to achieve its goals by using its resources effectively and efficiently. Digital pollution can negatively affect this efficiency. Addressing the relationship between digital pollution and organizational productivity is an important issue as it will contribute to organizational awareness. Organizations should adopt various strategies to combat this problem and increase their productivity. Here are some of these strategies:

4.2.1. Organizational Strategies to Combat Digital Pollution

Digital Sustainability Policies

Digital sustainability policies include organizations' preference for environmentally friendly digital devices and attention to digital waste management. These policies aim to increase the energy efficiency of digital devices and ensure proper disposal of electronic waste. For example, the use of environmentally friendly devices can help reduce carbon footprint (Hilty & Aebischer, 2015). Furthermore, by encouraging the recycling and reuse of digital devices, e-waste can be prevented from harming the environment (Pérez-Belis et al., 2017).

Training and Awareness Programs

Training employees about the effects of digital pollution can increase the awareness of organizations on this issue. Training programs provide information about what digital pollution is, how it occurs, and its negative effects on the organization. These programs can help employees adopt digital hygiene practices and reduce unnecessary data generation (Bhagat et al., 2016). For example, training can be provided on email management, file retention policies, and regular review of data.

Data Management and Security

Minimizing unnecessary data storage and processing contributes to reducing digital pollution. Data management and security strategies ensure that data is managed effectively and securely. These strategies include data classification, deleting unnecessary data, and backing up data regularly (Loshin, 2013). In addition, data security policies can protect data against unauthorized access and protect data integrity and confidentiality.

5. THE RELATIONSHIP BETWEEN DIGITAL POLLUTION AND ORGANIZATIONAL PRODUCTIVITY

Digital pollution can negatively affect the productivity of organizations. Digital pollution causes loss of time and productivity by making it difficult to access information. For example, employees' inability to access the information they need quickly and easily leads to slower work processes and lower work quality (Hallowell & Gambatese, 2010). Furthermore, digital pollution can prevent the organization from achieving its strategic goals by complicating decision-making processes (Davenport & Prusak, 1998).

Organizational efficiency refers to an organization's ability to achieve its goals by using its resources effectively and efficiently. Productivity is directly related to the performance of

employees, the efficiency of business processes and the overall performance of the organization. Digital pollution can negatively affect this efficiency and reduce the competitiveness of the organization (Hammer & Champy, 1993).

Examining the impact of digital pollution on organizational productivity is important for organizations to combat this problem and increase their productivity. By adopting the above-mentioned strategies to reduce digital pollution, organizations can improve information and data management and thus increase their productivity.

5.1. The Effects of Digital Pollution on Organizational Productivity

- Information Access Challenges: Digital pollution makes it difficult for employees to access necessary information in a timely and accurate manner. Difficulty in accessing information slows down business processes and can lead to errors in decision-making (Özgen, 2019).
- Disruptions in Decision Making: Piles of unnecessary data prevent decision makers from accessing the right information. This can lead to uncertainty and erroneous decisions in decision-making processes (Çakmak & Tok, 2020).
- Increased Workload: Digital pollution causes employees to spend extra time on information management and data cleaning. This additional workload makes it difficult for employees to focus on their main tasks and reduces productivity (Kılıç, 2021).
- Technological Costs: Storing and managing unnecessary data increases the technological infrastructure costs of organizations. These costs can cause both waste of financial resources and a decrease in operational efficiency (Ergün, 2018).

5.2. Strategies for Mitigating Digital Pollution

5.2.1. Effective Information Management Systems

Organizations should develop effective information management systems to reduce digital pollution. These systems provide an organized classification and storage of data and ease of access to data (Yıldırım & Demir, 2019).

5.2.2. Digital Cleaning Policies

By implementing regular digital cleaning policies, unnecessary data should be periodically purged from systems. This is an important step in preventing digital pollution (Koç, 2020).

5.2.3. Employee Training and Awareness

Raising awareness of employees about digital pollution and providing training contribute to the improvement of information management processes. These trainings should emphasize the importance of digital hygiene (Aktaş, 2021). Digital pollution is a serious problem that negatively affects organizational efficiency. Factors such as difficulties in accessing information, disruptions in decision-making processes, increased workload and technological costs show the negative effects of digital pollution on organizations. Therefore, it is of great importance for organizations to develop effective information management systems, implement digital cleanliness policies and train their employees on this issue. Effective combating digital pollution increases the efficiency of organizations and enables them to achieve their goals faster and more effectively.

6. DISCUSSION

In the literature, the effects of digital pollution at individual and organizational levels have been discussed and the subject has been enriched with different research examples. While digital pollution has mental and physical effects on individuals, it negatively affects business processes and productivity in organizations. The findings are evaluated through both research in literature and case studies.

Montag and Diefenbach (2018) found that unnecessary content and information overload that individuals are exposed to on digital platforms lead to psychological problems such as distraction and digital burnout syndrome. The study shows that individuals can reduce these effects through strategies such as turning off unnecessary notifications and digital detox practices.

Another study focused on how young individuals perceive digital pollution in their daily lives. In particular, excessive use of social media increases information pollution and makes it difficult for individuals to access accurate information (Boztepe, 2020). The study emphasizes the importance of digital literacy trainings in reducing information pollution.

A study by Hilty and Aebischer (2015) reveals that organizations are lacking in data management and digital content cleaning in the digitalization process. The research states that storing unnecessary data increases energy consumption and increases the carbon footprint, which is contrary to sustainability goals.

As a case study, an analysis of an e-commerce company showed that regular cleaning of outdated and useless customer data reduced the company's data management costs by 25% and made business processes more efficient (EEA, 2022).

Reports published by the International Energy Agency (IEA) highlight the importance of training and technological solutions in reducing digital pollution. For example, it was reported that a company that provided digital hygiene training to its employees reduced unnecessary processes in e-mail and file management by 40% (IEA, 2021). In addition, the use of energy-efficient data centers and cloud technologies enable organizations to create a more sustainable ecosystem by reducing carbon emissions.

The findings emphasize the importance of raising awareness of individuals and organizations, taking strategic measures and making use of technological solutions to combat digital pollution. In this process, the dissemination of educational programs and the adoption of sustainable policies will play a key role in creating a cleaner digital ecosystem.

In a study by Chen et al. (2021), it was stated that increased interaction of individuals with digital devices increases mental fatigue and information overload. The study found that individuals can reduce these effects by limiting their digital consumption and improving their digital literacy skills.

Gonçalves and Kappler (2020), in their research examining the impact of social media platforms on individuals, stated that unnecessary content causes information pollution and negatively affects decision-making processes in individuals. The study points out that social media algorithms tend to direct users to unnecessary content.

Davenport and Prusak (2022), in their research on big data management processes in organizations, concluded that storing unnecessary data increases both financial costs and energy consumption. The study emphasizes that "data cleansing" processes are an important tool for businesses to combat digital pollution.

In a case study conducted by Jones et al. (2020) on applications in a logistics company, it was reported that business processes accelerated by 35% and operational costs decreased as a result of organizing old and unnecessary digital processes.

(2019) examined the effects of a training program for university students to build digital hygiene awareness. The study showed that students became more aware of their use of digital devices and reduced unnecessary digital activities by 50%.

The International Data Corporation (IDC, 2022) report states that energy efficient data centers and artificial intelligence-based file management systems play an important role in reducing digital pollution. In particular, cloud-based technologies offer great advantages in terms of organizing digital content and automatic cleaning of unnecessary data.

The findings reveal that digital pollution is a growing problem due to lack of individual awareness, social media use, data management challenges and lack of corporate responsibility. Adopting policies to expand education programs, use energy-efficient technologies and regulate social media platforms are effective approaches to address this problem.

7. CONCLUSION AND RECOMMENDATIONS

Digital pollution is an inevitable by-product of the modern digital world. Both individuals and organizations should be aware of this problem and take active steps to reduce digital pollution. Education and awareness, digital housekeeping, energy efficiency, digital stewardship policies and cybersecurity measures are effective ways to manage and reduce digital pollution. These approaches are necessary to protect both environmental and mental health and to make the most of the benefits of digital technology.

Digital pollution is a serious problem that needs to be addressed at both individual and organizational levels. With individual awareness and organizational strategies, the effects of digital pollution can be reduced and a more sustainable digital ecosystem can be created. Education, technological solutions and sustainability policies are of great importance in this process.

Digital pollution is an environment of complexity and chaos created by the uncontrolled accumulation of information and data in the digital world. This makes it difficult to access information and leads to a loss of productivity. However, digital pollution is not only a problem, but also a specific concept with solutions. Therefore, it is necessary to investigate digital pollution, raise awareness and take serious measures (Erdoğan, 2018).

Digital waste is the trace left by rapidly aging and renewed digital devices on the environment. These wastes often contain toxic substances and, if not managed properly, damage soil, water and air (Özdemir, 2020). Heavy metals and chemicals used in the production of electronic devices can cause serious health problems when released into the environment. In addition, the energy consumption of digital devices increases the carbon footprint by increasing the use of fossil fuels (Kılıç, 2019).

Digital sustainability policies include choosing environmentally friendly digital devices and emphasizing digital waste management. These policies aim to increase the energy efficiency of digital devices and ensure proper disposal of electronic waste. For example, the use of environmentally friendly devices can help reduce carbon footprint (Çelik, 2022).

Furthermore, by encouraging the recycling and reuse of digital devices, e-waste can be prevented from harming the environment (Yılmaz, 2020).

Educating employees and society about the effects of digital pollution can increase awareness. Training programs provide information about what digital pollution is, how it occurs, and its negative effects on the environment. These programs can help them adopt digital hygiene practices and reduce unnecessary data generation (Kaya, 2021). For example, training can be provided on email management, file retention policies and regular review of data.

Technological Solutions to Combat Digital Pollution

Technology can be both a cause and a solution to reducing digital pollution. Technological solutions that can be used to combat digital pollution include:

- Artificial Intelligence and Machine Learning: Filtering unnecessary information and more efficient information management.
- Cloud Computing: Minimizing environmental impact by reducing the need for physical devices.
- Green Technology: Environmentally friendly hardware and energy efficient software.

Global Measures in Social and Political Context

Combating digital pollution requires global measures at the social and political level. These measures help both individuals and organizations to minimize the effects of digital pollution.

International Regulations and Policies

- Electronic Waste Management: International regulations and policies should be developed for the proper management and recycling of e-waste (Lepawsky, 2018).
- Regulation of Digital Service Providers: Social media platforms and other digital service providers should be regulated to prevent disinformation and reduce information pollution (Hameleers, Van der Meer & Vliegenthart, 2020).

Global Cooperation and Alliances

- Information Sharing and Cooperation: Information sharing and cooperation between countries plays an important role in mitigating the effects of digital pollution.
- Joint Education Programs: Common digital literacy and awareness programs should be developed and implemented internationally (Lanier, 2018).

Sustainable Technology Development

- Green Technology: The development and use of environmentally sound technologies should be encouraged (European Environment Agency, 2019).
- Energy Efficiency: The energy efficiency of digital devices and data centers should be improved (Lepawsky, 2018).

As a suggestion, the following can be done briefly:

- The energy efficiency of digital devices can be increased (Hilty & Aebischer, 2015; Gürbüz, 2021).
- Recycling of electronic waste is important (Pérez-Belis et al., 2017; Özdemir, 2020).
- Training programs can increase digital hygiene practices (Bhagat et al., 2016; Kaya, 2021).
- Data management and security strategies ensure effective data management (Loshin, 2013; Demir, 2021).
- Digital pollution causes loss of productivity by making it difficult to access information (Hallowell & Gambatese, 2010; Kara, 2020).
- Digital pollution can complicate decision-making processes (Davenport & Prusak, 1998; Acar, 2019).
- Productivity is associated with the performance of employees and the efficiency of business processes (Hammer & Champy, 1993; Doğan, 2018).

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