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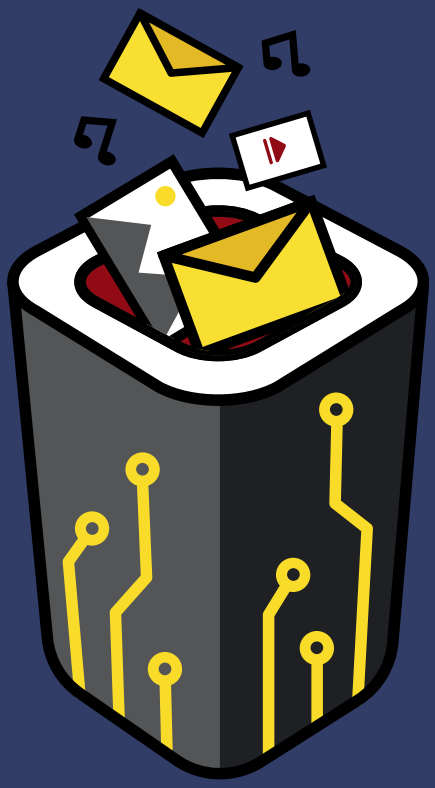

DIGITAL WASTE PROJECT

Project Guidebook

Eco-Digital Literacy and Citizenship for Our Planet and Future

2021-1-TR01-KA220-YOU-000028571

Co-funded by the European Union

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Eco-Digital Literacy and Citizenship for Our Planet and Future

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Introduction

Introduction

The KA220 project named “Eco-Digital Literacy and Citizenship for Our Planet and Future” is a project including France, Lebanon, Romania and Portugal under the coordination of Ankara Siyasal ve Ekonomik Araştırmalar Merkezi Derneği (ASEM).

Within the scope of the project, you can benefit from the short descriptions of the trainings, the things that can be applied digitally, and a guide (Digital Waste mobile application) and the work done with a guide.

Project work will continue until February, 2023. The team consists of project managers, technical education managers, software developers and visual education, educators and trainers.

DIGITAL WASTE mobile application and guidebooks will be accessed from the project website, Salto, E+ link and project social media pages.

DIGITAL WASTE PROJECT TEAM
2022

Table of Contents

Table of Contents

About the Project

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The project is applied to tackle the challenge of digital waste and take urgent action to combat digital waste with transnational and international cooperation. The project will contribute to the development of youth in skills of digital literacy and ecology, which is vital for humanity and our planet. The project aims to address digital waste and develop strategies to prevent non-amendable results thereof by fostering youth workers' skills in digital literacy and ecology to make them as digital natives to be more responsive and engaged in the issue of digital waste and how to prevent it. The project plans to raise awareness and build attitudes of youth workers to prevent non-amendable consequences of digital transformation.

And foster youth workers to be more responsive and engaged citizens by developing their skills in digital literacy and digital waste to combat climate change in the wake of the climate neuter planet. As final, the project will strengthen the active citizenship of youth to combat digital waste in terms of digital waste through transnational and international cooperation. It will engage young people and partner organizations to take urgent action to raise consciousness on digital waste and its non-amendable effects on our planet on the path to digital transformation.

To achieve the objectives of the project, Project Management Meetings, Learning Teaching and Training and cooperation activities will be implemented to produce project results including a Need Analysis Report, Mobile Application, and Short Documentary on the issue of digital waste and climate change to raise public awareness and take urgent actions on the digital waste and its non-amendable effects on the planet. If we do not cooperate against climate change with synergy, it can become a common tragedy.

For successful dissemination and impact of the project, it is necessary to communicate and cooperate with governmental and non-governmental organizations and institutions especially authoritative, policy-maker organizations and non governmental associated partners during the course and beyond the duration of the project.

The project will raise awareness of digital waste and climate change among youth workers and make the issue mainstream in terms of climate change. Young workers will be trained on the issue to have knowledge of digital waste and develop green and gender neuter skills and competencies. Need Analysis Report, Mobile Application and Short Documentary will be produced as the project result. Project results will be disseminated and shared through both traditional and new media channels to raise public awareness and take urgent actions to foster eco-digital literacy in terms of digital waste.

Partner organisations will cooperate with formal and non-formal organisations, associated partners, environmental institutions for this purpose. Project results and outcomes will be shared jointly with local, national, international policy maker formal organisations and non-governmental organisations such as municipalities, Ministry of National Educational, Ministry of Environment and Urbanization, universities, educational institutions to name a few so as to widen the visibility and impact of the results and outcomes of the project in both European and national level.

Literature

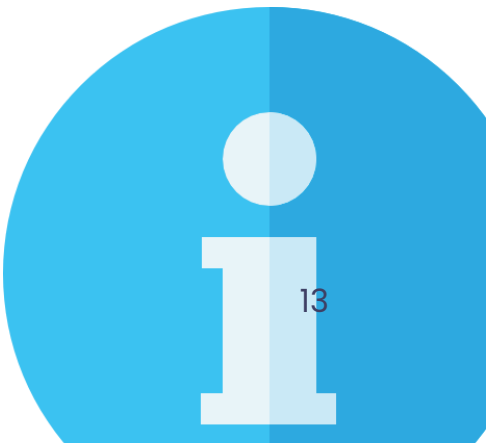
What is Digital Waste?

We produce 2.5 quintillion bytes of data per day, which is more than ever before (Forbes, 2018). As data becomes more valuable and as technology that can analyze massive databases, like AI, grows more advanced, this amount is expected to increase over the coming years. While this data can have significant business advantages, there is a negative aspect to our increased data generation as well: digital waste (Revolutionez, 2021).

Large-scale data storage is now more accessible, affordable, and efficient than ever before, especially for big enterprises with the financial means to purchase a lot of storage at once.

Even though it may not seem energy-intensive to store data, doing so has a carbon cost.

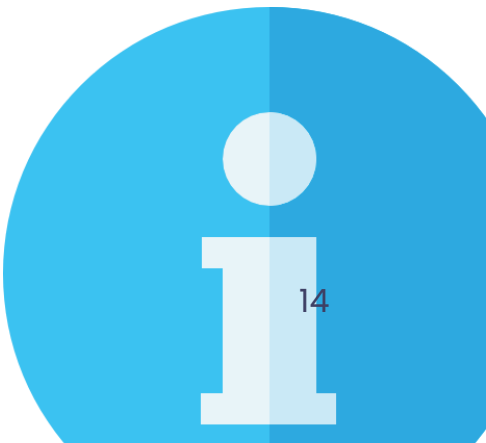
Although estimates of the energy consumption of data storage differ, experts concur that it is unquestionably a sizable quantity of energy. According to a response from Justin Adamson, a Stanford engineering student at the time, you produce about 0.2 tons of carbon dioxide annually for every 100 gigabytes of data you save and store on the cloud (Stanford Magazine 2017).



Compared to other carbon-producing activities like driving a car or using gas to heat a home, this amount of CO2 is negligible.

However, the cost of carbon can quickly mount, particularly for huge companies that depend on collecting and processing enormous "big data" collections.

According to HubSpot study, the average firm saved and stored 347.56 terabytes of data in 2016. The quantity of carbon dioxide produced each year by keeping that data preserved would be close to 700 tons.

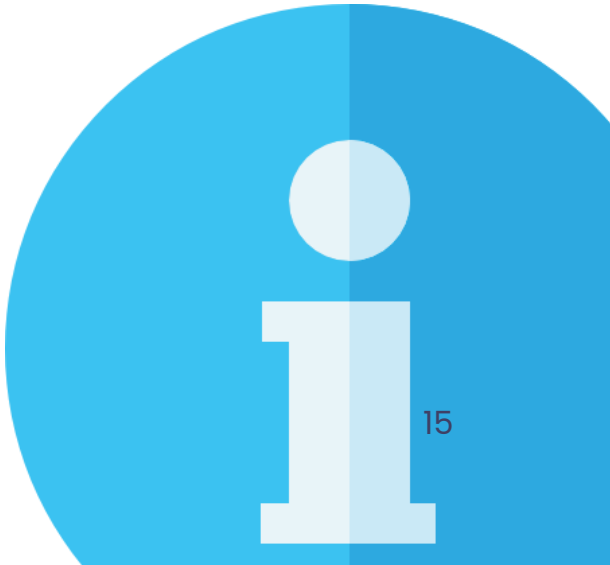


When Do Digital Records Become Waste?

The effects of bad data stewardship on the ecosystem are now referred to as "digital waste." The long-term repercussions of holding enormous amounts of information in a digital format, whether that information is raw data, processed data, idle data, or data in use, are known as digital waste or data waste.

The energy and carbon emissions created by data-driven infrastructures, such as the enormous database complexes that power cloud services provided by Microsoft, Google, and Amazon, are frequently referred to as "digital waste" by experts (Elettra Bietti and Roxana Vatanparast).

Digital technologies are estimated to be responsible for 4% of all carbon emissions. By 2025, this number is anticipated to double.



How Does Data Use So Much Energy?

Information can be used in ways that require more energy than others.

As much carbon dioxide as five cars will emit throughout their lifetimes may be needed to train one AI algorithm. Bitcoin mining already consumes almost the same amount of energy as some nations, and as the market expands, so will this energy use.

By 2025, the number of zettabytes of information that will be produced daily by IoT devices, a popular tool for gathering data on everything from HVAC performance to machine maintenance, is expected to reach 79.

Businesses are utilizing these devices more and more to collect data that can be used to simplify operations and forecast future occurrences, but the sheer volume of data they produce could pose a challenge.

Similar to this, the rise of commercial data-collection systems may be fueled by the availability and value of data from sources like automobile telematics systems, internet advertising services, and e-commerce platforms. Businesses can gain insights on the operation of their equipment or the habits and interests of their customers using the information from various sources.

Some experts are also concerned about the opportunity cost associated with data storage. Massive volumes of physical storage hardware are needed to store large amounts of data. This gear requires a lot of energy and room to operate, as well as power for supporting hardware like fans and fire suppression systems.

Businesses acquire an increasing amount of data, which need increasing amounts of storage space and devices that can store that data. These procedures all result in carbon emissions.

Why Businesses and Individuals Create More Data Than Ever?

Both private and commercial sources of data contribute to this wastage of data.

Businesses are producing more data as a result of its rising value. Consumer data, data from IoT devices, and even data from a company's internal systems can all result in valuable insights or other kinds of value.

Consumer data, for instance, is frequently a crucial component of contemporary advertising and sales forecasting algorithms. A company can predict consumer behavior, target content, and demand more precisely the more customer data it has.

What Organizations and Individuals Can Do to Reduce Digital Waste?

The majority of firms are currently having discussions regarding data usage and governance.
Businesses have been forced to review how they collect, store, and manage data due to the growing importance of data privacy and new laws like the California Consumer Privacy Act (CCPA) and the General Data Protection Regulation (EU GDPR) of the European Union.

Business executives might reduce digital waste while they talk about how new regulations might protect customer data privacy.

A data audit is both a crucial first step in strengthening data governance and probably a sensible place to start for any company that has a lot of data stored.

Businesses can learn where their data comes from and how much data they are holding onto by reviewing both their current data repositories and their data sources. They can identify stored data that may no longer be required by classifying datasets based on prospective value and use-cases throughout this assessment.

These data sets can be removed or reduced in size, allowing a company to cut data storage requirements and associated carbon expenses. Repeating these audits several times can assist a company in managing expanding storage requirements and assessing enterprise data usage.

The same principles apply to how individuals control their own data waste. Anyone can find material they no longer need and remove it from files on hard devices or cloud storage, freeing up space and lowering storage costs.

Ending Digital Waste Through New Laws and Tech-Related Attitudes

Politics or even a change in public attitudes may be required to bring about additional improvements.

Bietti and Vatanparast make suggestions in their paper on digital waste for how social and legal changes may assist to redesign the cyber culture that has resulted in such high rates of digital waste.

The two academics advise against using technology solutions to the issue of digital waste. They contend that the initial quick development in digital waste was probably caused by the notion that "technology can solve social and political problems without the requirement for social and political engagement."

Therefore, merely putting money into environmentally friendly or sustainable technology won't address the underlying social and legal issues that have made producing digital garbage so simple and lucrative.

Rather, to change the tech industry in a way that prevents future digital waste, measures such as laws governing data collection by tech companies, increased political engagement that encourages public investment in how data-collection structures are operated, or even antitrust action, may be required.

New Data Storage Methods May Contribute to Environmental Protection

Over the coming years, digital waste is going to become a much bigger issue. Businesses will continue to gather and keep increasing volumes of data, according to experts, especially as better technologies for evaluating vast amounts of data continue to be developed.

With businesses storing more data, the energy cost of this storage is currently high and will continue to rise. A shift in tech culture or the current legal system, along with new data storage procedures, could lessen the environmental impact of data storage. Businesses can short-term reduce their own data-based environmental effect by using techniques like data audits and new data governance procedures.

As Stephan Schmidt from United Nations University stated in 2010, in his article named "A Growing Digital Waste Cloud", digital waste has increased dramatically during the past ten years as data storage has moved online, including emails, images, audio and video files, etc.

Tapes and discs can now be abandoned (and are likely to end up in landfills) thanks to the development of web services that enable users to upload files. Instead, we can now store all of our recorded data in a single massive digital computer network.

The term "cloud computing" refers to the infrastructure and business model that is most common today, where users can access information, software, and other resources online as needed. To provide these services, a continually expanding network of power-guzzling data centers and server farms is needed.

Direct sales to customers and centralized digital inventories of goods could result in significant savings in energy use and greenhouse gas emissions by 2010 according to Joseph Romm's groundbreaking 1999 book The Internet Economy and Global Warming.

But things went in a different direction. We produce more data every day, so leaving a digital trace demands a lot of computer space and power. Think about all the data you have created online but are no longer using to understand a portion of that digital footprint that could be referred to as digital waste.

Our carbon footprint is increased by almost everything we do online.

An absurd example is provided by the Antivirus Company MacAffee, which claims that the electricity required to transmit the trillions of spam emails sent each year is equivalent to that required to power two million homes in the United States and produces the same amount of greenhouse gas emissions as three million cars.

The electricity used by cloud computing would rise from 632 billion kilowatt hours in 2007 to 1,963 billion kWh by 2020, according to a recent Greenpeace research, Make IT Green: Cloud Computing and its Contribution to Climate Change.

It is evident that we cannot continue along this route, but happily there are ways for big IT firms to expand sustainably without contributing to global warming.

One of the first Internet corporations to take efforts to lower energy use at its data centers was Google. In addition to promoting efficient computing, it aims to use more renewable energy. Google is a part of the Climate Savers Computing Initiative, along with many other top IT companies.

European server operators have done their math and realized that they could reduce energy use by implementing high performance, energy-efficient hardware and software, as well as precise cooling systems that use sensors and unique "cool corridors" to regulate temperature. One of Europe's largest server operators is the German web space provider Strato.

By using renewable energy to run its servers starting in 2008, Strato started to cut down on their CO2 emissions. They have joined the Green Grid, a group of IT businesses and experts working to increase energy efficiency in data centers and commercial computing globally. By bringing together "global industry initiatives to standardize on a common set of indicators, processes, methodologies, and new technologies to achieve its common aims," the association hopes to make the IT industry more environmentally friendly.

When if cutting CO2 emissions and conserving energy weren't enough of a reason for more businesses to join the project, the Green Grid will undoubtedly expand as oil supplies peak and oil prices rise. (Schmidft, 2010).

The Digital Carbon Footprint

The 4% of greenhouse gas emissions attributable to digital technology is projected to double by 2025, and the energy needed for this industry is rising by 8% annually. Online television viewing generates 1.6 kg of carbon dioxide every hour.

The Internet represents a threat to climate change, but because so many people use it for so many varied purposes, it is very challenging to govern. Video on the Internet is among the energy-hungry. More information is contained in ten hours of high-quality video than is present in all of the text-based English entries on Wikipedia.

In 2018, online movies made up 80% of all data flows worldwide, with the remaining 20% being made up of data from websites, video games, and other sources. These internet videos can be divided into several categories, including social networks, streaming services like Netflix and Amazon Prime, and "Tubes" like Youtube.

Many aspects need to be taken into account for each category, as seen by the variety of categories, which highlights how challenging it is to restrict video usage. Massive volumes of data are stored as a result of rising video consumption, further harming the environment and undermining the goals of the Paris Agreement (Ledger, 2020).

The carbon footprint of streaming video

An exponential rise in the use of streaming video has already occurred before a global pandemic forced millions of people into their homes due to advancements in internet connections and service options. Streaming services are flourishing since there aren't many other options for entertainment. Streaming services are linked to carbon emissions and energy use from hardware, network infrastructure, and data centers. However, contrary to a deluge of recent inaccurate media coverage, the climatic effects of streaming video continue to be quite minor, especially when compared to other endeavors and industries.

A claim that "the emissions caused by viewing 30 minutes of Netflix [1.6 kg of CO2] is the same as driving almost 4 miles" has been repeated in a number of recent media publications, including those in the New York Post, CBC, Yahoo, DW, Gizmodo, Phys.org, and BigThink.

The data comes from a July 2019 analysis on the "unsustainable and rising impact" of online video by the French think tank Shift Project. According to the data, streaming produced more than 300 million tonnes of CO2 (MtCO2) in 2018, which is equal to France's emissions.

When compared against a peer-reviewed study from 2014 on the energy and emissions effects of streaming video, The Shift Project's original estimate of "3.2 kg CO2 per hour" is about eight times higher, while its "adjusted" estimate of 0.4 kilogram CO2 per hour is comparable.

According to that 2014 study, lifecycle emissions from infrastructure and devices, including "embodied" emissions from manufacturing and disposal, were 0.42 kg CO2e per hour in the US in 2011. Only 0.36 kg CO2e per hour of emissions were attributable to operations, which were equivalent in scope to the Shift Project analysis.

The initial Shift Project data suggest that one hour viewing Netflix uses 6.1 kilowatt hours (kWh) of electricity when looking at electricity consumption alone. This is enough to run an LED lightbulb continuously for a month, a Tesla Model S for more than 30 kilometers, or to boil a kettle once every day for almost three months. According to the updated data, watching Netflix for an hour uses 0.8 kWh (IEA, 2020).

According to the updated Shift Project data, Netflix streaming consumes over 94 terawatt hours (TWh) annually, which is 200 times more than Netflix previously claimed, with 167 million customers watching an average of two hours every day (0.45TWh in 2019).

Data Equivalents of Digital Waste Measurements

There would be a monthly reduction of 3.5 million tons of CO2 if 70 million streaming customers switched from HD to Standard video quality. This would be the equivalent of cutting off 6% of the US's entire monthly coal consumption.

9.4 kg of CO2 are produced each month by an employee who attends 15 hours of online meetings with their camera on. He would conserve the same amount of emissions by turning off the video as would be produced by charging a smartphone every night for more than three years.

Bitcoin mining uses more energy than the entire country of New Zealand does in a year. Remember that all that comes from mining Bitcoin is a few bytes of encrypted data. Without producing a useful good or service, computers uses a huge quantity of energy.

You could commute up to 3000km or 2000 miles per year on an electric scooter with the energy you use for video streaming (on average 2 hours each day). That translates to an 8 km or 5 mile daily transportation budget.

You could commute up to 3000km or 2000 miles per year on an electric scooter with the energy you use for video streaming (on average 2 hours each day). That translates to an 8 km or 5 mile daily transportation budget.

Google consumes 15,616 MWh of energy daily, which is more than Hoover Dam generates and is enough to power an entire nation of 1 million people for a day.

Today, we consume three times as much energy as all the solar panels in the world combined due to our unrestricted internet usage. The majority of the energy used by our internet habit comes from fossil fuels, thus clicking, scrolling, and streaming account for more than 870 million tonnes of CO2, accelerating the catastrophic trend of global warming.

281 billion emils zip around the globe every day. More than three hours a day are spent refreshing, reading, and responding to business emails; five hours, if personal email accounts are included. More than two thirds of our working hours, or more than 20 weeks a year, may be required. You may free up that time by planning your emails, sending fewer of them, and communicating with others through alternative channels like co-working places. This would also stop the inefficient behavior of organizing work through emails (Digital Cleanup Day, 2022).

Results of the Needs Analysis

Co-funded by the European Union

Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste)

2021-1-TR01-KA220-YOU-000028571

Results of the Needs Analysis

TURKEY

I. Research methodology

The present report delineates the outcomes of a research endeavor executed by a consortium of Turkish partners, comprising Ankara Siyasal ve Ekonomik Araştırmalar Merkezi (ASEM), Mardin Artuklu University, İdareci ve Bürokratlar Birliği Derneği, and Bilgi Paylaşım Topluluğu. This research initiative was undertaken in collaboration with all the partners of the KA220 project Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste), having the code 2021-1-TR01-KA220-YOU000028571, and was supported by the Erasmus Plus Programme.

The study sample comprised 53 Turkish citizens, who were surveyed utilizing a web-based questionnaire, distributed across social media platforms like Instagram, employing Google Forms. The data collection period spanned from October 6, 2022, to October 15, 2022.

II. Sample Structure

Sample structure **Table .1**

Gender	**Female (62%)**		**Male (38%)**		
Age	**17-22 (11.3%)**	**23-28 (45.3%)**	**29-34 (17%)**	**35-39 (1.9%)**	**40+ (24.5%)**
Education Level	**High School (1.9%)**	**Undergraduate (34%)**	**Master's Degree (47.2%)**	**PhD Degree (17%)**	

Source: own processing

Table 1 shows that 62% of the participants in the study are females. The majority of the respondents (45.3%) are between 23-28 years of age, while only 11.3% are aged between 17-22 years. The educational background of the respondents shows that 47.2% hold a Master's degree, 34% hold a Bachelor's degree, while 17% have a PhD degree. Only 1.9% of the participants have a high school diploma.

III. Data Analysis

In the subsequent sections, we will present the results pertaining to the primary objectives of our study. In terms of cloud-based applications used by respondents for storing different files, Google Drive emerged as the most popular option, with a percentage of 58%. Other applications that followed a similar model included Apple iCloud (14.8%), Microsoft OneDrive (13.6%), and Dropbox (10.2%). On the other hand, Mega was the least utilized option, with a representation of only 3.4% (Figure 1).

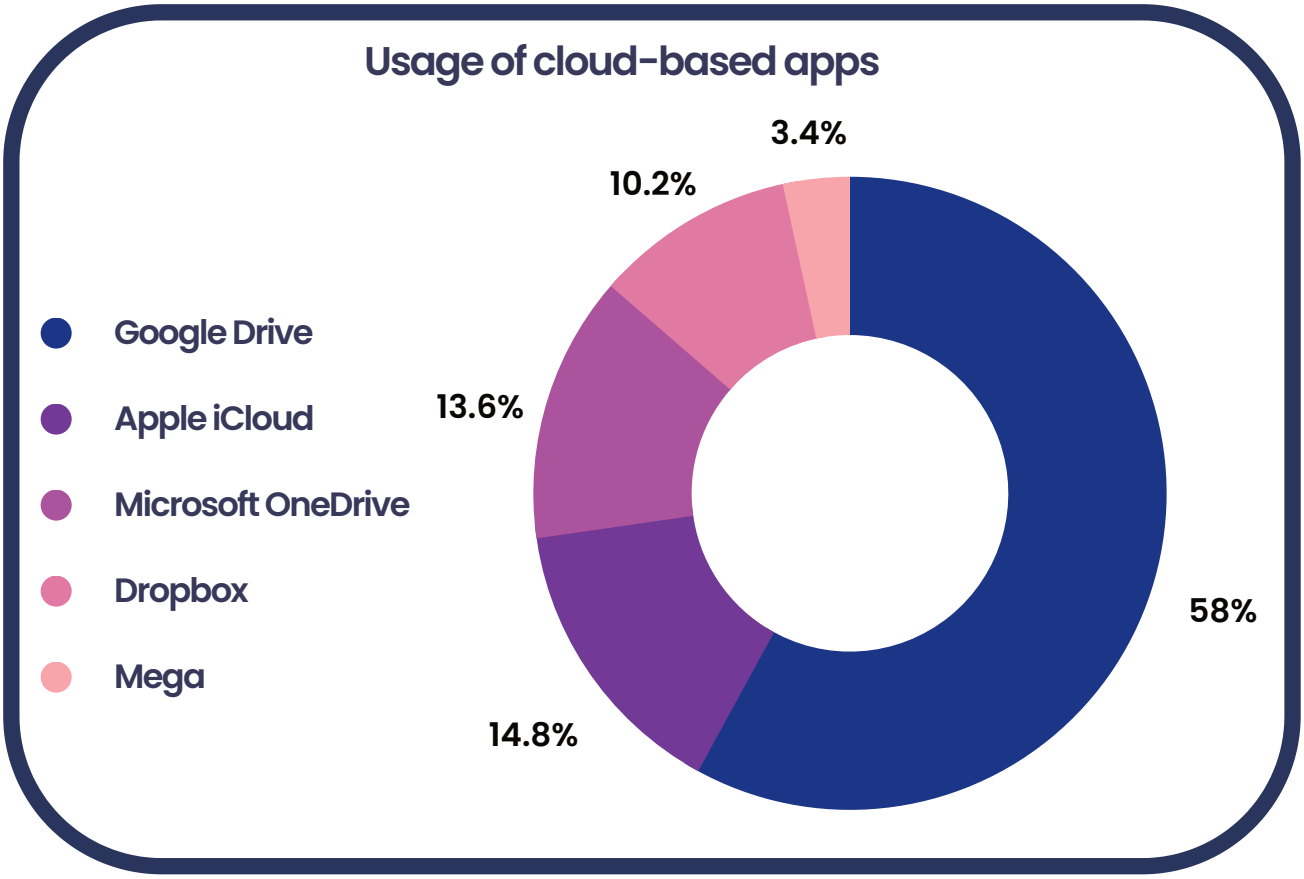


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Figure 1. Usage of cloud-based apps

Figure 2 displays the frequency of usage for the aforementioned applications. The majority of respondents, accounting for 58.8%, reported using these applications on a daily basis. Those who use the applications a few times a week or once a month make up 13.7% of the respondents. 9.8% of the respondents reported using the applications once a week, while 3.9% reported using them a few times a month.

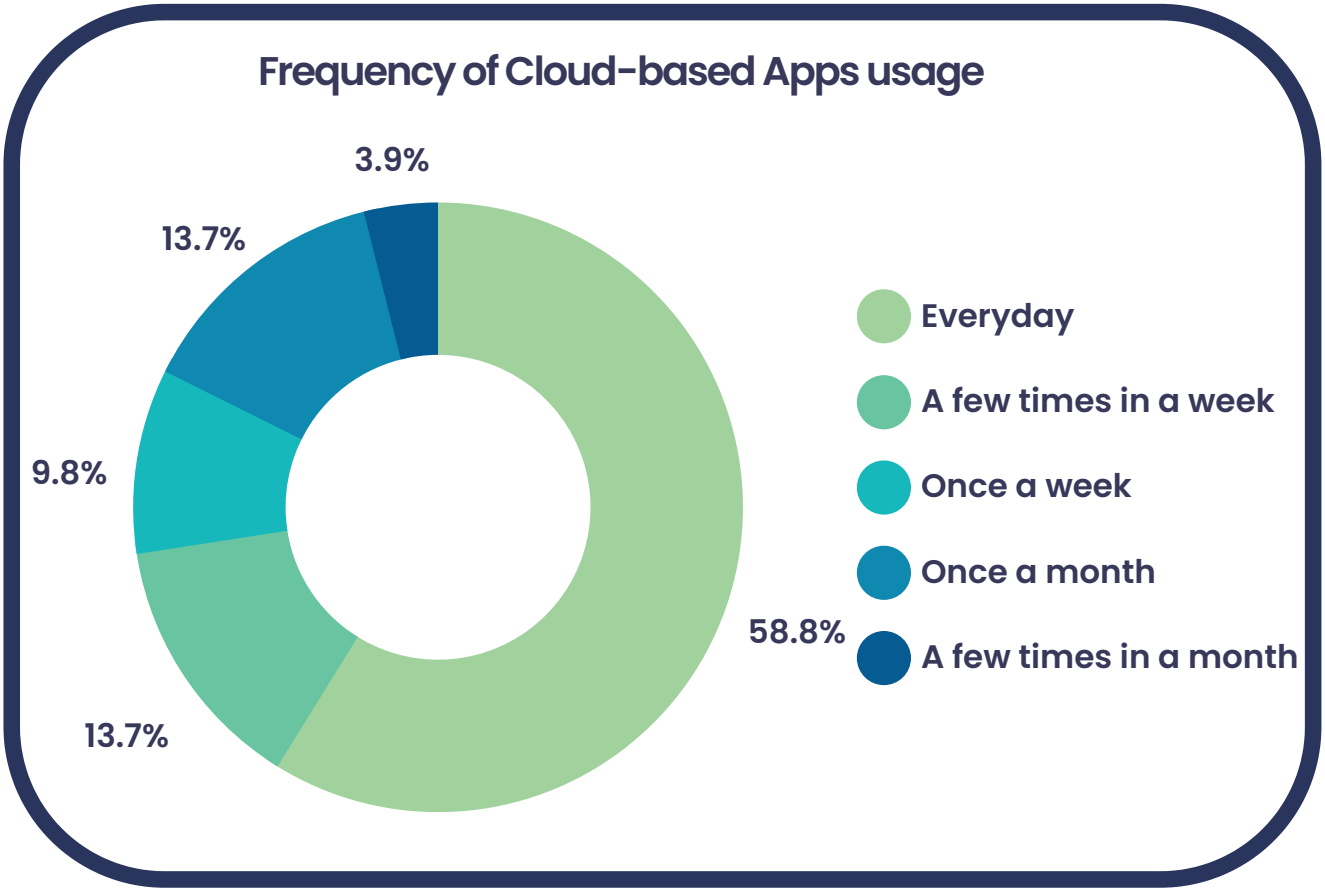

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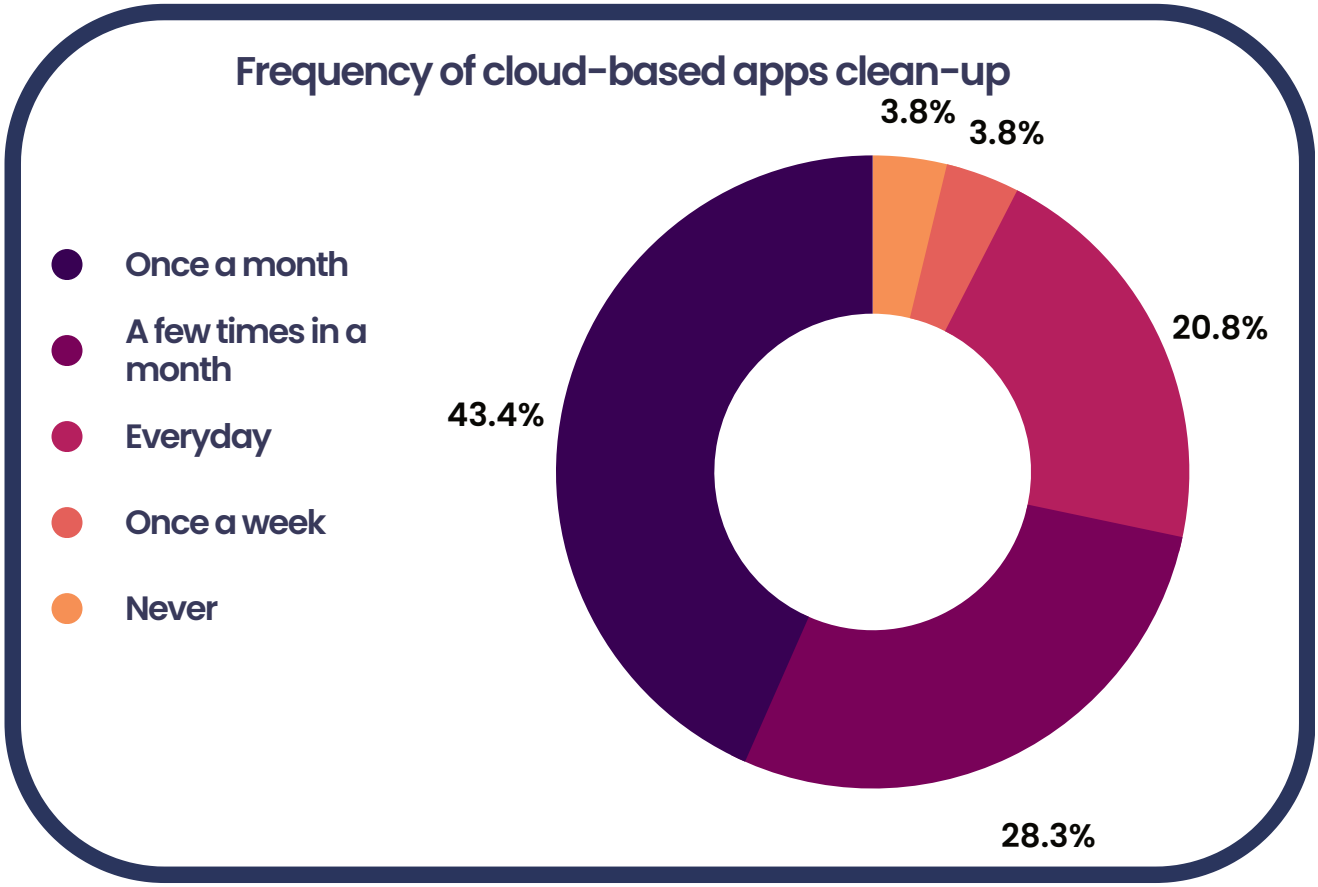
Figure 2. Frequency of Cloud-based Apps usage

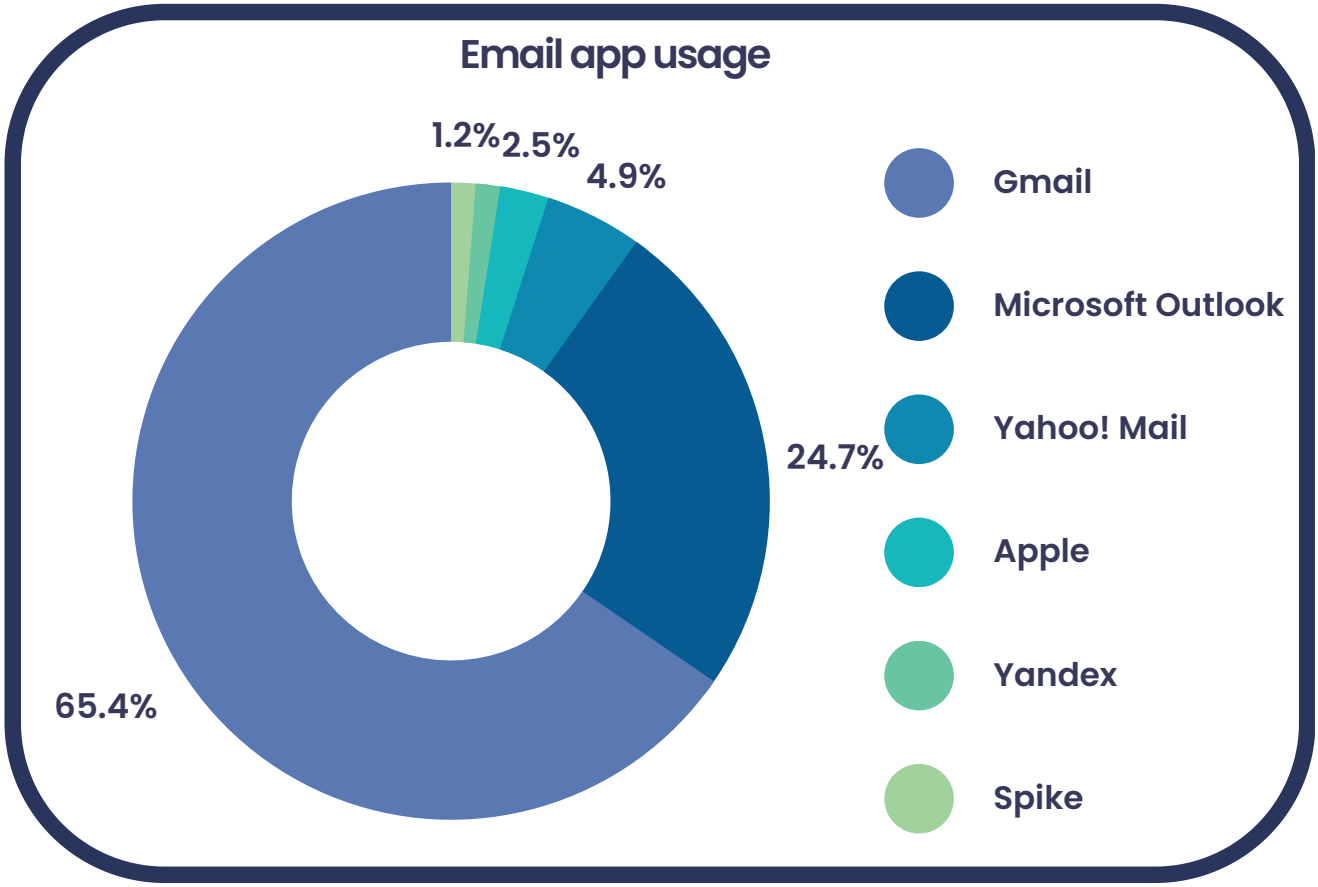
Based on the data presented in Figure 3, the majority of respondents (43.4%) clean their cloud-based application storage spaces once a month, while 28.3% do so a few times in a month. A smaller percentage, 20.8%, prefer to clean their storage of cloud-based apps every day. Only 3.8% of respondents reported cleaning their storage once a week or never.



Source: own processing

Figure 3. Frequency of cloud-based apps clean-up

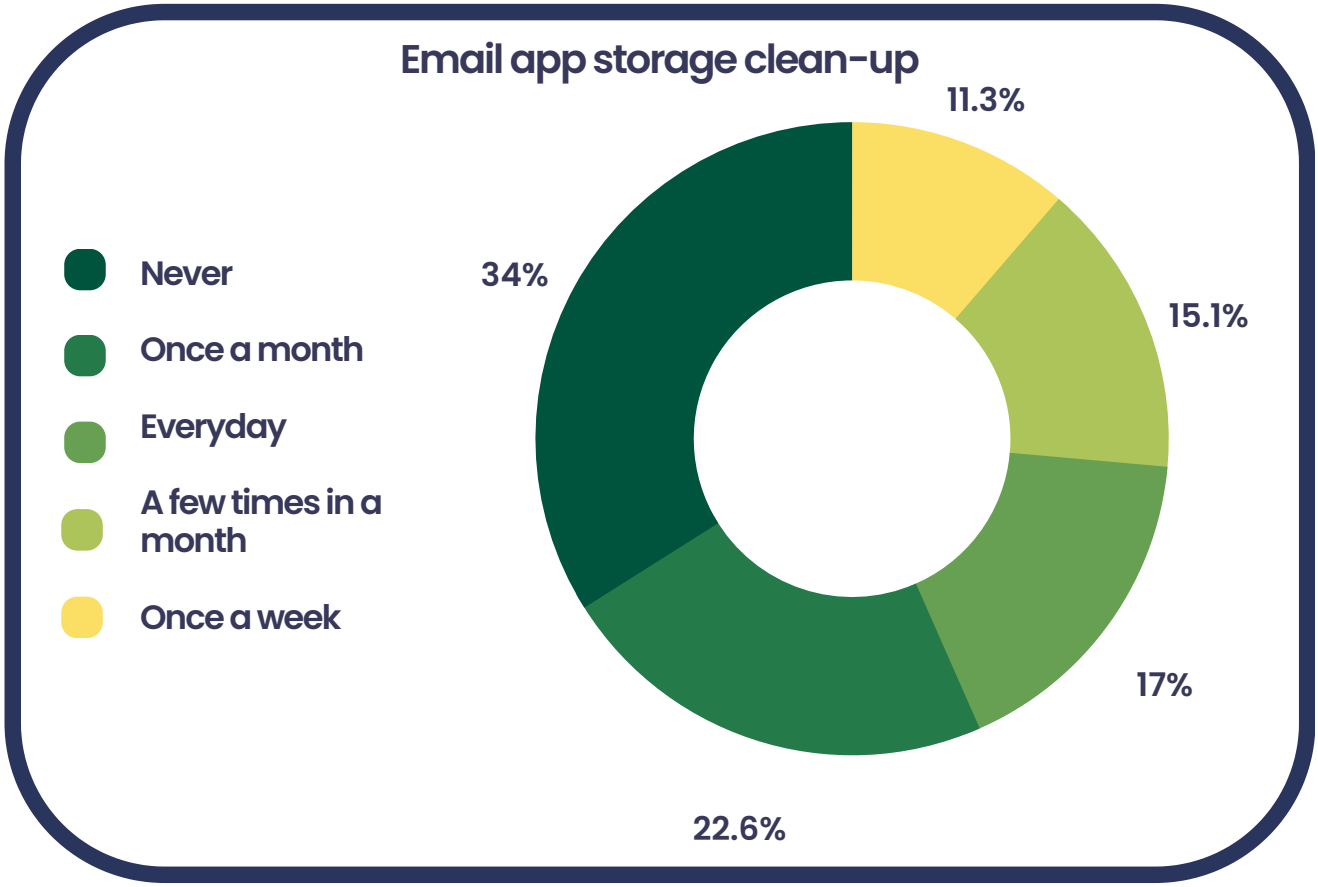
The majority of participants in the study (65.4%) prefer using the Gmail application among all available email applications. Microsoft Outlook is the second most preferred option, with 24.7% of respondents favoring it. Only 4.9% of participants use Yahoo! Mail and Apple respectively, while Yandex and Spike are used by 1.2% of participants (Figure 4).



Source: own processing

Figure 4. Email app usage

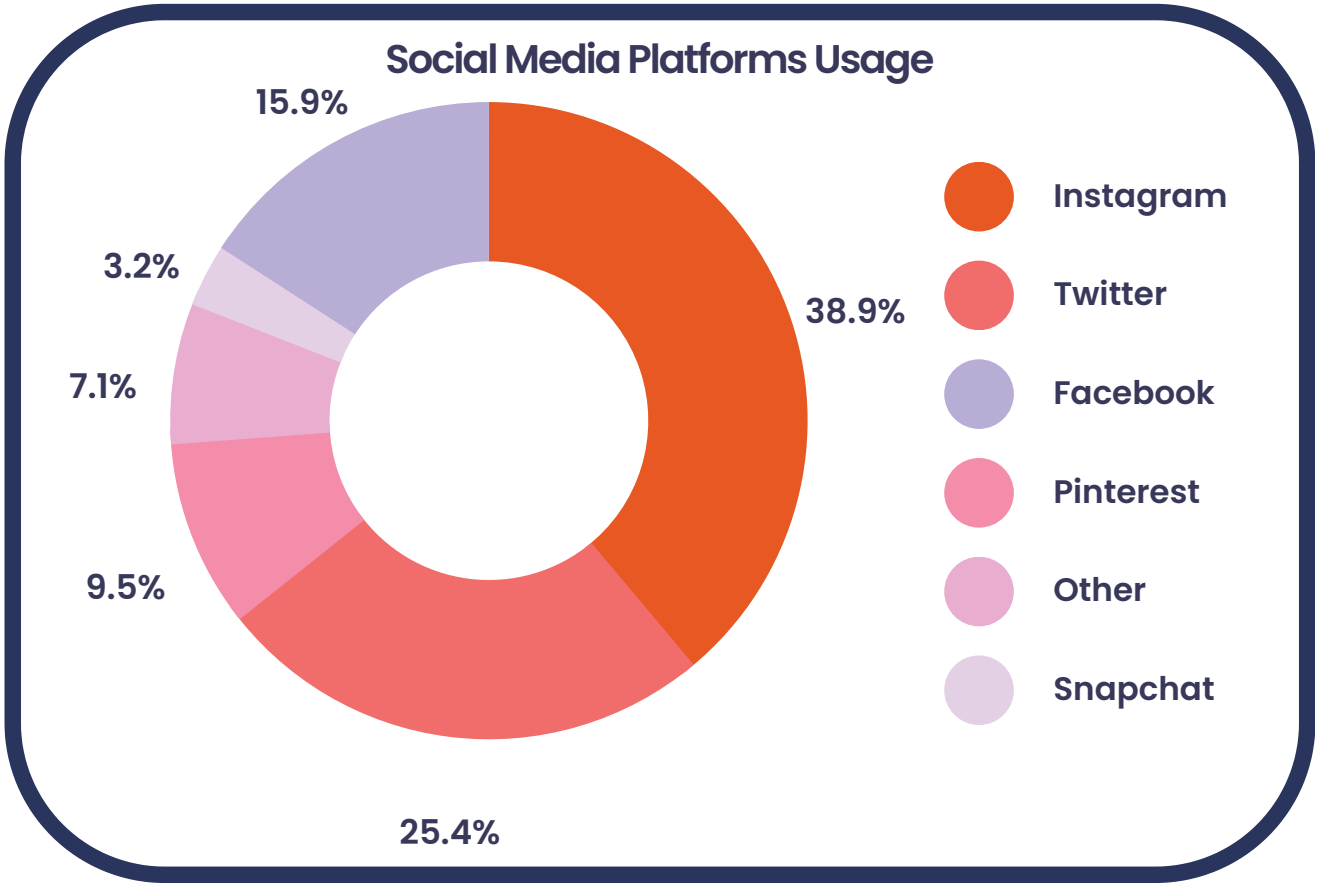
Most respondents (34%) have never cleaned their email app storage, while 22.6% clean it once a month. A significant proportion of participants (17%) clean their email app storage every day. Additionally, 15.1% of respondents clean their email app storage a few times a month, while 11.3% do it once a week (Figure 5).



Source: own processing

Figure 5. Email app storage clean-up

The majority of Turkish respondents prefer Instagram (38.9%) as their preferred social media platform, with Twitter coming in second at 25.4%. Pinterest has a user base of 9.5%, while 7.1% of respondents mentioned other platforms. Snapchat is the least preferred platform with only 3.2% of respondents using it (Figure 6).



Source: own processing

Figure 6. Social Media Platforms Usage

The data shows that the largest proportion of respondents (43.4%) spend 3-5 hours per day on these social media platforms, followed by 35.8% who spend 0-2 hours per day, and 13.2% who spend 6-8 hours per day (Figure 7).

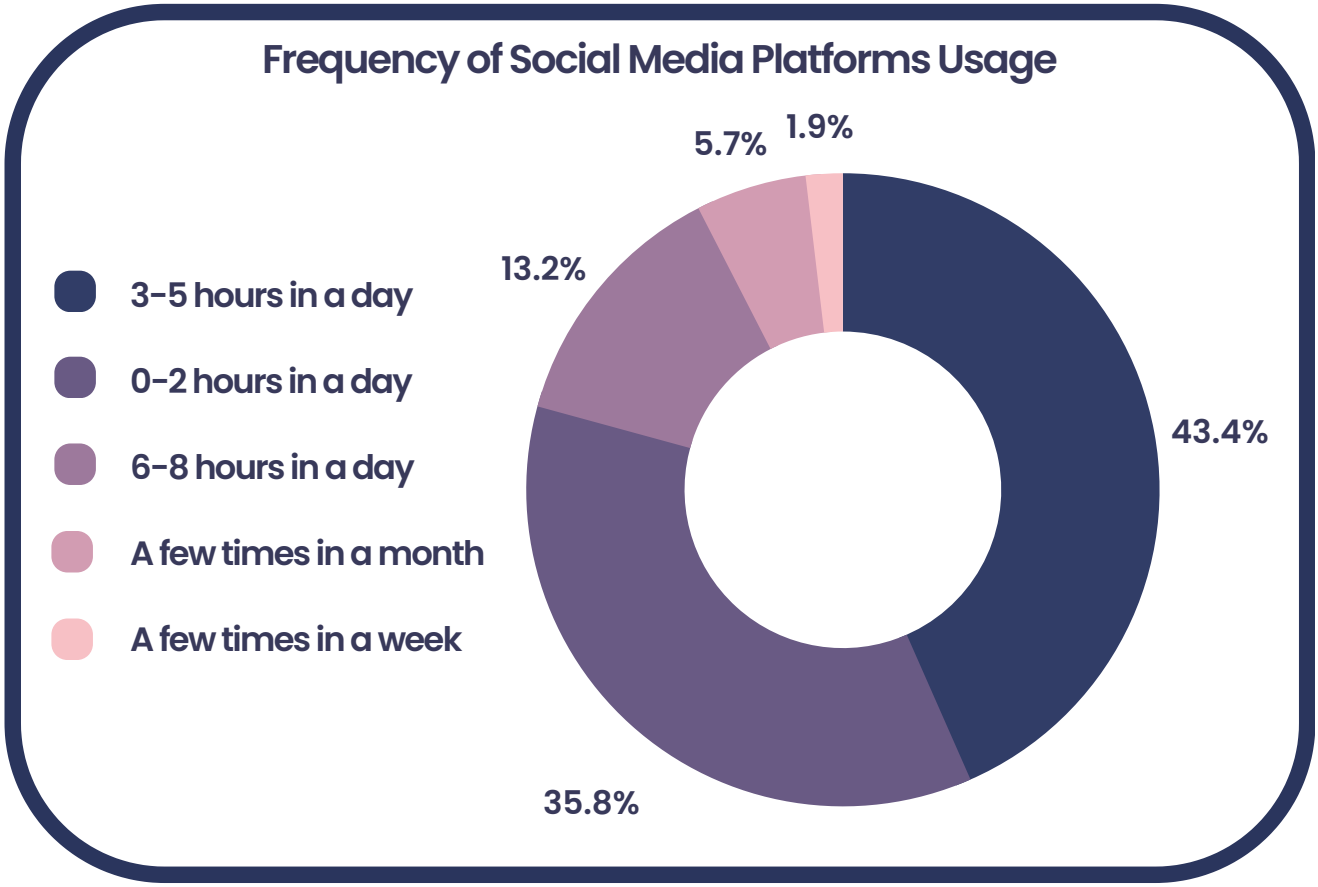


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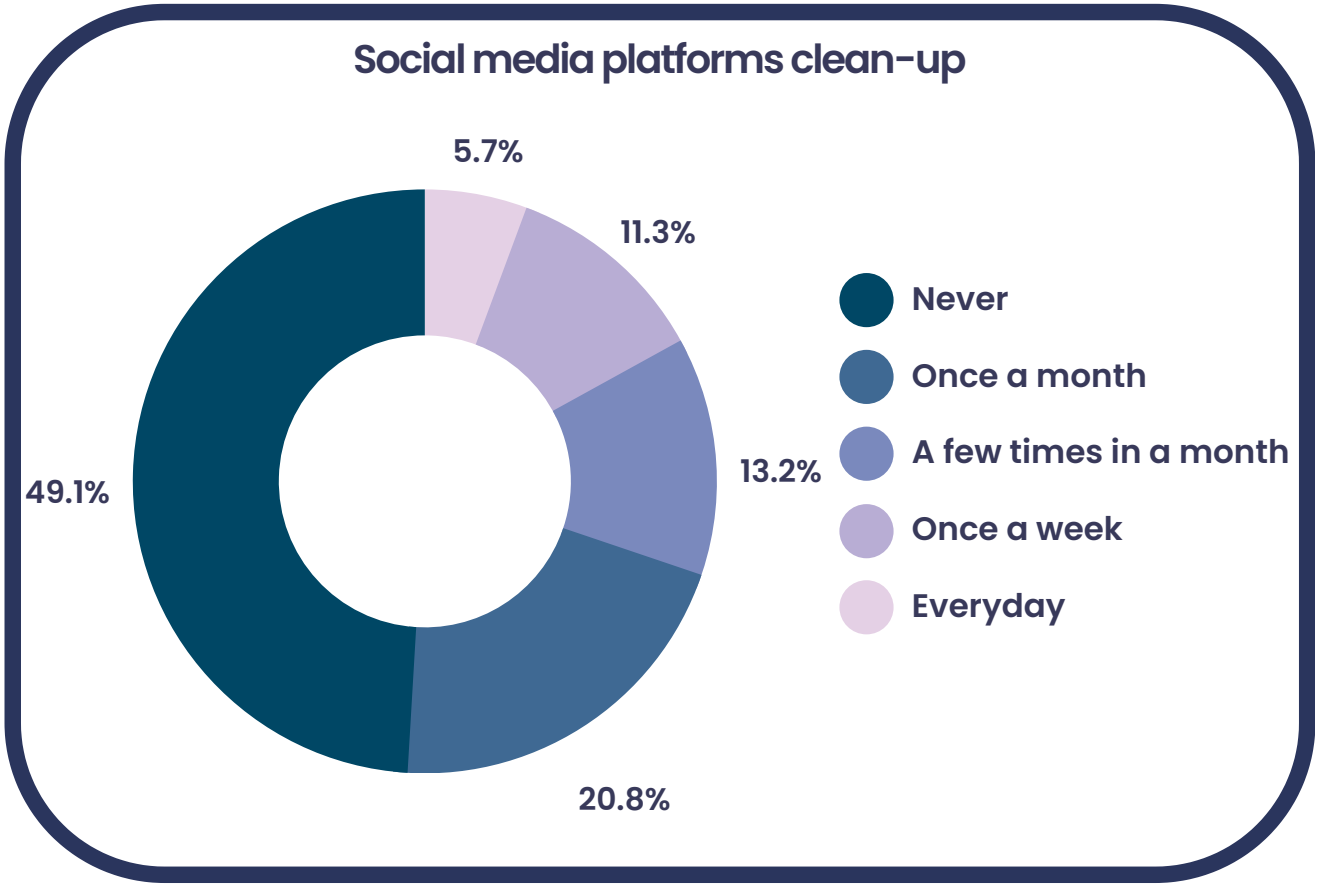
Figure 7. Frequency of Social Media Platforms Usage

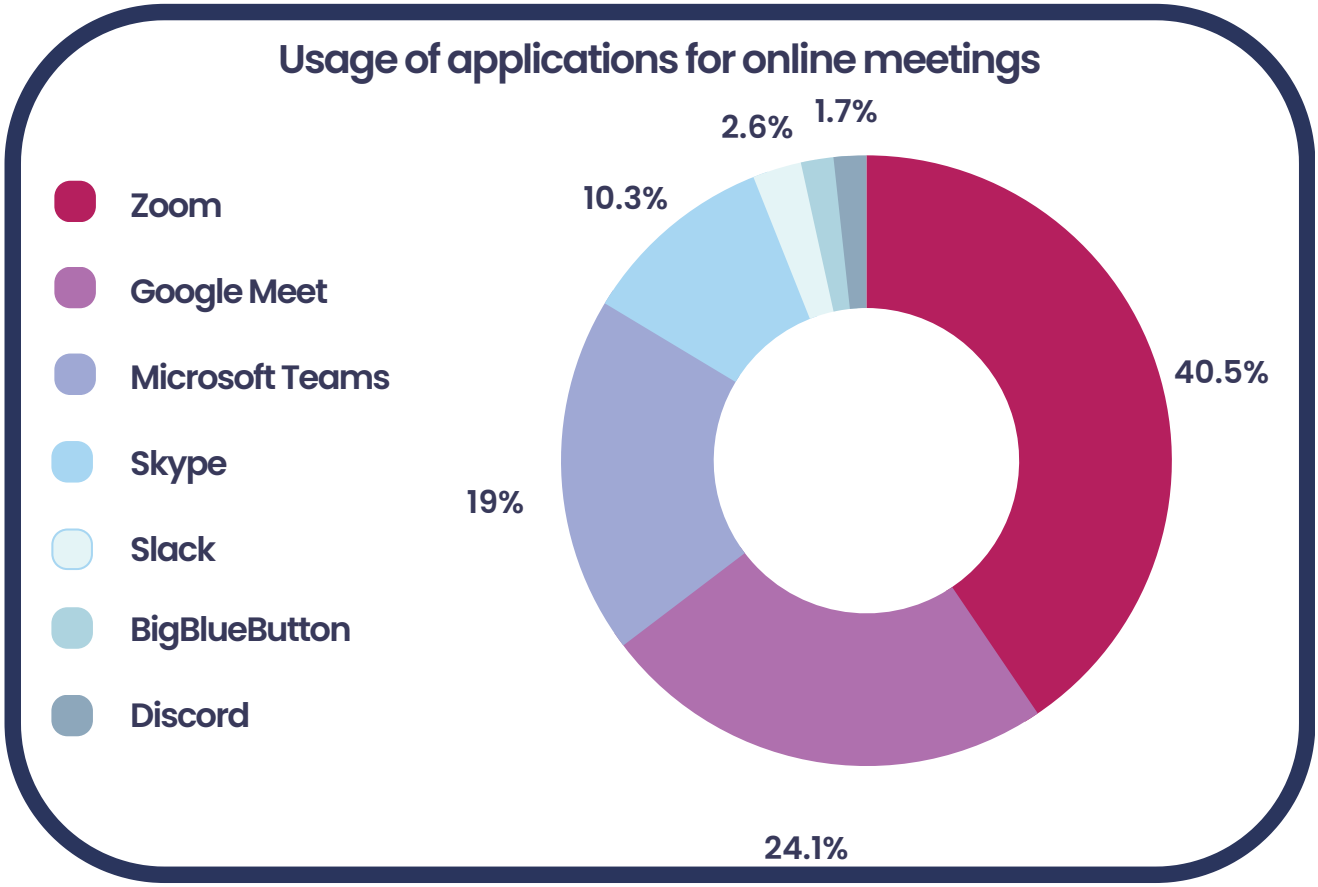
The majority of respondents (49.1%) in the survey reported that they had never deleted their data and cache from social media platforms. 20.8% of the respondents clean their data once a month, while 13.2% clean it a few times a month. 11.3% clean their social media storage once a week, and 5.7% clean it daily, as shown in Figure 8.



Source: own processing

Figure 8. Social media platforms clean-up

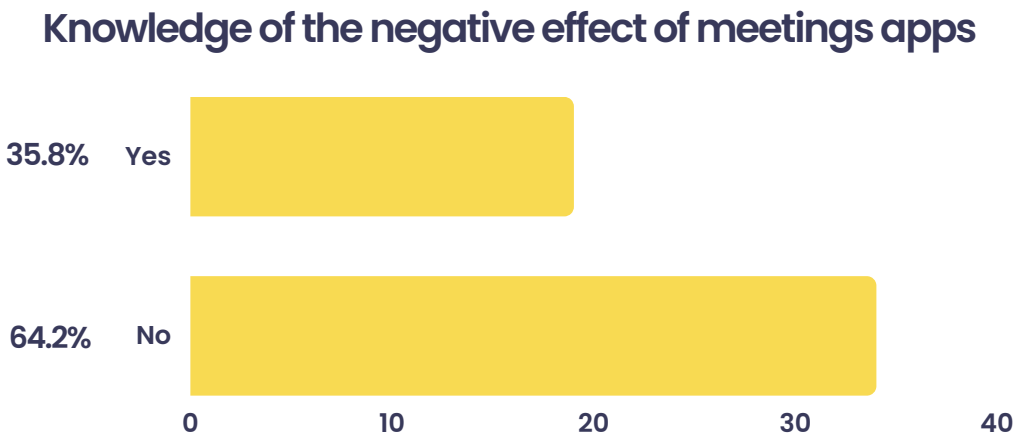
While the majority of the respondents prefer ZOOM application for online meetings (40.5%) and Google Meet (24.1%), other apps used are Microsoft Teams (19%), Skype (10.3%), Slack (2.6%), BigBlueButton (1.7%) and Discord (1.7%) (Figure 9).



Source: own processing

Figure 9. Usage of applications for online meetings

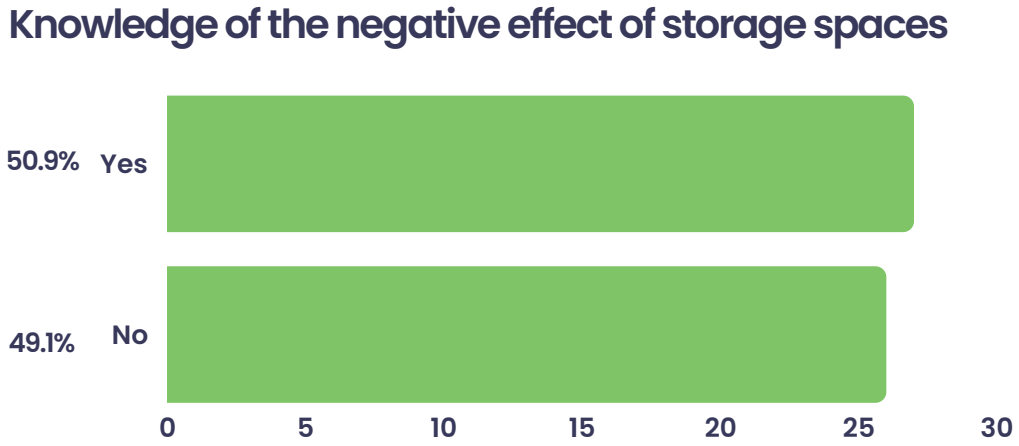
Only 35.8% of respondents in the study showed awareness about the potential carbon footprint created by meeting applications when video cameras are turned on and meetings are recorded (Figure 10).



Source: own processing

Figure 10. Knowledge of the negative effect of meetings apps

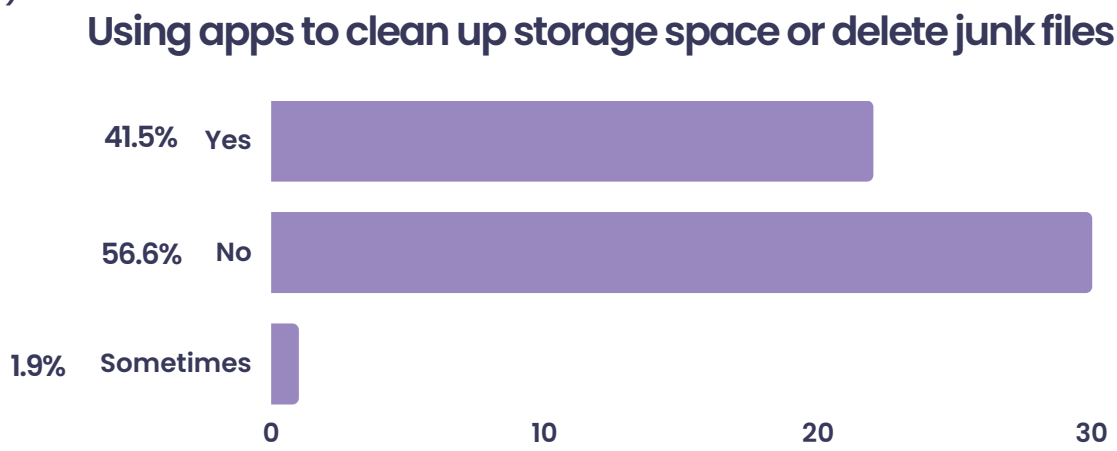
The results show that almost half of the respondents (49.1%) are not aware that using digital tools for storage increases energy consumption and carbon emissions, while the other half (50.9%) are aware of it (Figure 11).



Source: own processing

Figure 11. Knowledge of the negative effect of storage spaces

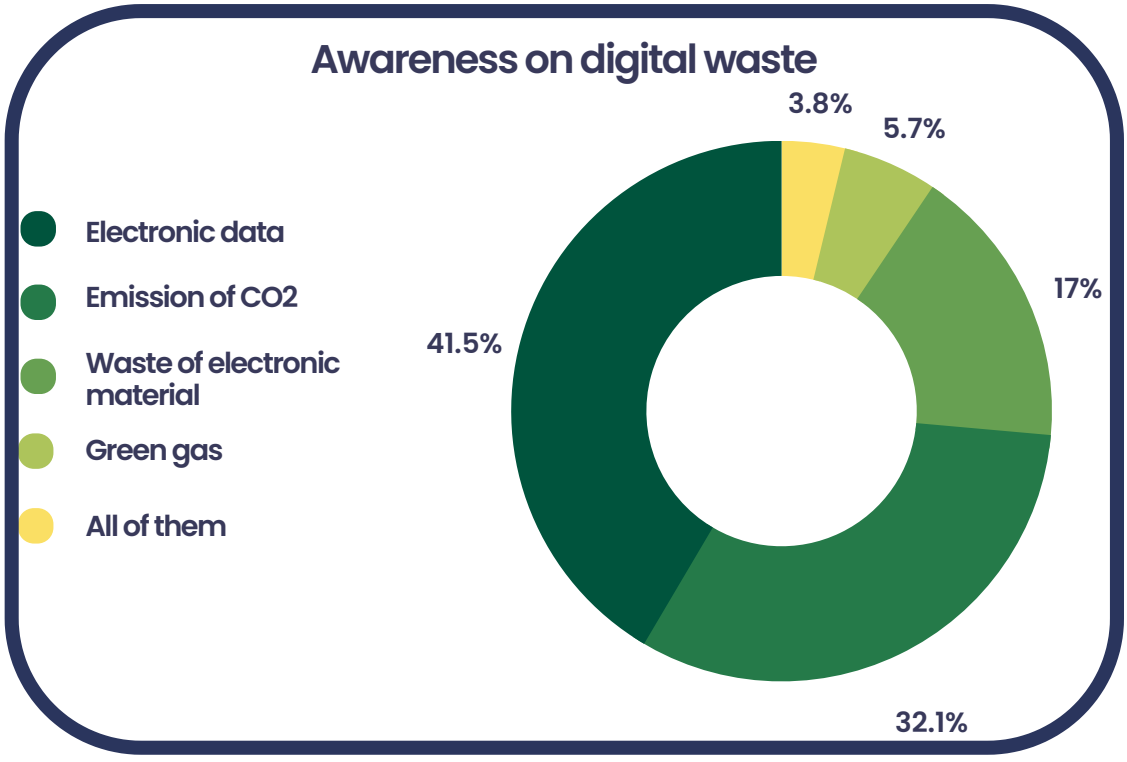
Around 41.5% of the participants utilize a storage cleaning app or delete unnecessary files. Meanwhile, most respondents have never used such apps for storage or junk file cleaning (Figure 12).



Source: own processing

Figure 12. Using apps to clean up storage space or delete junk files

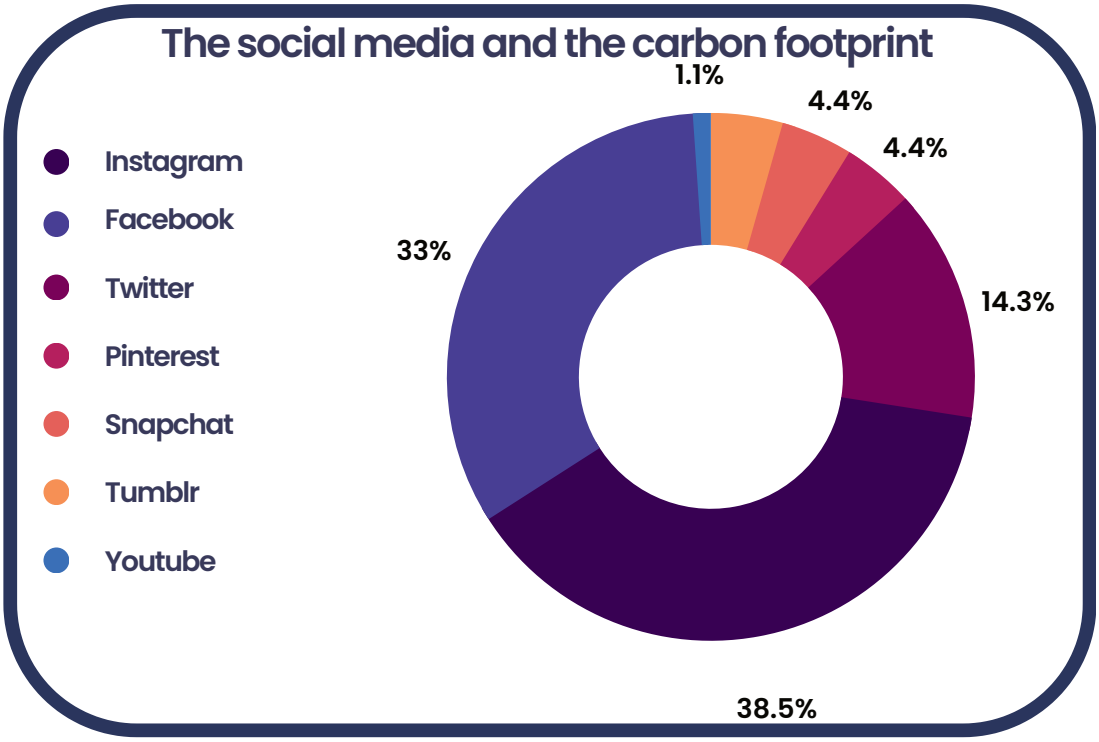
41.5% of the respondents defined "Digital Waste" as electronic data. 32.1% of the participants referred to CO2 emission as digital waste, while 17% stated that waste of electronic materials is digital waste (Figure 13).



Source: own processing

Figure 13. Frequency of Cloud-based Apps usage

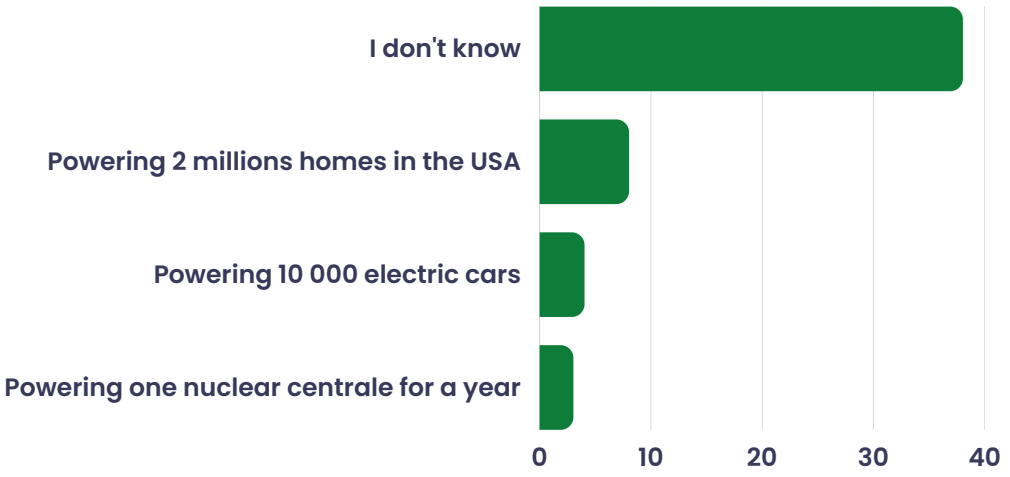
According to the survey, Instagram has the largest carbon footprint among social media platforms, with 38.5% of respondents considering it as such, followed by Facebook at 33% (Figure 14).



Source: own processing

Figure 14. The social media and the carbon footprint

We asked two questions about a MacAffee study on our research. Majority (71.7%) did not know how much electricity was required to send trillions of spam emails annually. 15.1% believed it was equal to powering two million US homes, while 7.5% thought it was equivalent to powering 10,000 electric cars (Figure 15).



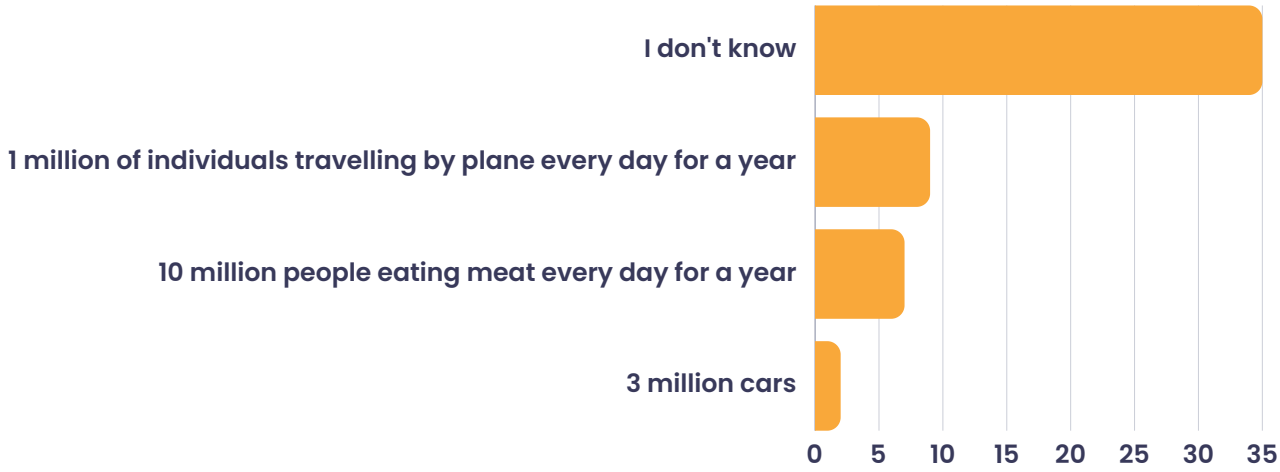
Source: own processing

Figure 15. MacAffee study - part I

In the second question, the survey inquired about the amount of greenhouse gas emissions that are generated annually by spam emails.

A significant majority of 66% of respondents were uncertain about the answer to this question.

However, a small percentage of the remaining respondents provided their estimations: 17% believed that the emissions produced by spam emails could be equivalent to the amount generated by a million people traveling by plane for a year, while 13.2% suggested it could be generated by 10 million people eating meat every day for a year. In addition, a minority of 3.8% of respondents estimated that spam emails could generate the same amount of emissions as three million cars do (Figure 16).



Source: own processing

Figure 16. MacAffee study - part 2

The last six questions in the survey asked about the respondents' knowledge of certain types of behavior, the results of which can be seen on Table 2.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I am aware that my online behaviour has an ecological impact	17	26	5	3	2
I know that I am supposed to delete my emails regularly	15	21	9	7	1
I tend to store my files on CDs/DVDs/sticks/hard disks, so as not to load the memory of my phone or computer.	11	24	6	8	4
I unplug my appliances when I am not using them	29	18	4	9	2
I am used to completely switching off my computer when I'm not using it	22	14	7	7	3
I usually unplug the charger after the phone is fully charged	20	13	8	8	4

Source: own processing

Table 2. Agreement or disagreement on certain situations

IV. Conclusion

The results of our data analysis revealed that the citizens are highly interested in discussing climate change and digital waste, indicating a growing awareness of the significance of these issues.

However, the analysis also revealed that many individuals lack adequate knowledge regarding the potential negative consequences of inappropriate digital technology usage.

Given this insight, we perceive the Eco-Digital Literacy and Citizenship for Our Planet and Future initiative, more commonly known as Digital Waste, as an excellent opportunity to create and implement effective tools aimed at improving eco-digital literacy.

Our overarching objective is to equip individuals with the requisite knowledge and competencies necessary to participate in responsible digital technology practices that not only minimize negative environmental impacts but also promote sustainable development.

In so doing, we hope to promote a broader understanding of the intricate interplay between digital technology and environmental sustainability, and how individuals can make informed choices to achieve a more sustainable future.

Co-funded by the European Union

Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste)

2021-1-TR01-KA220-YOU-000028571

Results of the Needs Analysis

ROMANIA

RESULTS

I. Research methodology

This research was carried out by the Ovidius University of Constanta, in collaboration with the partners of the Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste) project, code 2021-1-TR01-KA220-YOU-000028571, financed by the Erasmus Plus Programme. The target group was represented by Romanian citizens.

The research tool was a questionnaire, distributed online through Facebook and Instagram. The period in which the results were collected is
October 6, 2022 – October 27, 2022.

In total, the analysis of the results focused on a sample composed of 64 people.

II. Sample structure

Sample Structure Table 1

Gender	**Female (73%)**		**Male (27%)**		
Age	**17-22 (48%)**	**23-28 (20%)**	**29-34 (3%)**	**35-39 (11%)**	**40+ (17%)**
Education Level	**High School (22%)**	**Undergraduate (36%)**	**Master's Degree (22%)**	**PhD Degree (20%)**	

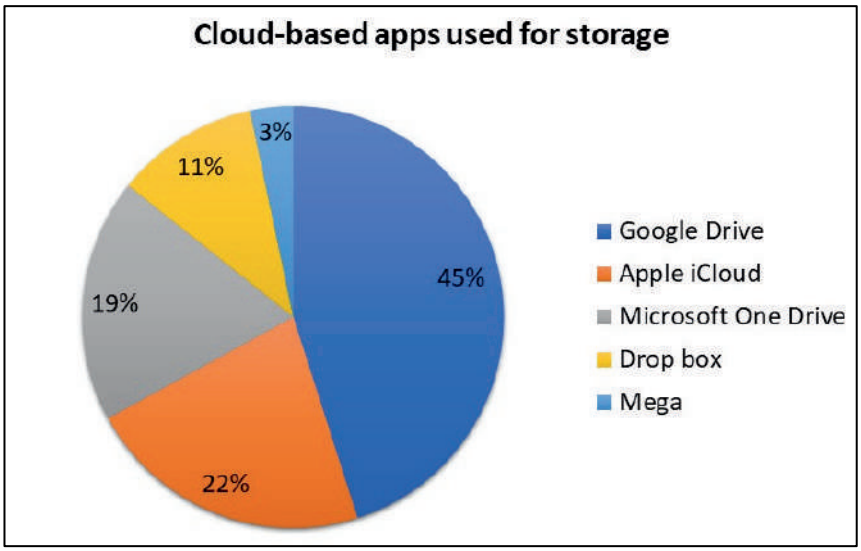
Source: own processing.

According to the results presented in Table 1, of the total number of respondents, 73% are female. When we discuss their age, 48% are between 17 and 22 years old, while 3% of them are between 29 and 34 years old. Regarding the level of education, the situation is somewhat balanced. While 36% have only completed bachelor's studies, 22% have completed high school studies, 22% have completed master's studies, and 20% have completed doctoral studies.

III. Data analysis

In the following lines, we will present the data specific to the main objectives of our research.

When discussing the cloud-based application that respondents use to store various files, the most popular among them was Google Drive, with a percentage of 45%. Other popular applications, based on the same principle, are: Apple iCloud (22%), Microsoft One Drive (19%) and Drop box (11%). The least represented was Mega, with a percentage of only 3%.



Source: own processing.

Figure 1. Cloud-based apps used for storage

In Figure 2 we can see the frequency with which the previously listed applications are used. Thus, most respondents prefer to use the applications daily (30%), several times a week (25%) or once a week (20%).

The situation is a little different when we discuss cleaning up the storage spaces of these cloud-based applications. More details can be seen in Figure 3.

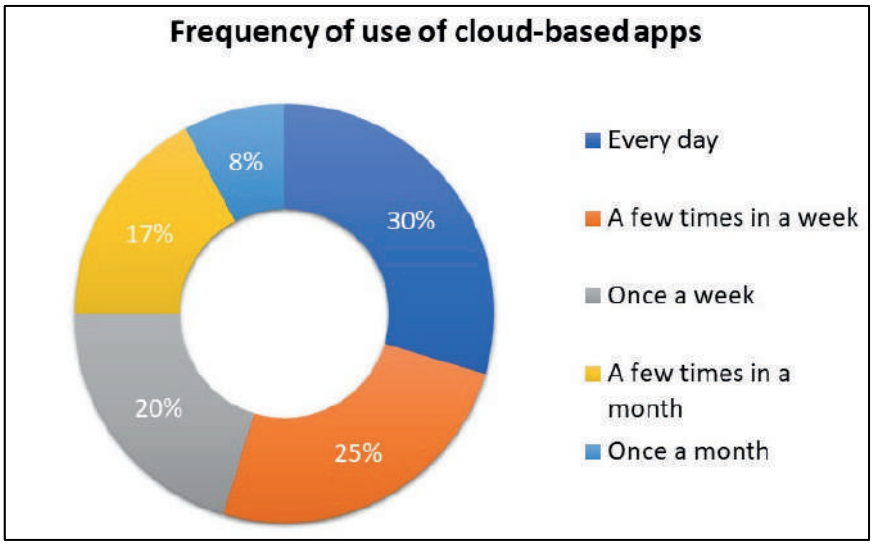
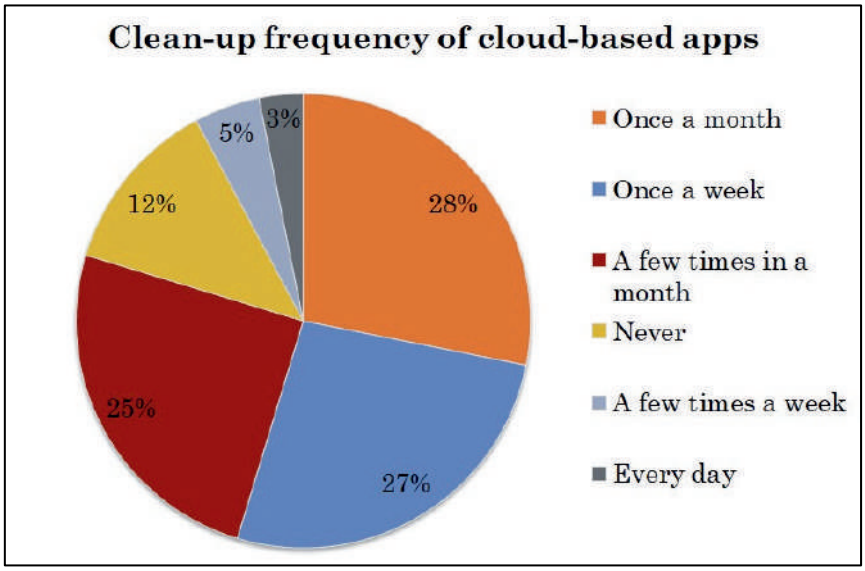


Figure 2. Frequency of use of cloud-based apps *Source: own processing.*

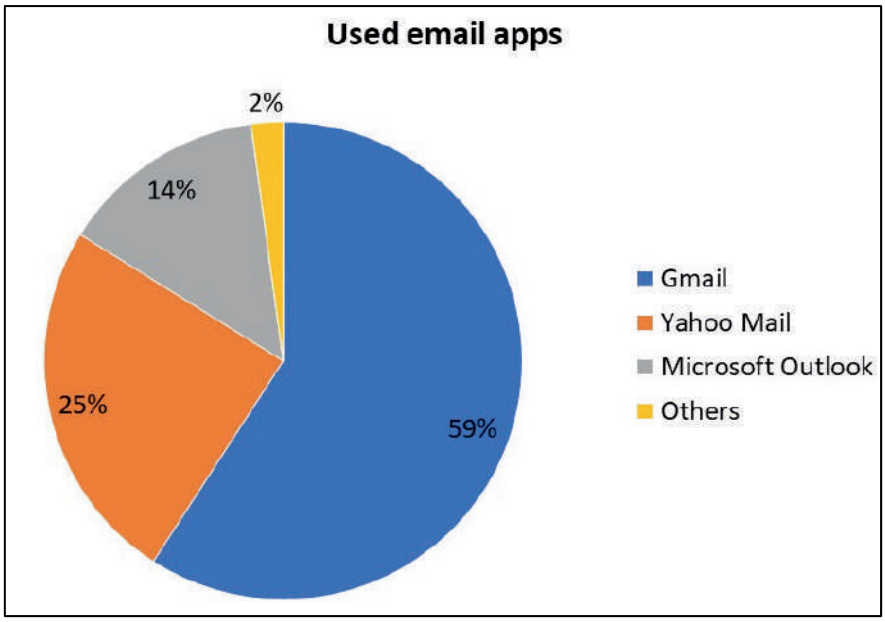


Source: own processing.

Figure 3. Clean-up frequency of cloud-based apps

According to the Figure 3, 28% of respondents clean their cloud-based application storage spaces once a month, while 27% of Romanians do so once a week. Very few respondents clear their app storage daily (3%).

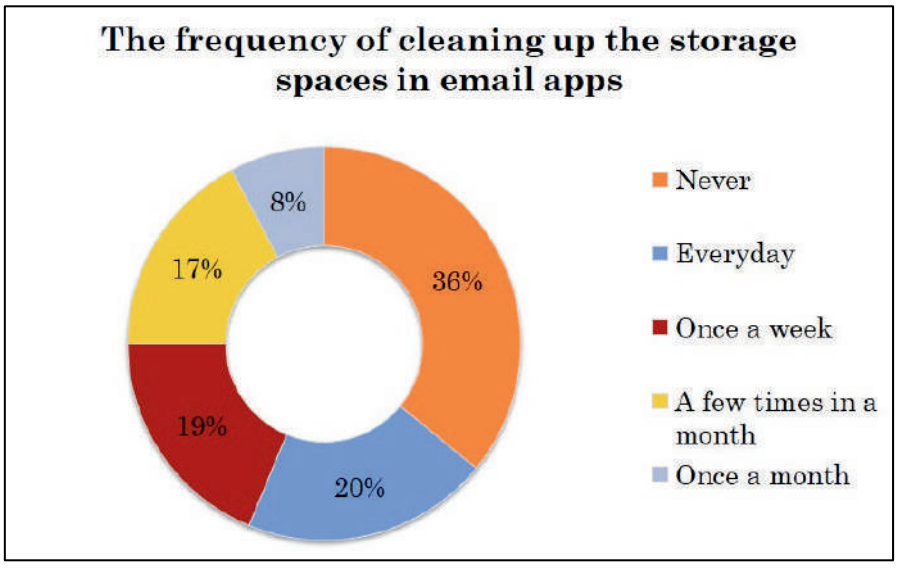
Of all existing email applications, most participants in this research prefer to use the Gmail application (59%). 25% of respondents prefer to use Yahoo Mail, 14% Microsoft Outlook, while 2% use other applications.



Source: own processing.

Figure 4. Used email apps

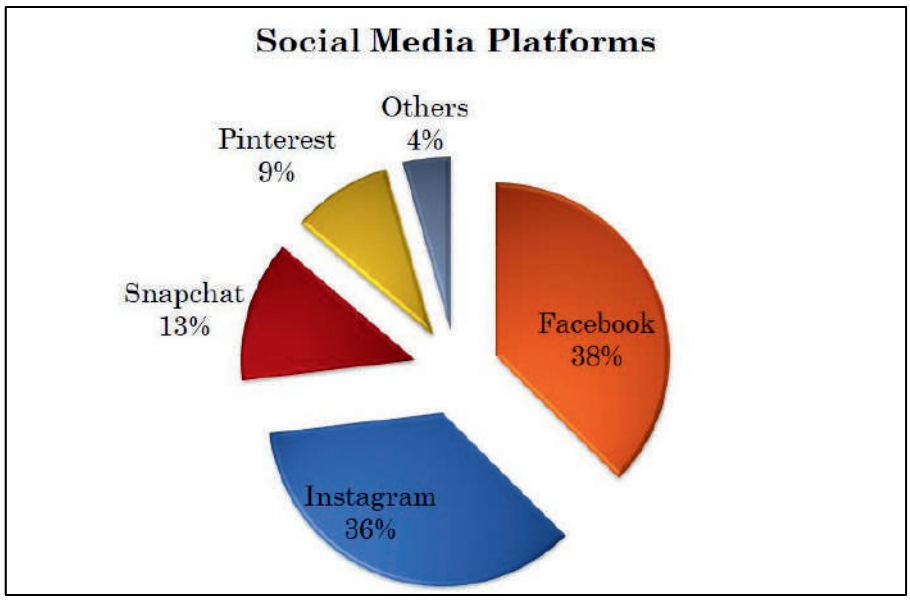
A significant portion of respondents (36%) have never cleaning up their email app storage. 20% of participants do this daily, and 19% once a week (Figure 5).



Source: own processing.

Figure 5. The frequency of cleaning up the storage spaces in email apps

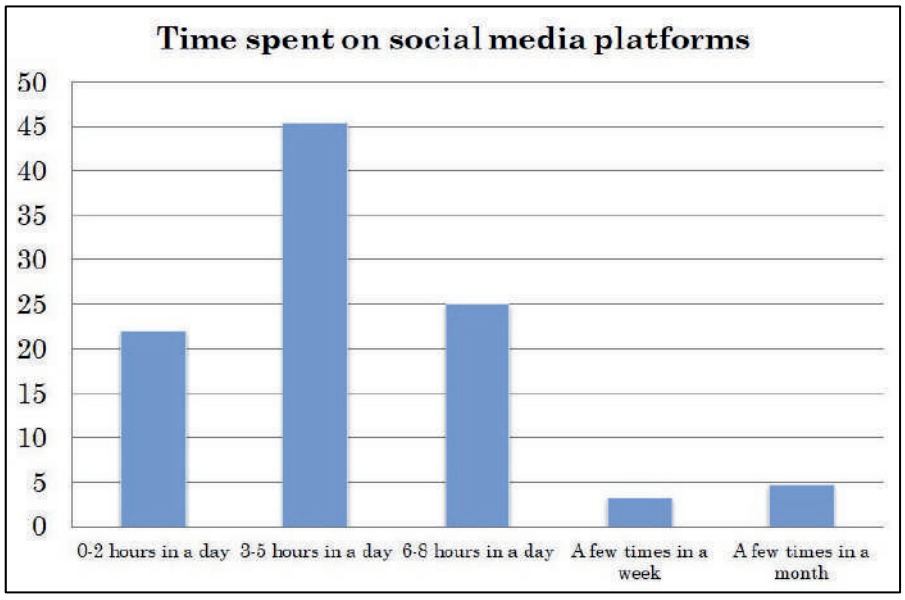
When we discussed the use of a social media platform, the top two places were Facebook (38%) and Instagram (36%). In the last three positions were Snapchat (13%), Pinterest (9%) and other social networks (4%).



Source: own processing.

Figure 6. Social Media Platforms

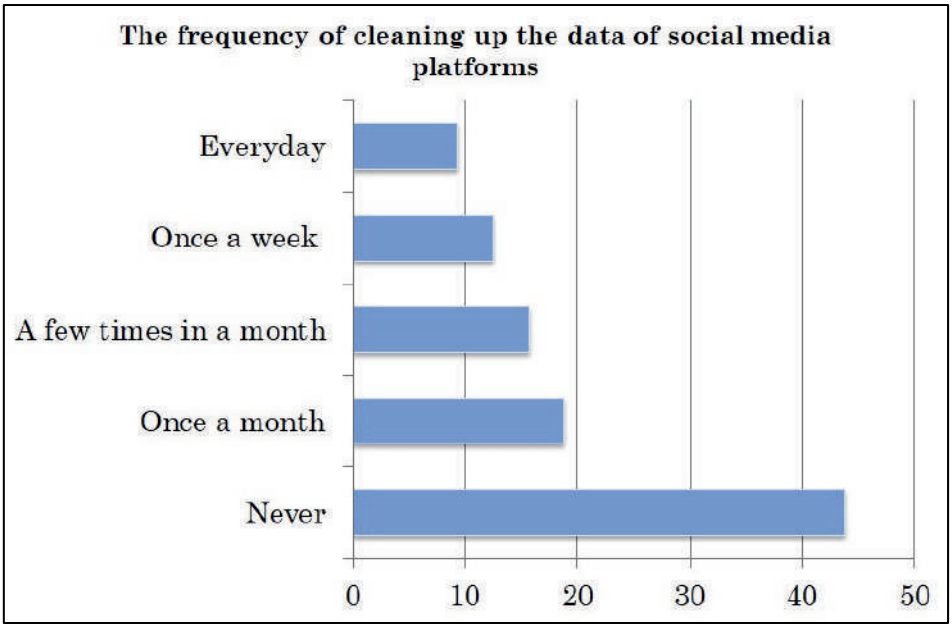
Regarding the time spent on these platforms, most of the respondents (45,30%) allocate between 3 and 5 hours per day. They are followed by those who allocate between 6-8 hours per day (25%) and by those who spend only up to 2 hours per day (21,88%).



Source: own processing.

Figure 7. Time spent on social media platforms

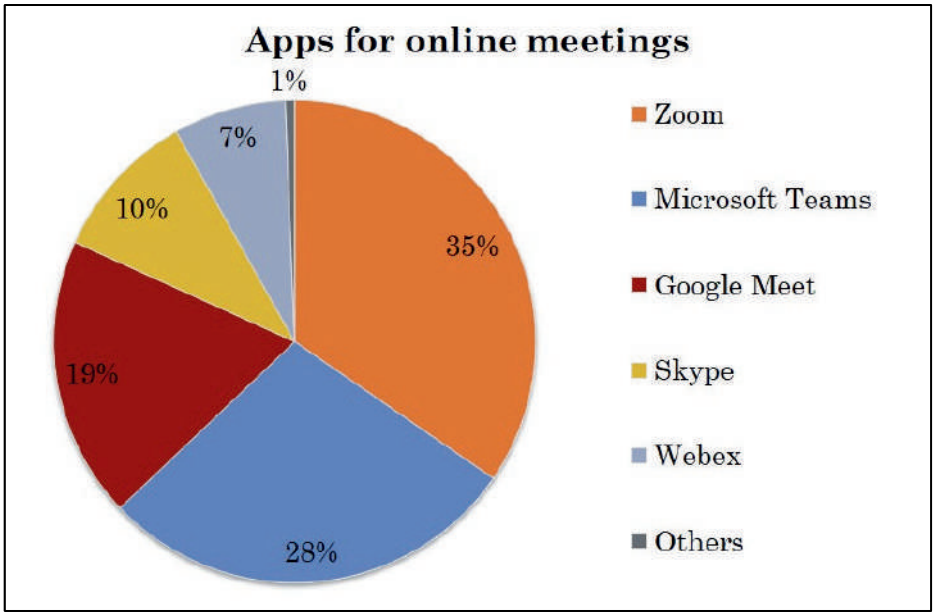
Of all respondents, 44% have never cleared their data from these social media platforms. 19% do this cleaning once a month, and 16% several times a month. Only 9% do this daily.



Source: own processing.

Figure 8. The frequency of cleaning up the data of social media platforms

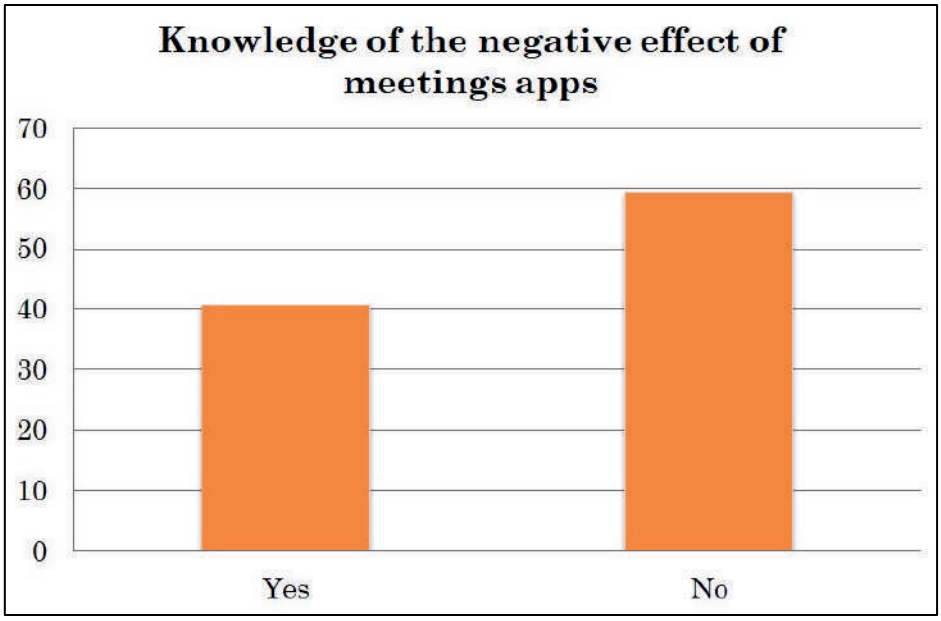
The Figure 9 shows the applications used by our respondents for conducting online meetings.



Source: own processing.

Figure 9. Applications for online meetings

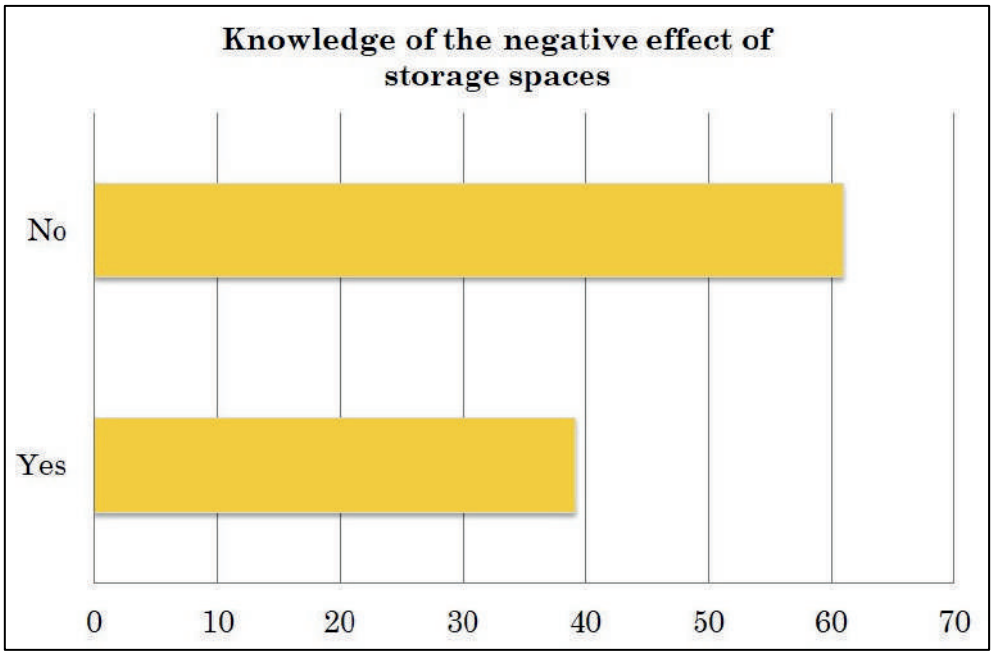
Most of them prefer ZOOM (35%) and Microsoft Teams (28%). Other apps used are Google Meet (19%), Skype (10%), Webex (7%). Of all respondents, only 40.6% are aware that these apps can create a carbon footprint if video cameras are turned on and meetings are recorded.



Source: own processing.

Figure 10. Knowledge of the negative effect of meetings apps

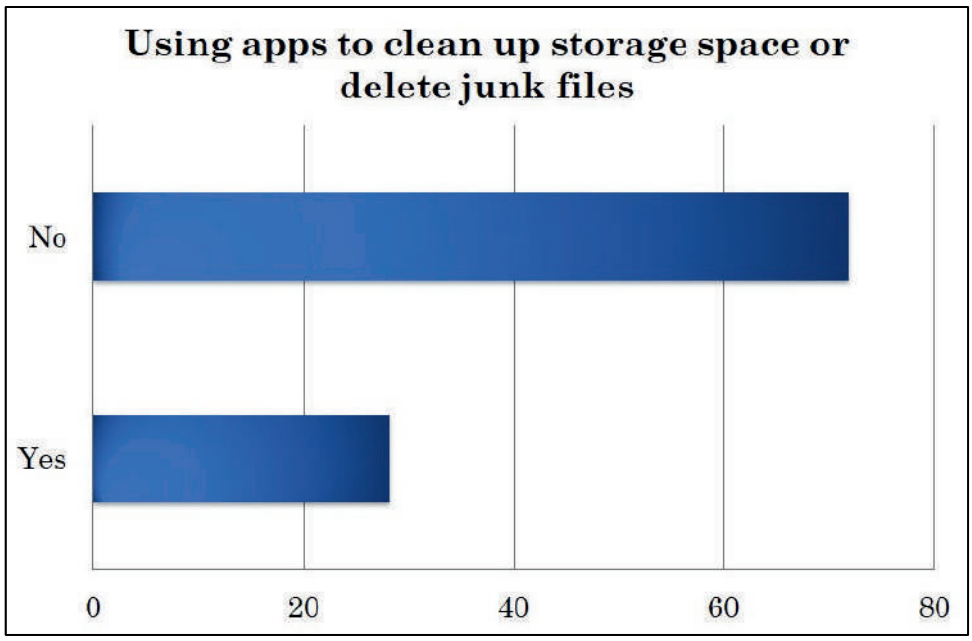
60.9% of the research participants do not know that the storage spaces they use through digital tools have an increased energy consumption and that they also cause an increase in carbon emissions.



Source: own processing.

Figure 11. Knowledge of the negative effect of storage spaces

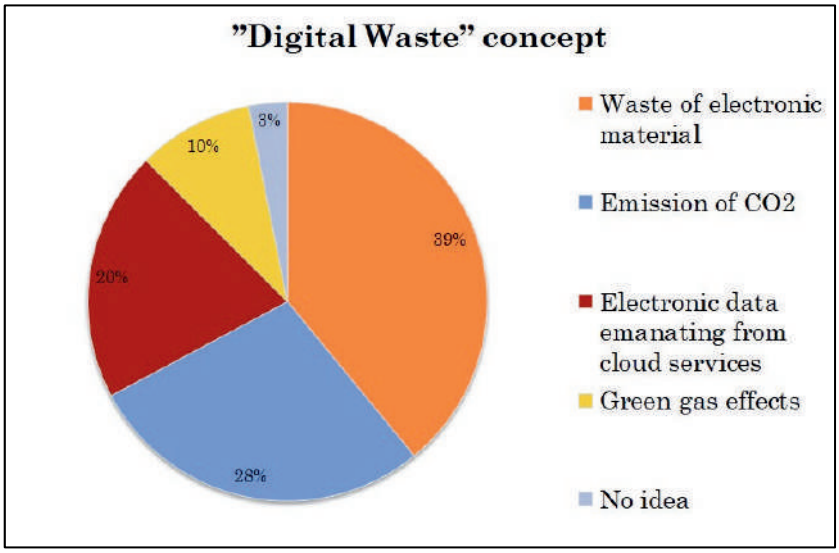
Of the total respondents, only 28.12% use an app to clean up their storage space or delete junk files.



Source: own processing.

Figure 12. Using apps to clean up storage space or delete junk files

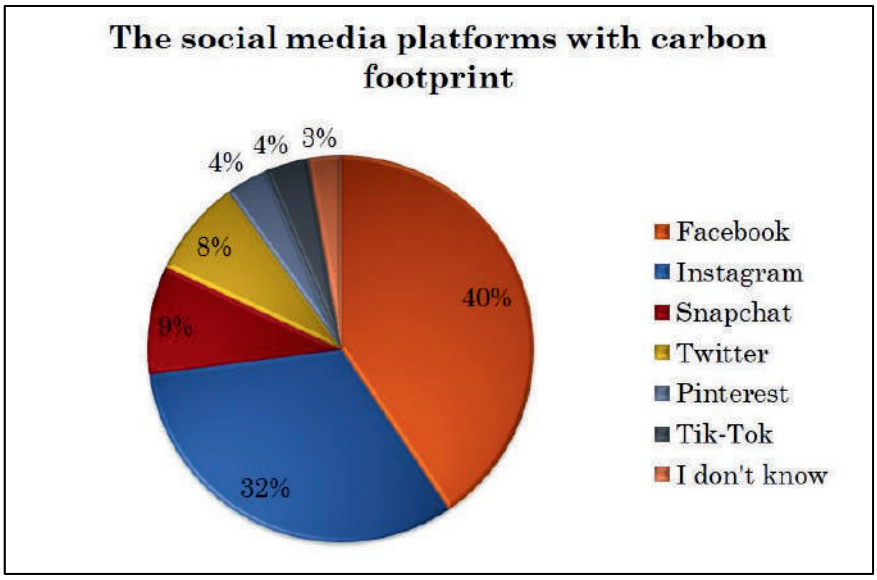
When asked about the meaning of the "Digital Waste" concept, 39% of respondents referred to waste of electronic materials, 28% referred to emission of CO2, and 20% equated this notion with electronic data emanating from cloud services.



Source: own processing.

Figure 13. Digital Waste concept

In the opinion of Romanian citizens, 40% of them consider the fact that Facebook, as social network, has the biggest carbon footprint, closely followed by Instagram, with 32%.



Source: own processing.

Figure 14. The social media platforms and the carbon footprint

Our research also included two questions about a study conducted by the MacAffee company. The subject of the first was related to the amount of electricity required just to send trillions of spam emails each year. Half of the respondents did not know how to answer. 25% of them thought it was equivalent to powering 10,000 electric cars, while 22% thought it could be equal to powering two million US homes.

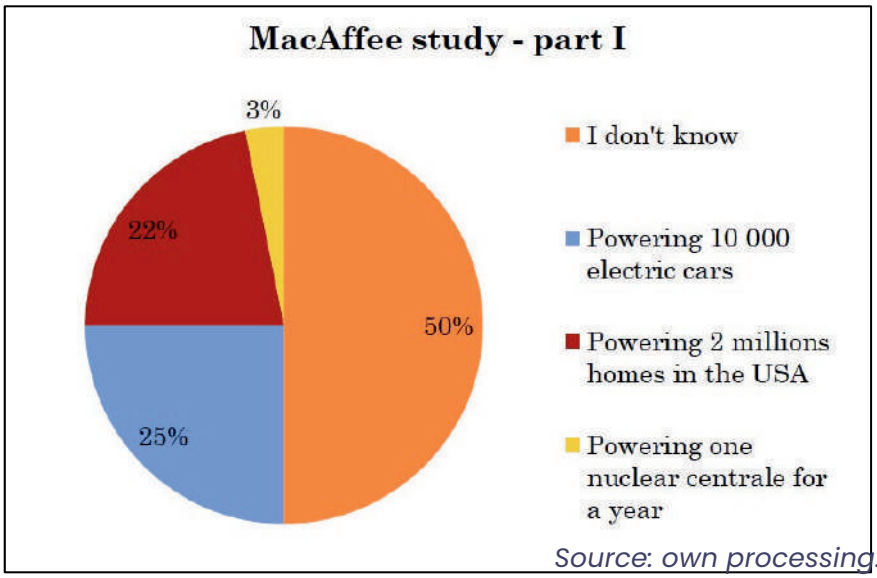
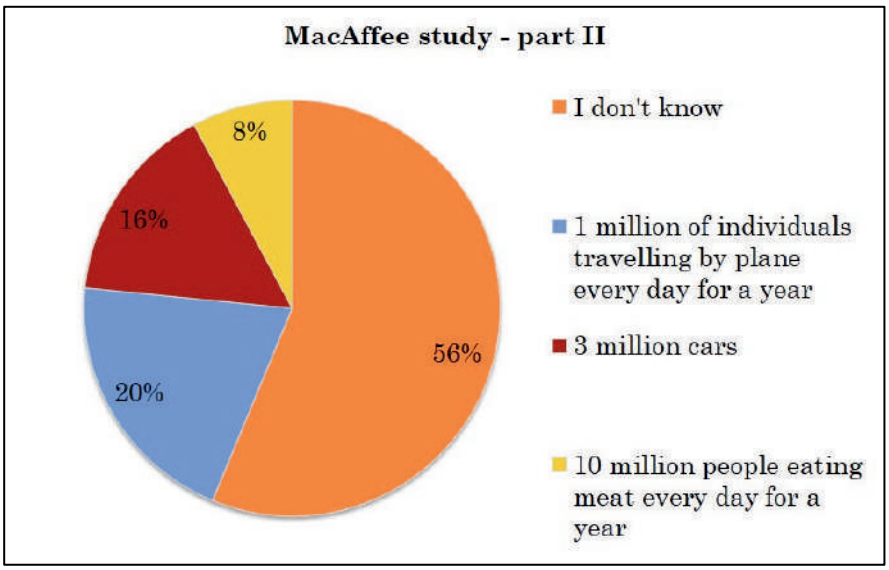


Figure 15. MacAffee study - part I



Source: own processing.

Figure 16. MacAffee study - part II

The topic of the second question referred to the amount of greenhouse gas emissions generated by spam emails sent each year. This time, 56% of respondents did not know how to answer the question. The other people mentioned that it could be equal to the amount generated by 1 million people traveling by plane for a year (20%), 3 million cars (16%), or that generated by 10 million people eating meat in every day for a year (8%). The last six research questions concerned the respondents' awareness of certain types of behavior (Table 2). A Likert scale was used to answer the questions, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

According to the results presented in Table 2, we can say the following:
- most of the participants in Romania are aware of the fact that the actions carried out in the online environment have an ecological impact;
- most respondents are also aware of the fact that they should regularly delete their emails;
- a significant part of the respondents tend to store their files on CDs/DVDs/sticks/hard disks, in order not to load the phone or computer memory;
- most participants disconnect their electronic devices from charging when they are not using them;
- a significant part of the respondents are used to turning off their computer completely when they are not using it;

- when it comes to disconnecting the phone charger after it has been fully charged, there is a balance between people who tend to do this and those people who completely ignore it.

Table 2

Items	N.	Min.	Max.	Mean	Mode
I am aware that my online behaviour has an ecological impact.	64.	2	5	3.84	4
I know that I am supposed to delete my emails regularly.	64.	1	5	3.69	4
I tend to store my files on CDs/DVDs/sticks/hard disks, so as not to load the memory of my phone or computer.	64.	1	5	3.63	4
I unplug my appliances when I am not using them.	64.	2	5	4.08	4
I am used to completely switching off my computer when I'm not using it.	64.	2	5	3.80	4
I usually unplug the charger after the phone is fully charged.	64.	1	5	3.59	3

Source: own processing.

IV. Conclusions/Recommendations

Following the collected results, we noticed that our citizens have a positive attitude to discuss the issue of digital waste and climate changes. At the same time, we noticed that they are not very familiar with the negative effects that inappropriate behavior regarding the use of digital tools can imply. Thus, through the Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste) project, we consider it opportune to develop eco-digital literacy tools to support the population of Romania and beyond. At the same time, they would support citizens to promote a more environmentally friendly behavior.

Co-funded by the European Union

Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste)

2021-1-TR01-KA220-YOU-000028571

Results of the Needs Analysis

PORTUGAL

Results

This research was carried out by **Embaixada da Juventude**, in collaboration with the partners of the **Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste) project**, financed by the **Erasmus+ Programme**.

Project: 2021-1-TR01-KA220-YOU- 00002857

In total, **55 individuals** completed the questionnaire, which we shared through social media.

I. Our Respondents

Gender	**Female** (43.64%)		**Male** (54.55%)	**Other** (1.82%)
Age	**17-22** (47.27%)	**23-28** (38.18%)	**29-34** (9.09%)	**35+** (5.45%)
Education level	**High School** (21.82%)	**Undergraduate** (49.09%)		**Master's** (29.09%)

Table 1

As shown in **Table 1**, the 54.55% majority is male.

As for age, 47.27% are between 17 and 22 years old, while 5.45% are older than 35 years old. Regarding the level of education, almost half of the participants were undergraduates.

While 49.09% have only completed bachelor's studies, 21.82% have completed high school studies, with the remaining 29.09% having completed their master's studies.

II. Data Analysis

In the following lines, we will analyze the data that we gathered through our questionnaire.

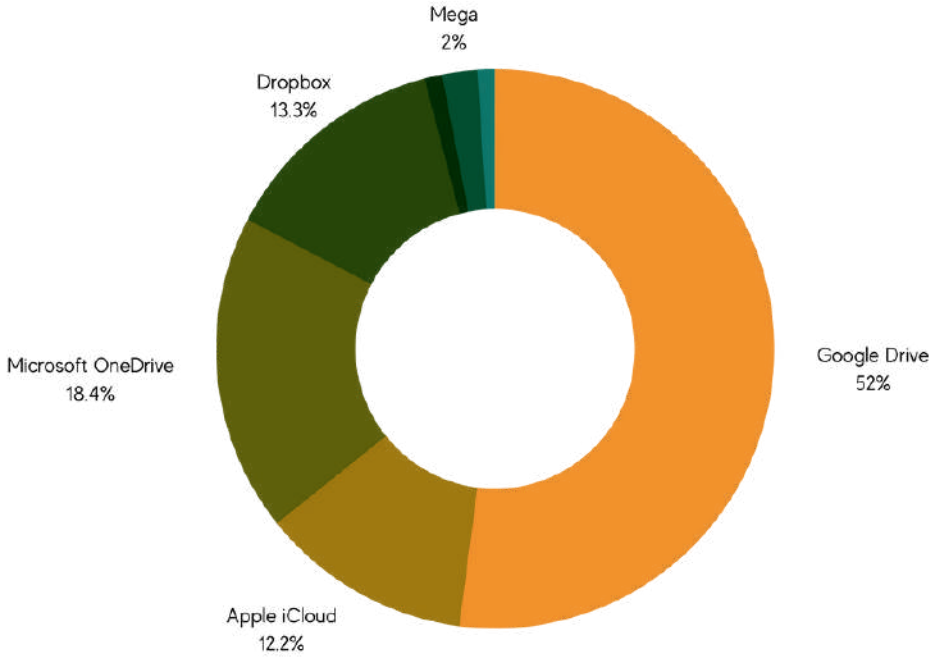


Fig. 1

In **Fig. 1**, we can clearly see which cloud-based application respondents use to store various files, with Google Drive unsurprisingly receiving the highest percentage of votes (52%). Microsoft OneDrive (18.4%), Dropbox (13.3%), and Apple iCloud (12.2%) are additional well-liked programs that operate on the same principles.

Box had the lowest representation, accounting for only 1% of the total.

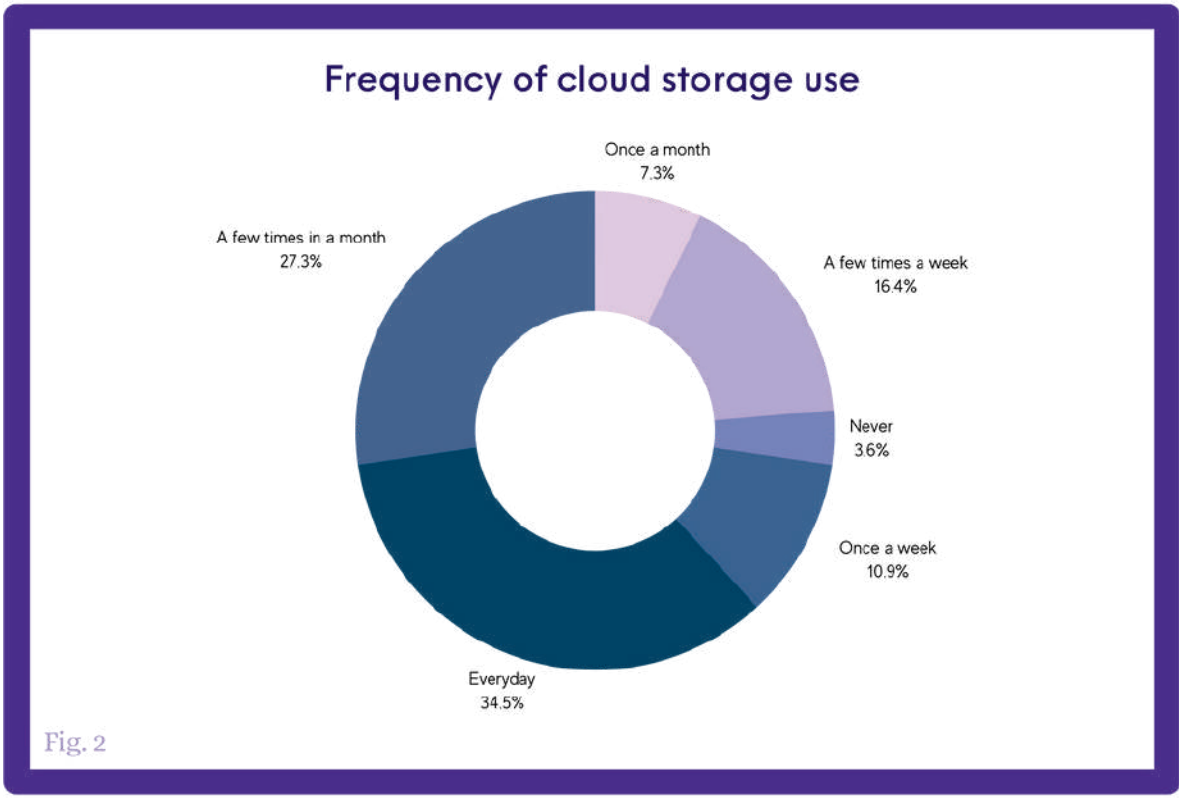


Fig. 2

In **Fig. 2**, we can see the frequency with which the previously listed applications are used. Thus, most respondents prefer to use the applications daily (34.5%), a few times a month (27.3%), or once a few times a week (16.4%).

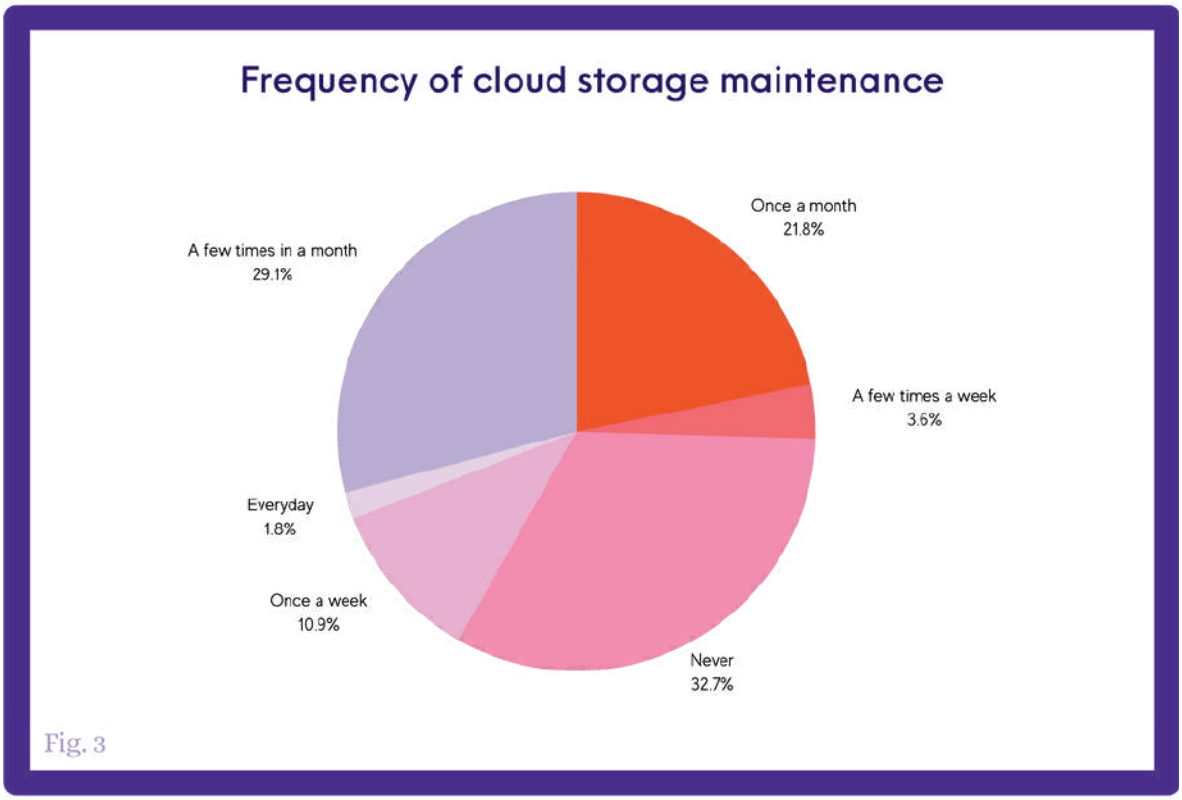


Fig. 3

According to **Fig. 3**, 32.7% of respondents clean their cloud-based application storage spaces once a month, whereas 10.9% do so once a week.
Very few respondents clear their app storage daily (1.8%).

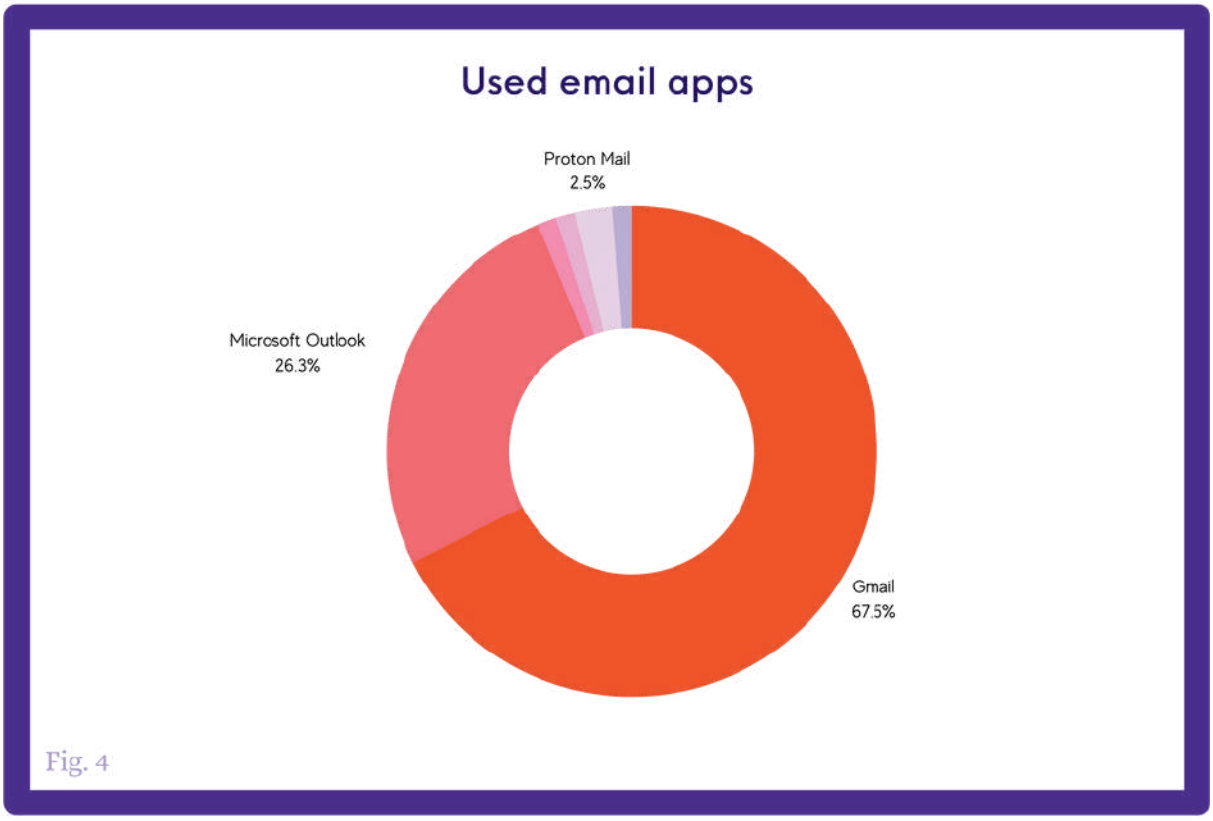


Fig. 4

More than twice as many people used Gmail (67.5%) than Microsoft Outlook (26.3%) among all available email services, whereas Yopmail, Yahoo!, iCloud, and Proton accounted for a combined 6.25% of the total. **(Fig. 4)**

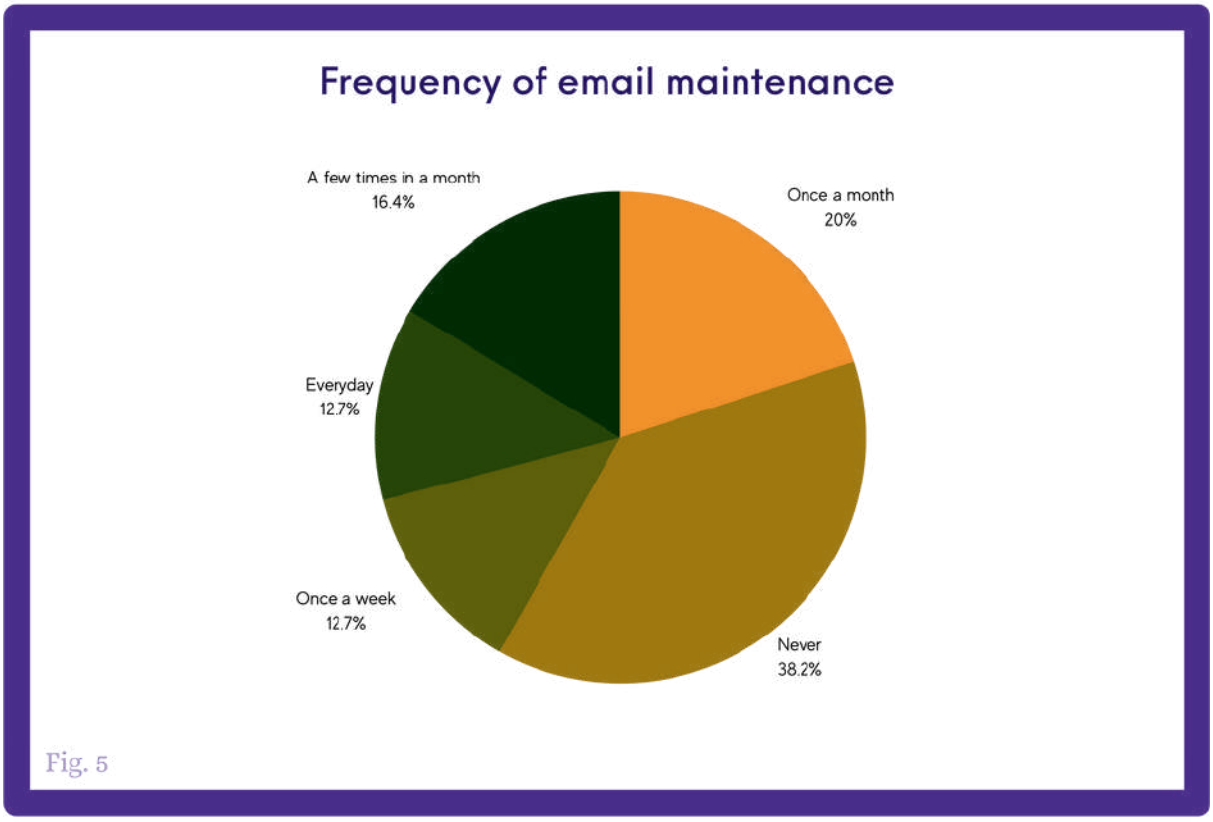


Fig. 5

Regarding the frequency of email maintenance **(Fig. 5)**, the respondents who never cleaned their email app storage were the majority, making up 38.2% of the total; however, 20% clean their storage at least once a month, followed by those who clean a few times in a month (16.36%).
The percentage was equal between those who clean once a week and those who clean daily (12.7%)

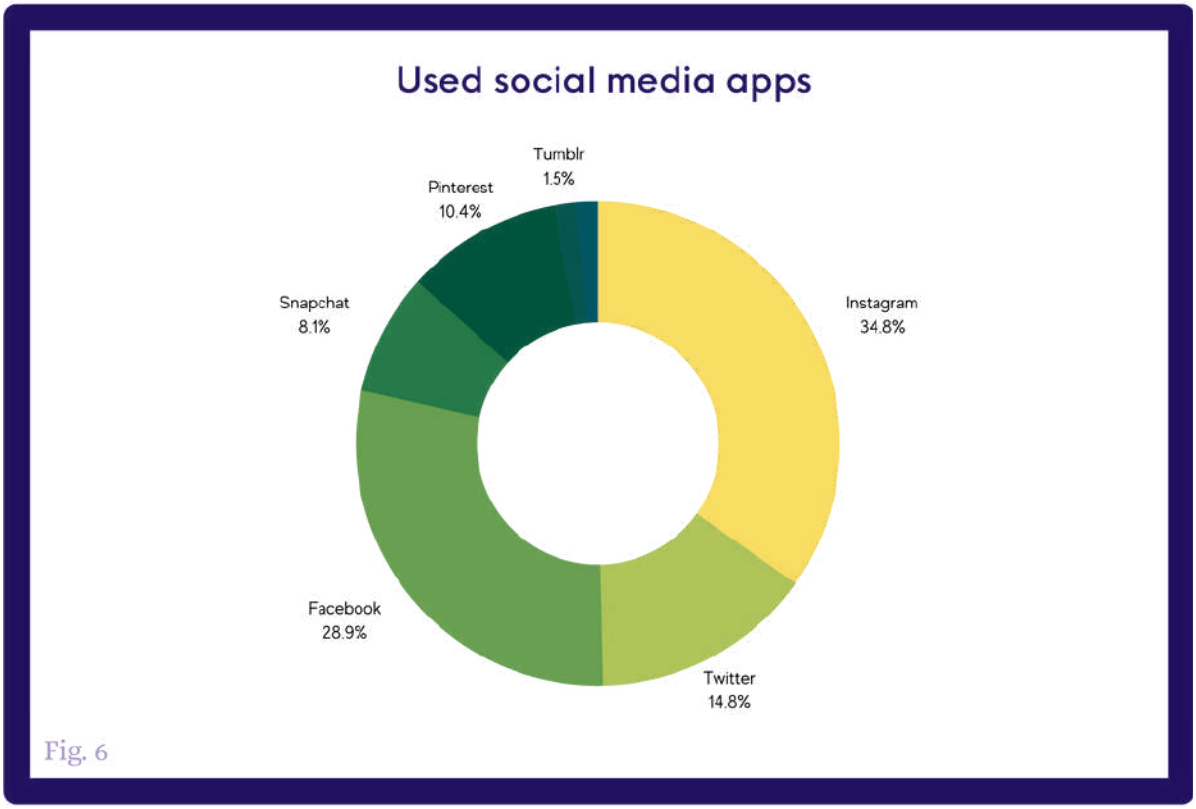


Fig. 6

In terms of social media platforms, Instagram (34.8%), Facebook (28.9%), and Twitter (14.8%) were the most popular. Furthermore, Snapchat and Pinterest accounted for 18.52% of the total, with Tumblr receiving the same percentage (1.48%) as those who selected "None of the above" **(Fig. 6)**

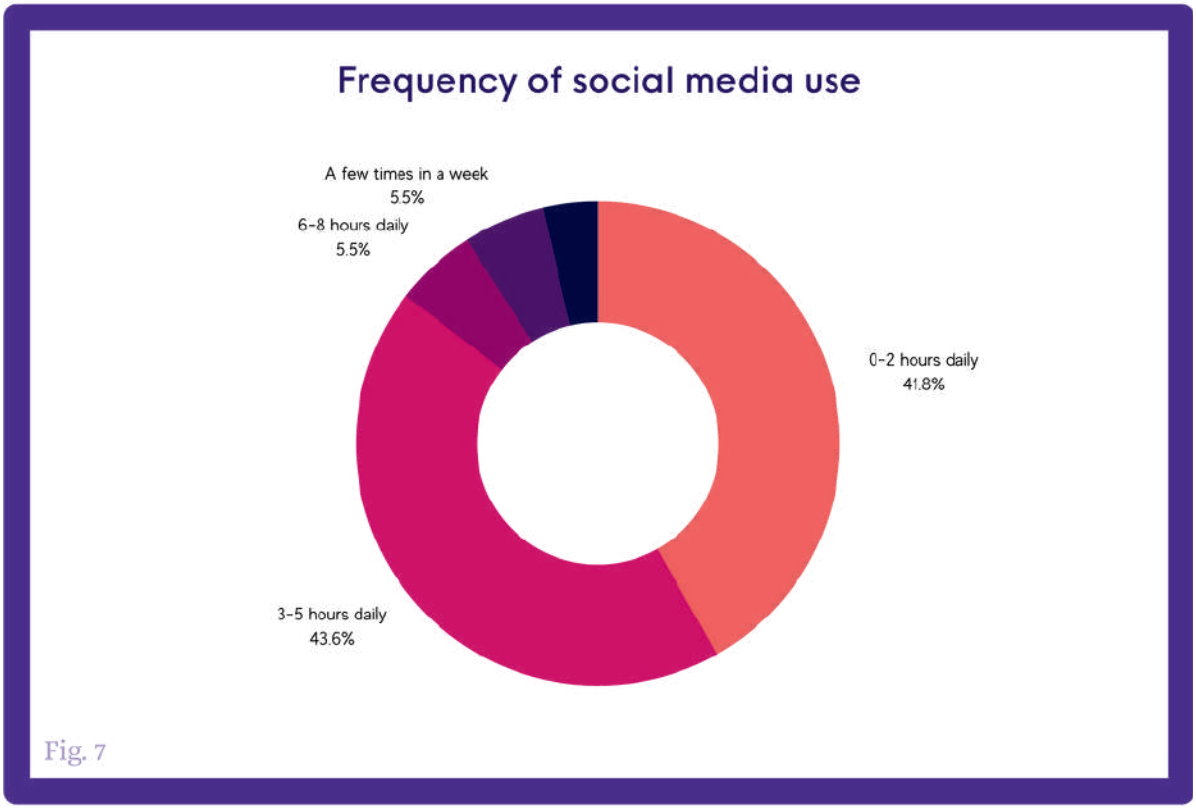


Fig. 7

Regarding the time spent on these platforms, most of the respondents overall (43.6%) allocate between 3 and 5 hours per day, followed by those who spend only 2 hours per day (41.8%).

People who use these platforms for 6 to 8 hours per day match those who use them only a few times per week (5.5% each), and even more surprisingly, 3.6%[66] barely use social media within the span of a month. **(Fig. 7)**

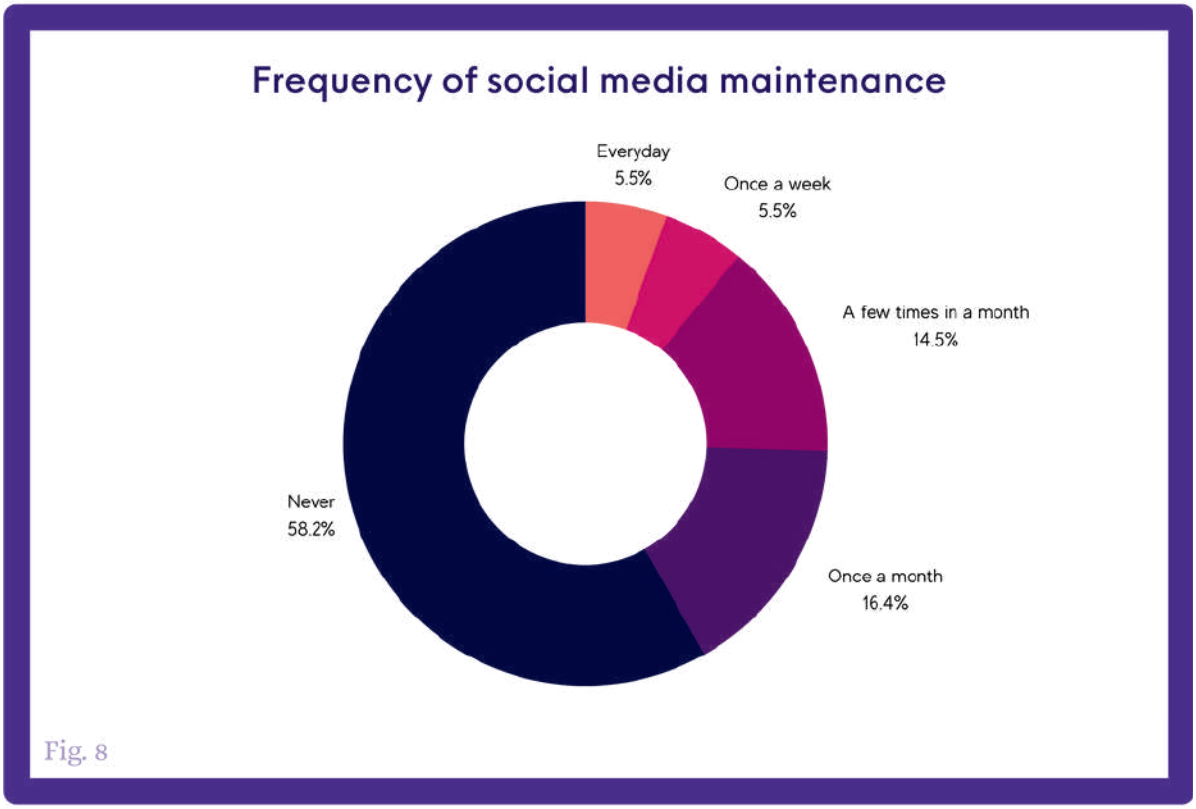


Fig. 8

As for social media storage maintenance, 58.18% of respondents said they had never deleted their data from these social media sites. 16.36% clean their data once a month, and 14.55% clean it several times a month, with those who clean daily accounting for 5.45% of the total. **(Fig. 8)**

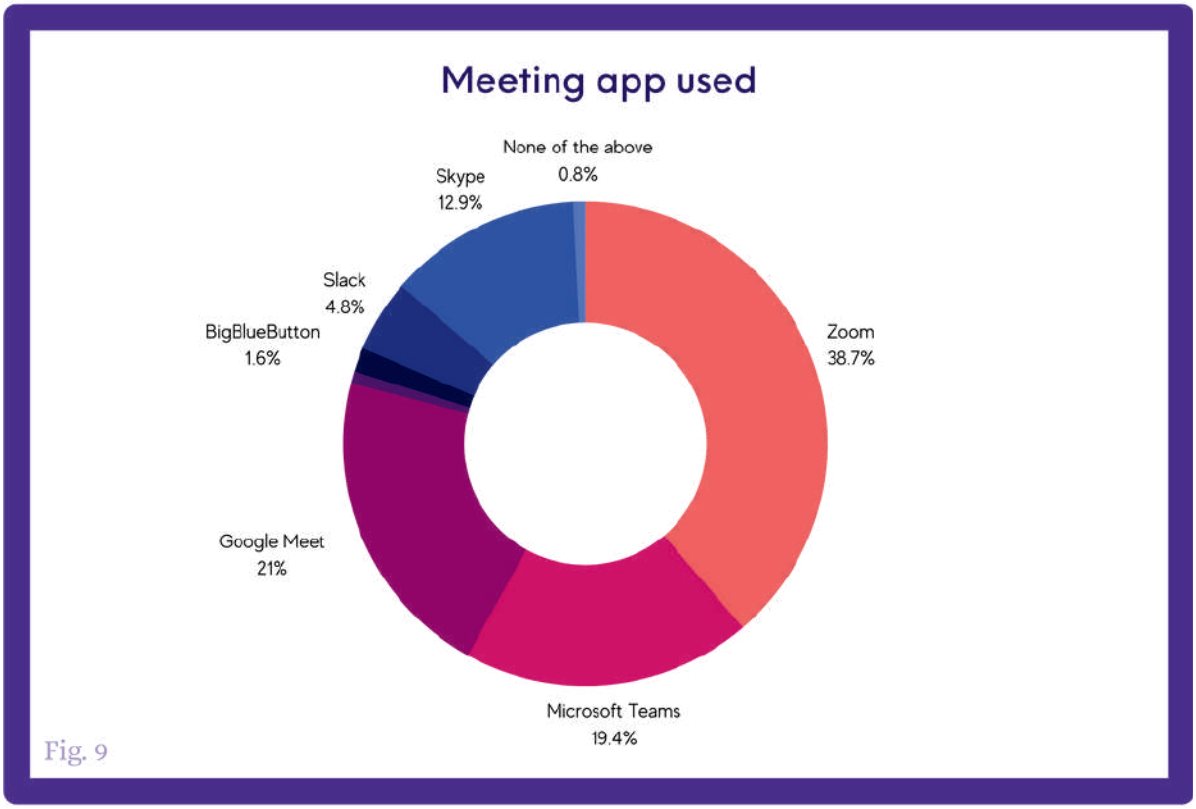


Fig. 9

Regarding apps that are used for online meetings, we can see on **Fig. 9** that the most used apps were Zoom (38.7%), Google Meet (21%), and Microsoft Teams (19.4%). Skype came in 4th with 12.9%, and the remaining services—GoTo Meeting, BigBlueButton, and Slack—accounted for the remaining 7.16%.

III. Awareness

In the following segment, we will evaluate the level of awareness among our respondents.

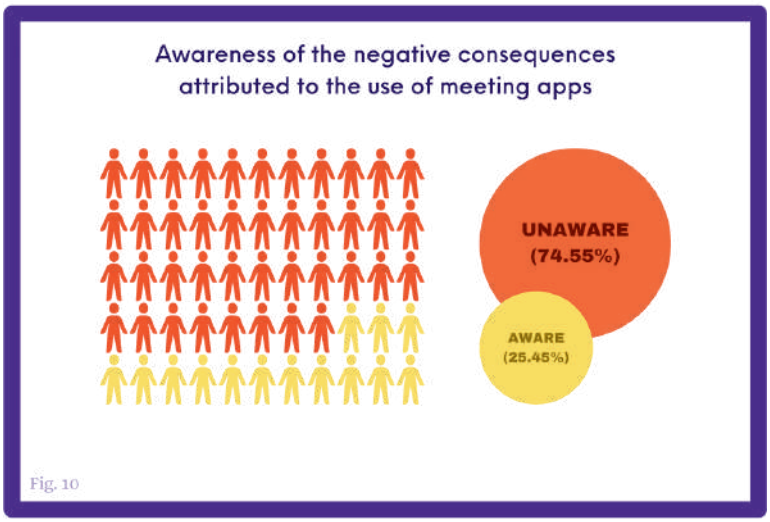


Fig. 10

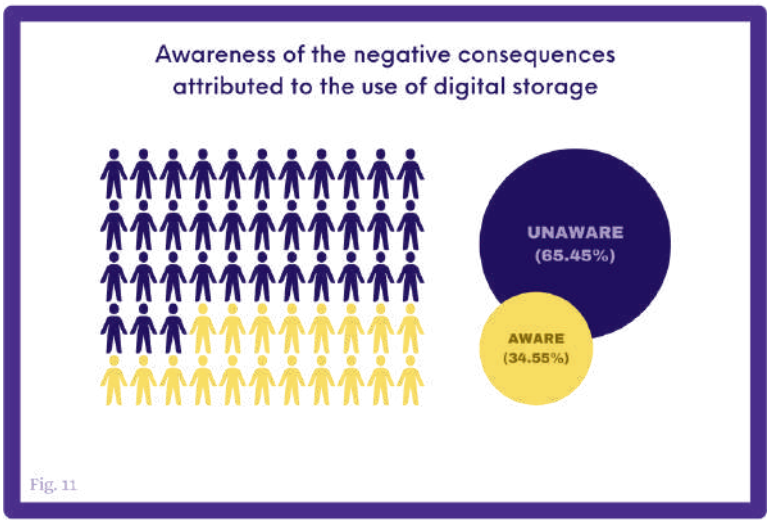


Fig. 11

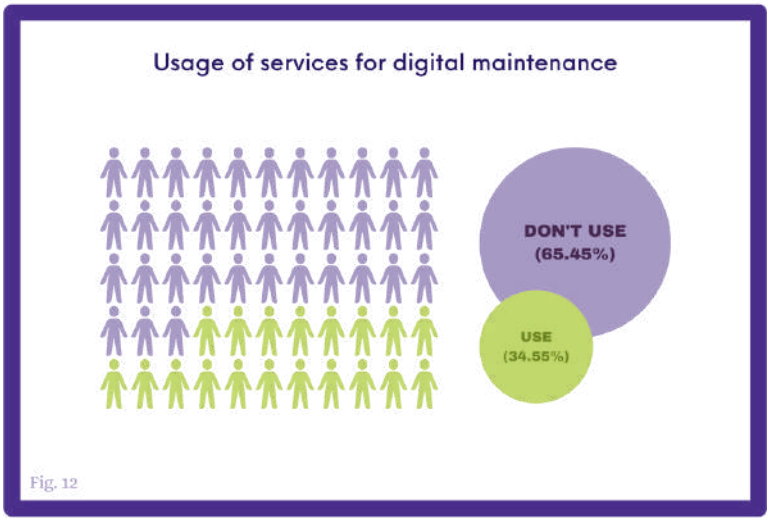


Fig. 12

According to our survey's results, the majority of respondents (74.5%) were not aware of the real-world impact that the aforementioned meeting apps create through their use, which may have come as a shock to them considering the wide use of such apps during the COVID-19 pandemic and their continuing use since then by public institutions, religious establishments, and businesses, to name a few. **(Fig. 10)**

We are reminded again of this general lack of knowledge of how the digital world affects our own when we observe the results of **Fig. 11**, where only a 34.55% minority is aware of the fact that storage causes more carbon emissions.

Fig. 12 also shows that 65.45% of people do not use any application or service to clean up their storage and junk files.

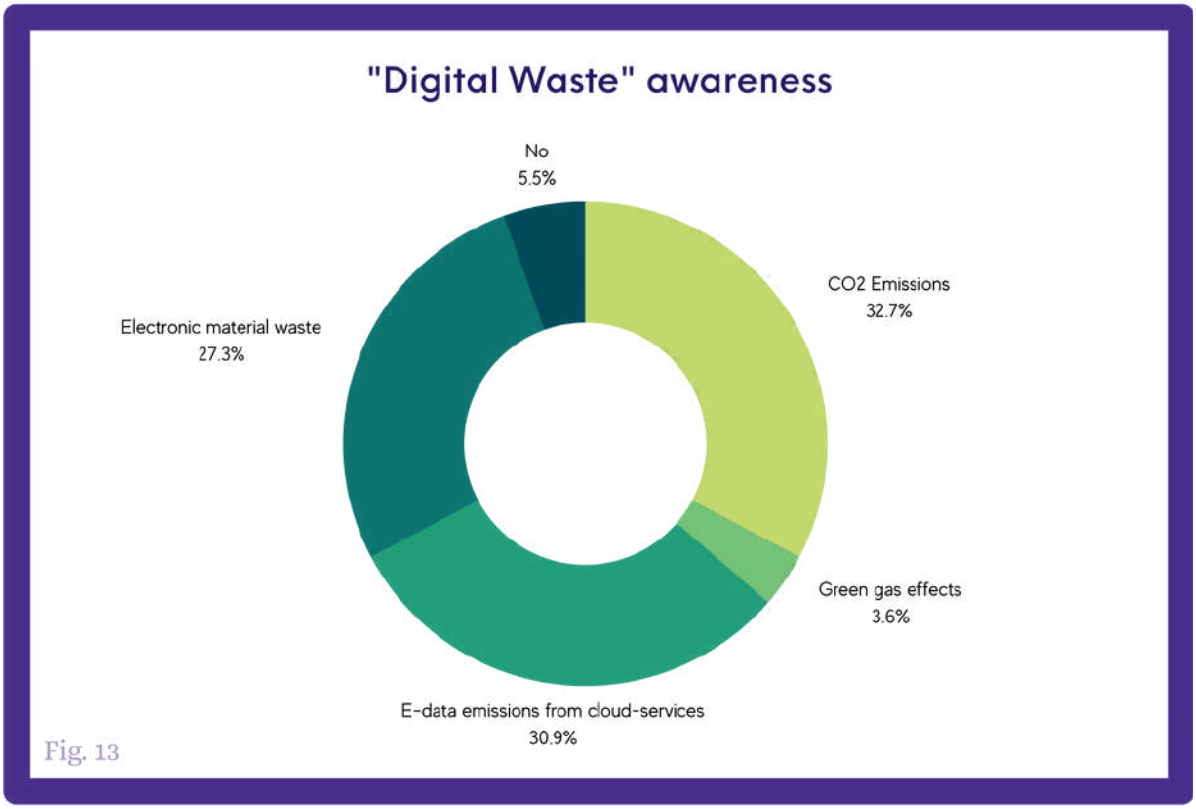


Fig. 13

When asked to define "Digital Waste", a significant proportion of respondents associated the term with specific types of waste generation. 32.7% identified it as CO2 emissions resulting from the production of goods and services, 30.9% viewed it as electronic data emanating from cloud services, and 27.3% defined it as waste of electronic materials. **(Fig. 13)**

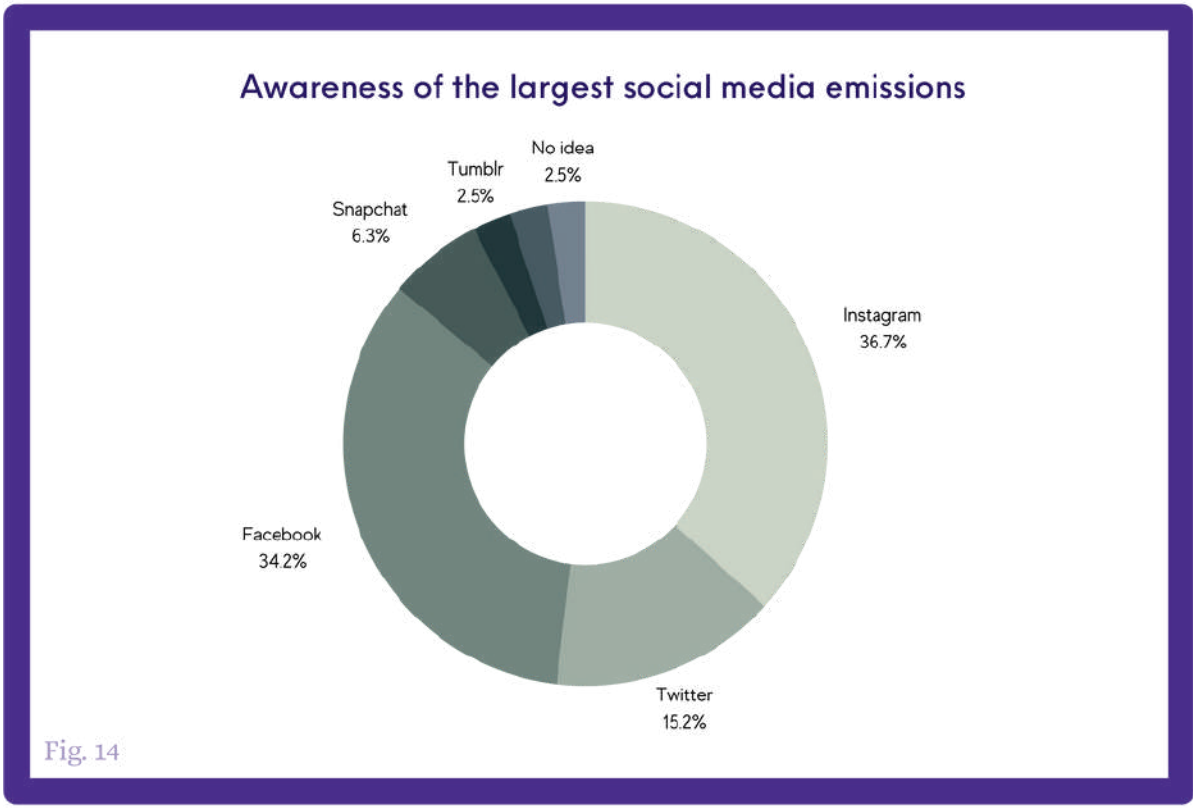


Fig. 14

Regarding which social media platform has the biggest carbon footprint, it appears that Instagram (36.7%) and Facebook (34.2%) are believed to be the most polluting. Twitter was identified as the third most polluting platform, with 15.2% of respondents selecting it. **(Fig. 14)**

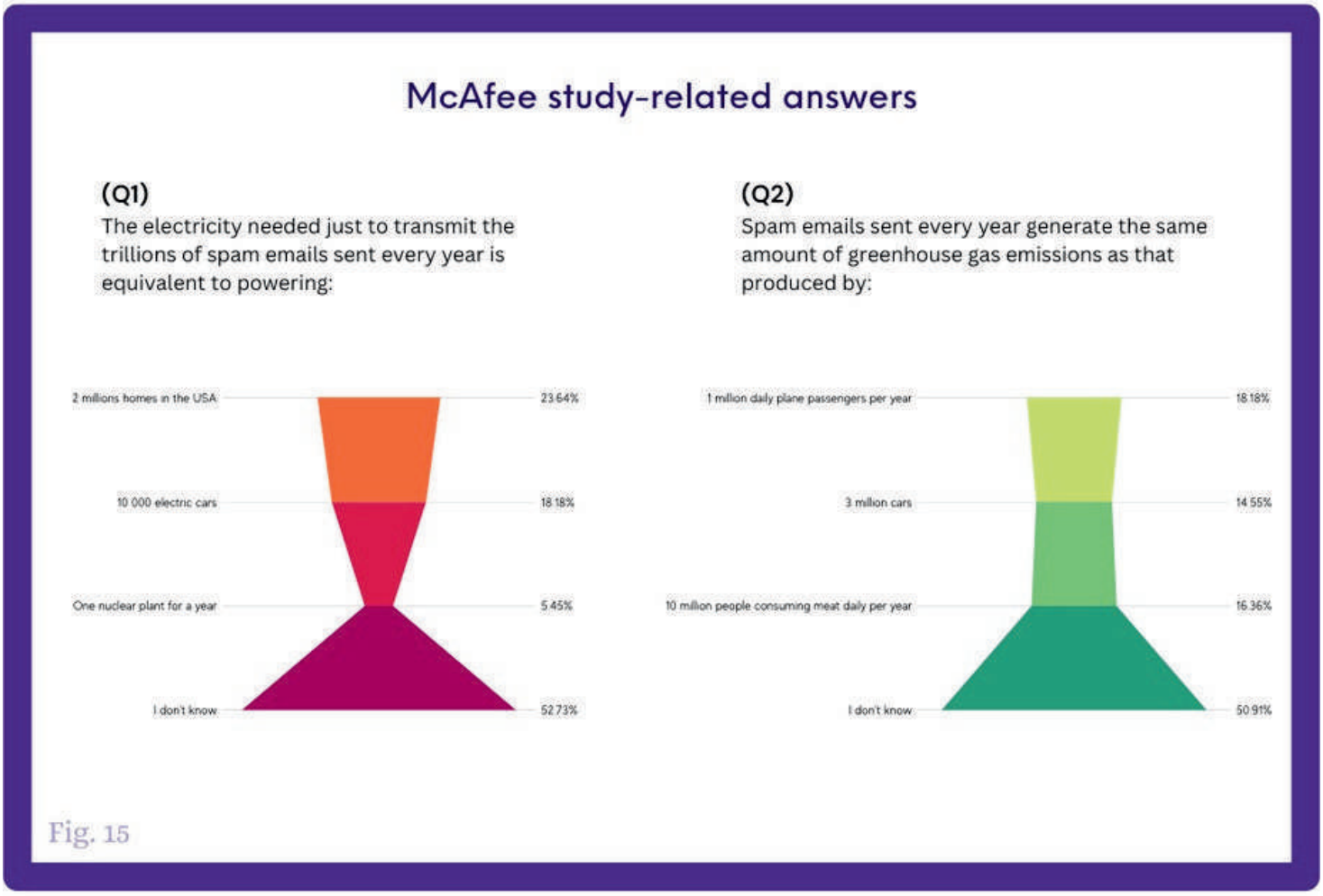


Fig. 15

As part of our research, we also included two questions referencing a study conducted by McAfee. Our respondents were asked to guess "what is equal to the energy required to send trillions of spam messages each year" **(Q1)** and “what is equal to the greenhouse gas emissions caused by this amount of spam” **(Q2).**

The 52.7% majority did not know the answer to **Q1**, however, 23.6% of respondents answered correctly that the electricity needed could power 2 million US homes. Regarding **Q2**, the 50.9% majority also lacked any knowledge, in contrast to the 14.55% minority that answered correctly with “3 million cars."

The last six questions in the survey asked about the respondents' knowledge of certain types of behavior, the results of which can be seen on Table 2

Table 2	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I am aware that my online behavior has an ecological impact	13	22	13	5	2
I know that I am supposed to delete my emails regularly	15	23	8	7	2
I tend to store my files on CDs/DVDs/sticks/hard disks, so as not to load the memory of my phone or computer	13	20	10	7	5
I unplug my appliances when I am not using them	21	21	6	6	1
I am used to completely switching off my computer when I'm not using it	24	17	8	5	1
I usually unplug the charger after the phone is fully charged.	25	10	6	8	6

Given the results we see in Table 2, we can make the following assumptions:

- Most of our respondents are aware of the ecological impact of their online behavior and know the importance of regular email maintenance.
- A majority of them tend to store their data on physical storage devices.
- The majority of respondents are unplugging their devices, and switching them off when not in use.

Conclusions

Our survey results reveal that a significant number of respondents were unaware of the environmental impact of their digital activities.

However, upon learning more about the concept of "digital waste," they expressed a willingness to adopt more sustainable practices.

This highlights the importance of education and awareness-raising in promoting eco-friendly behaviors.

By providing our community with accurate and actionable information about the environmental consequences of their digital choices, as well as the tools and resources needed to reduce their impact, we can work towards a greener and more sustainable future. We believe that this is a crucial step towards building a world that is emission-free and better able to withstand the challenges of the 21st century.

Thank you for your attention.

Co-funded by the European Union

Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste)

2021-1-TR01-KA220-YOU-000028571

Results of the Needs Analysis

LEBANON

I. Research methodology

Aie Serve, the youth-led non-profit organization committed to empowering communities, joined forces with the partners of the Digital Waste project, which is funded by the Erasmus Plus Programme, to conduct a comprehensive research study aimed at investigating the level of eco-digital literacy and citizenship among Lebanese citizens.

This project, with the code 2021-1-TR01-KA220-YOU-000028571, sought to raise awareness about the environmental impact of digital waste and promote sustainable digital practices in Lebanon. To achieve this objective, the research study utilized an online questionnaire as its primary data collection tool, which was distributed through social media platforms.

The online questionnaire was designed to collect information on different aspects related to digital waste, such as the proper disposal of electronic devices, the harmful effects of digital waste, and the utilization of eco-friendly alternatives. The study was targeted towards Lebanese citizens, who represent a diverse population with various levels of education and digital literacy.

II. Data Analysis

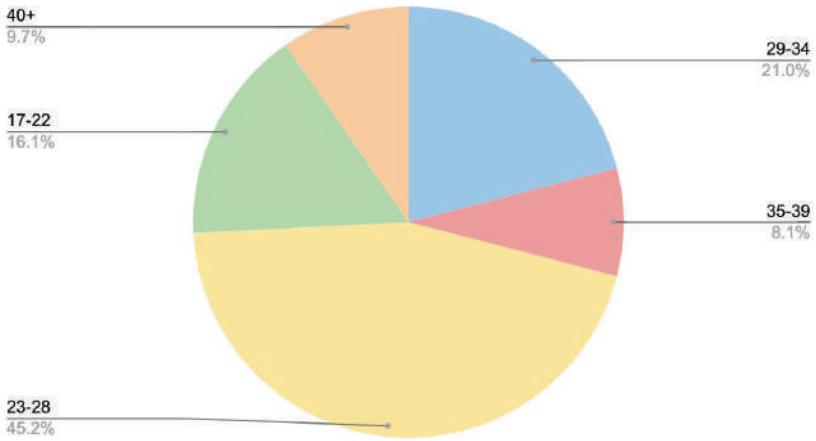


Figure 1. Age of the participants

According to Figure 1., it can be observed that a significant proportion of the participants, representing almost half of the total sample (45%), fell within the age range of 23 to 28 years old.

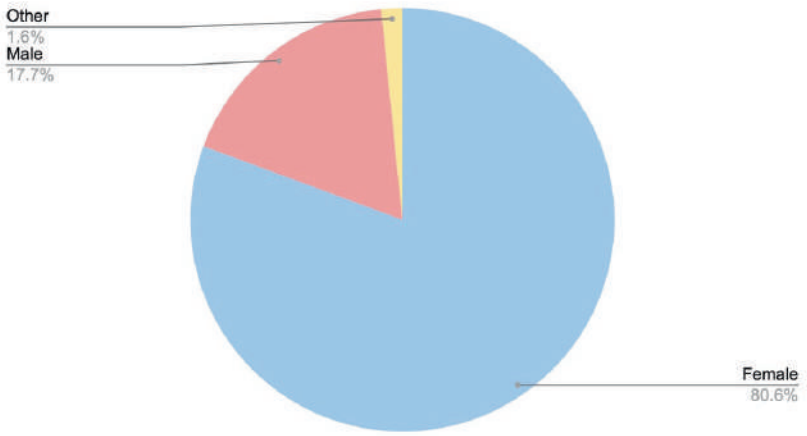


Figure 2. Gender of the participants

The survey results showed that females constituted almost 81% of the respondents, indicating a potential gender imbalance in the field or a higher interest among females. Further analysis could uncover the reasons behind this disparity, informing future research and policy decisions (Figure 2).

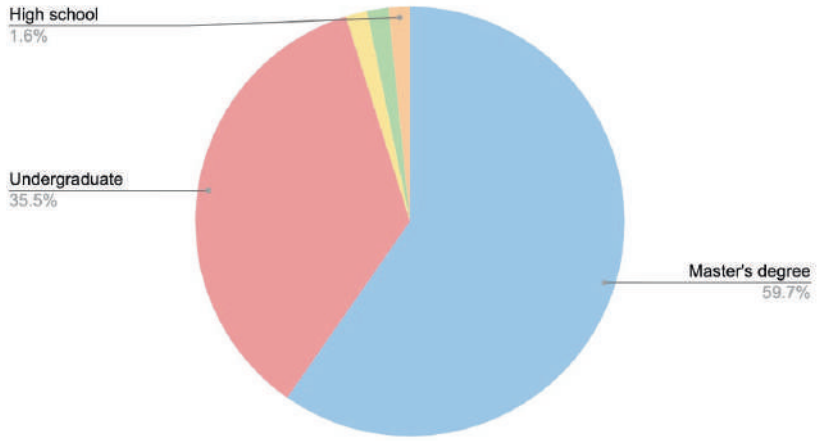


Figure 3. Education of the participants

As seen on Figure 3., the majority of survey respondents had education, with 60% holding a Master's degree and 35.5% having completed undergraduate studies. This suggests that the study appealed to a broad audience with varying levels of education, but particularly to those with advanced qualifications. The high proportion of Master's degree holders may have implications for the interpretation of the results.

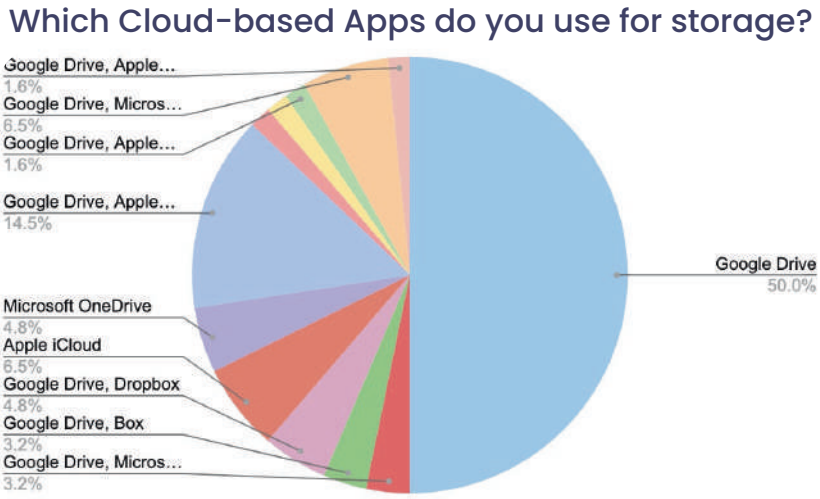


Figure 4. Cloud-based app usage

Google Drive is the most commonly known and widely used storage application among the survey participants. The results indicated that a significant proportion of the respondents were familiar with the application, and a majority of them reported using it frequently for various purposes such as storing documents, images, videos, and other files. (Figure 4).

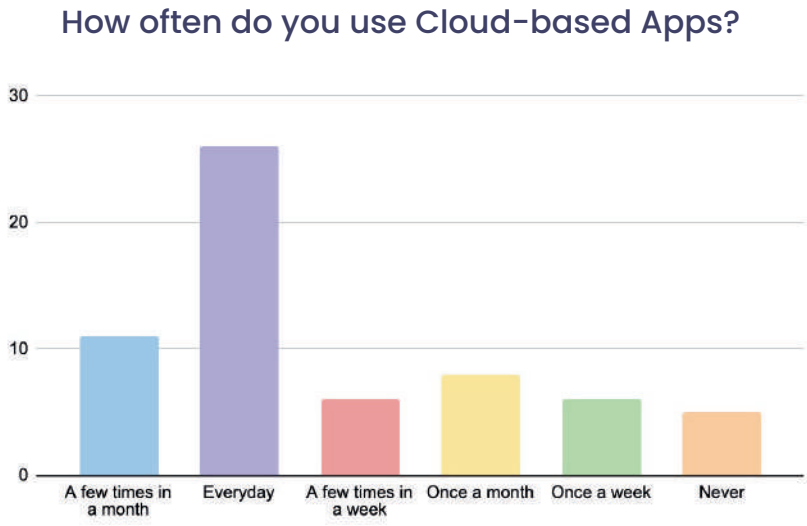


Figure 5. Frequency of cloud-based app usage

According to Figure 5, the majority of people use cloud-based apps daily to back up their photos, videos, and documents. The convenience, accessibility, and security features of these apps have led to a shift from traditional storage methods, reflecting the growing concern for data security and privacy.

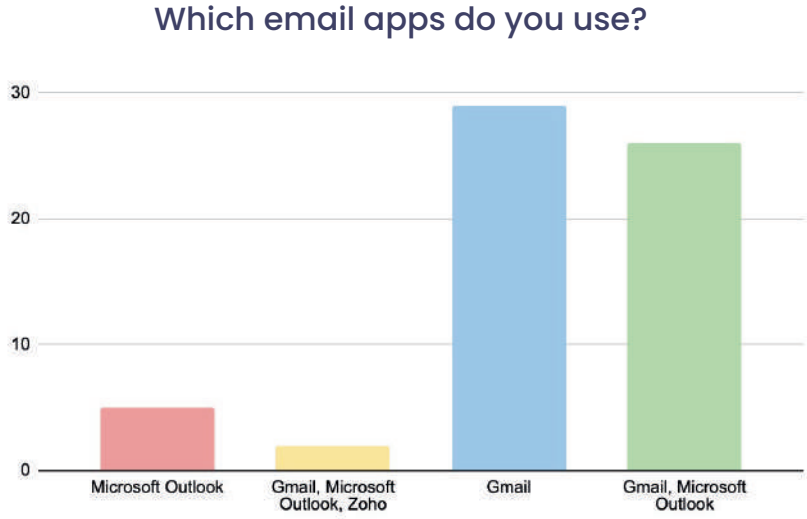


Figure 6. Email app usage

Figure 6. indicates that Gmail is the most popular and widely preferred email application among the participants. A vast majority of the respondents reported using Gmail as their primary email app, highlighting its user-friendly interface, comprehensive features, and seamless integration with other Google services.

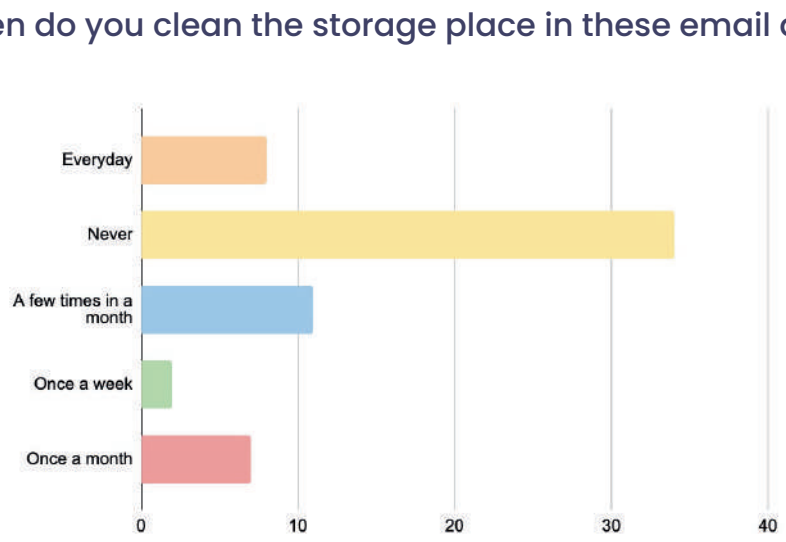


Figure 7. Frequency of clearing emails

Based on the survey results, it can be inferred that a significant proportion of individuals do not delete their unwanted emails and spam messages. The survey revealed that a majority of the participants reported having a cluttered inbox with a high volume of unread and unorganized emails (Figure 7.).

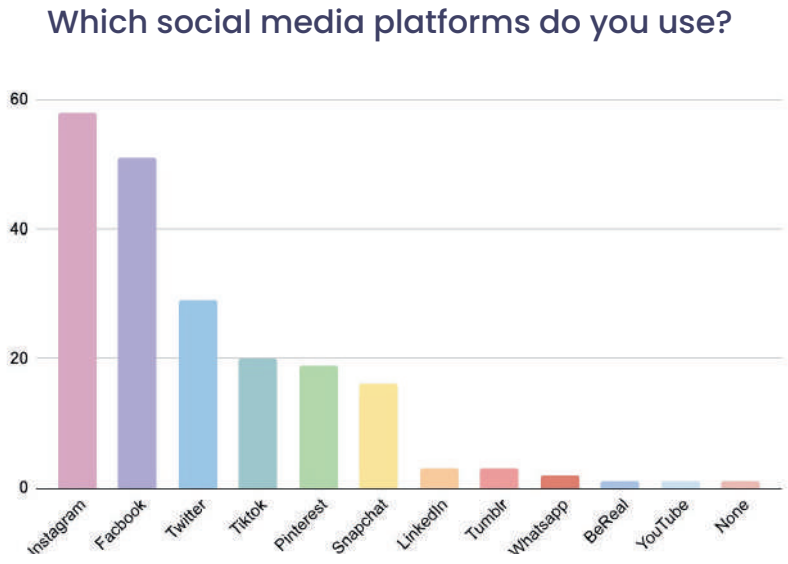


Figure 8. Social media platforms usage

According to Figure 8., the widespread preference for Gmail among the survey participants indicates that it has become the default choice for email communication for individuals across various age groups and professions.

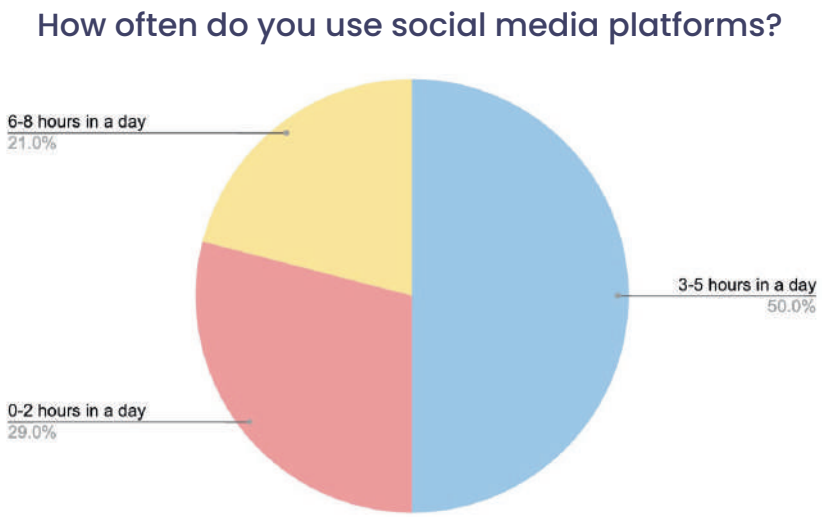


Figure 9. Frequency of social media usage

The majority of participants spend between 3 to 5 hours a day on social media platforms. The survey revealed that individuals across different age groups and professions reported spending a significant amount of time on social media platforms such as Facebook, Instagram, Twitter and LinkedIn (Figure 9.).

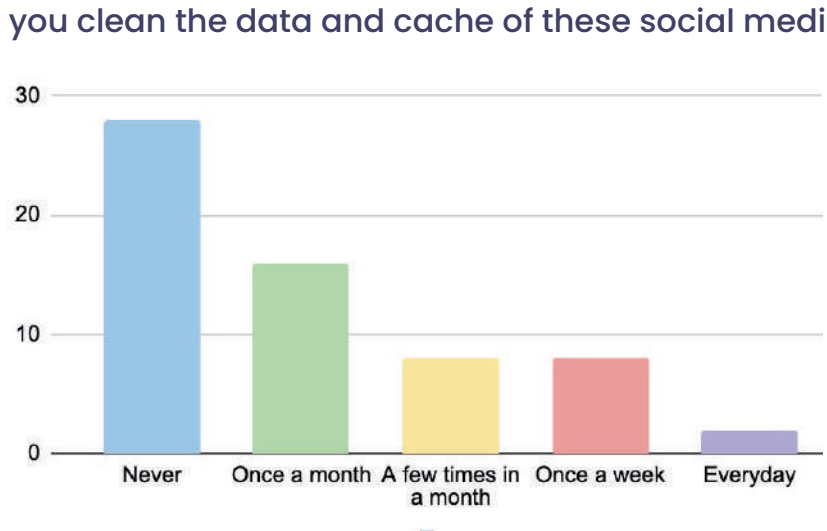


Figure 10. Frequency of cleaning social media data & cache

It can be inferred that a majority of individuals who filled out the survey do not clean their cache regularly. The survey revealed that many individuals were not aware of the importance of clearing their cache or were unsure of how to do it (Figure 10).

Which meeting applications do you use for online meetings?

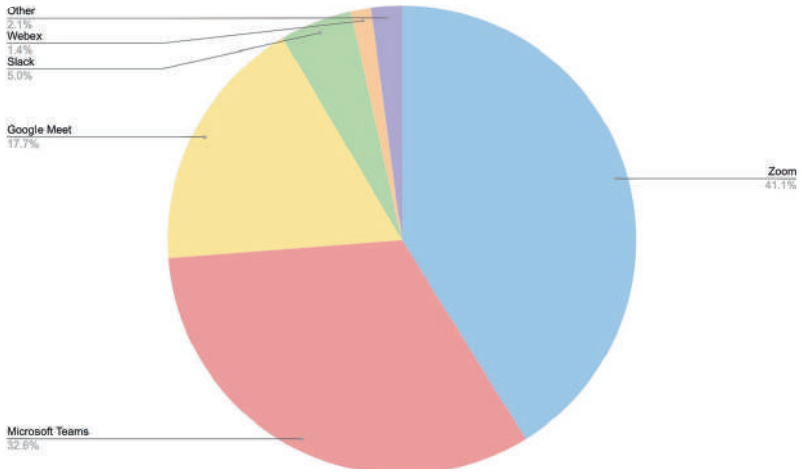


Figure 11. Online meeting app usage

Zoom and Microsoft Teams are the two most widely used applications for online meetings, with a majority of the participants reporting regular usage of these platforms. Google Meet ranked third in terms of popularity, with fewer participants reporting regular usage of the platform (Figure 11).

Did you know these meeting apps can also create a great carbon footprint?

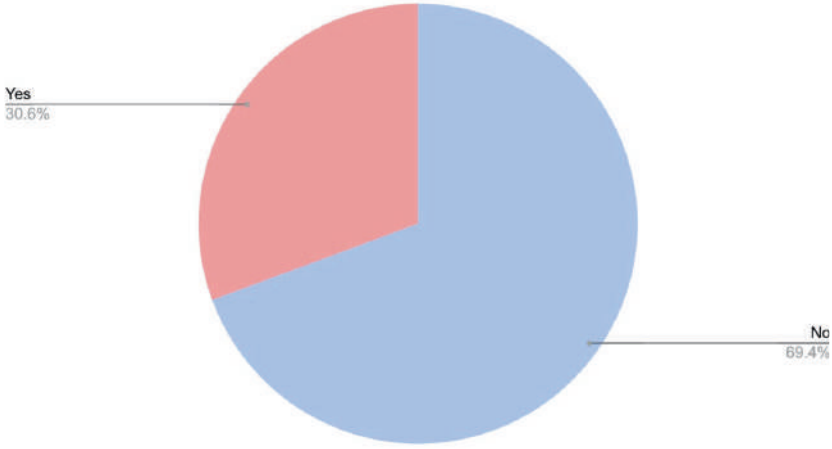


Figure 12. Awareness on carbon footprint

There is a general lack of awareness among individuals regarding the environmental impact of online meeting applications. Many participants reported not knowing about the carbon footprint left by these apps or the ways to reduce their environmental impact (Figure 12).

Did you know that the storage we use consumes energy and cause more carbon emission?

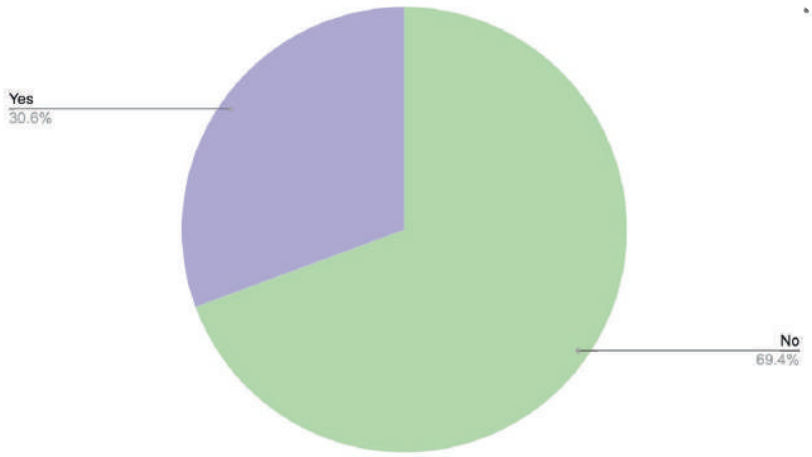


Figure 13. Awareness on energy consumption and carbon emission

Based on Figure 13, it can be inferred that a significant majority of individuals (around 70%) had little to no knowledge regarding the energy consumption and carbon emissions associated with digital storage. Many participants reported not being aware of the environmental impact of their digital storage habits or the ways to reduce their carbon footprint.

Do you use applications to clean your storage and delete junk files?

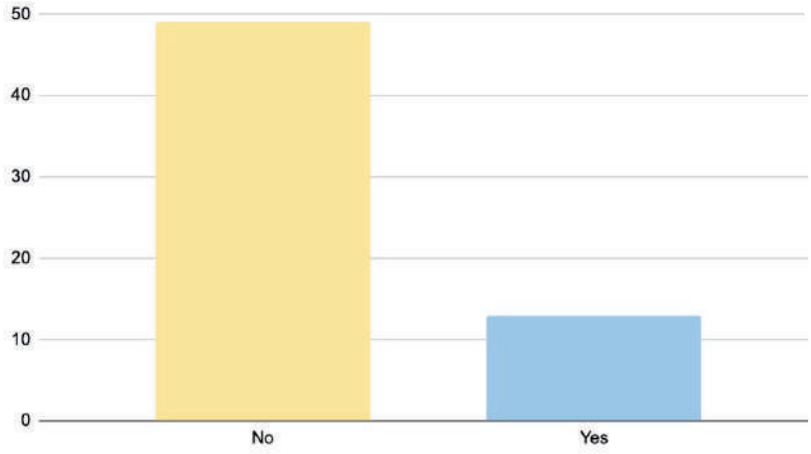


Figure 14. App usage for cleaning storage

A majority of individuals do not perform any form of cleaning or maintenance on their digital storage. Many participants reported having cluttered and disorganized storage, with numerous duplicates and unnecessary files (Figure 14).

Do you know what digital waste is?

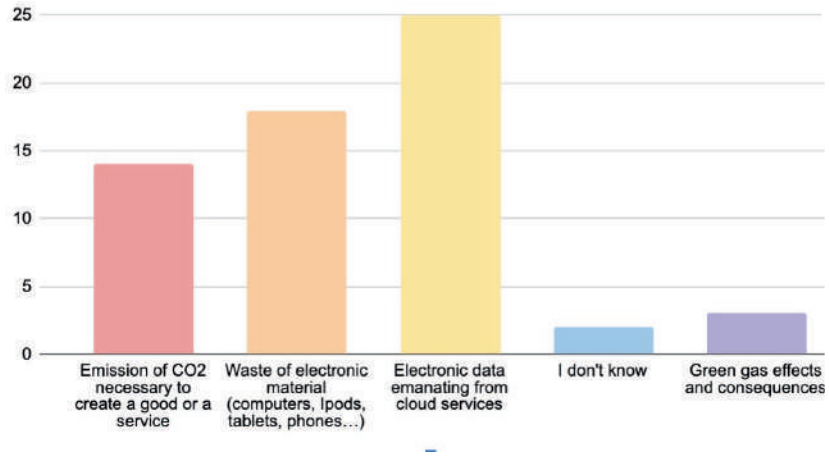


Figure 15. Awareness on digital waste

It appears that there is a lack of awareness among Lebanese people regarding digital waste and its impact on the environment. Many participants reported not knowing about the various forms of digital waste or the ways to reduce their environmental impact (Figure 15.).

Which social media platform has the biggest carbon footprint?

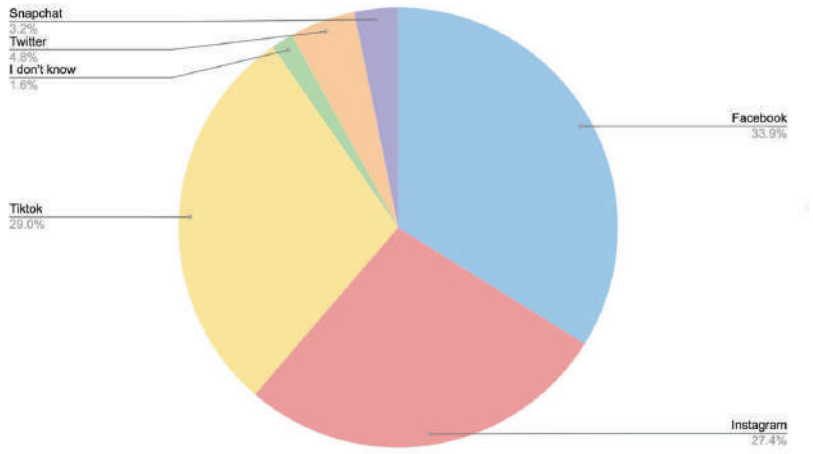


Figure 16.

Facebook, Tiktok, and Instagram ranked amongst the most widely used social media platforms by the participants. These platforms are popular among individuals of all age groups, with many reporting daily usage and active engagement with content (Figure 16).

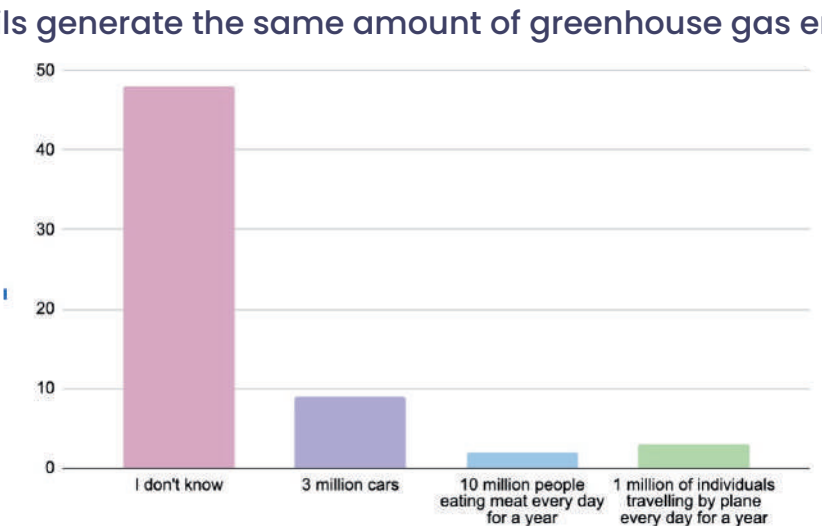


Figure 17.

Based on Fİgure 17, it can be inferred that a significant number of individuals, more than 48 people, had little to no knowledge regarding greenhouse gas emissions. Many participants reported not knowing about the environmental impact of greenhouse gas emissions or the ways to reduce their carbon footprint.

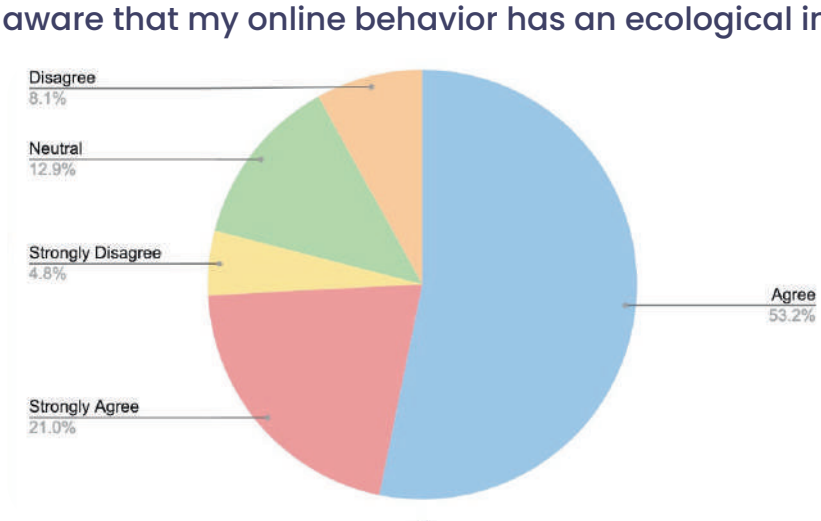


Figure 18.

it appears that more than 50% of the participants were aware of the impact of their online behavior on the environment. Many participants reported being conscious of their digital carbon footprint and taking steps to reduce their environmental impact (Figure 18).

I know that I am supposed to delete my emails regularly

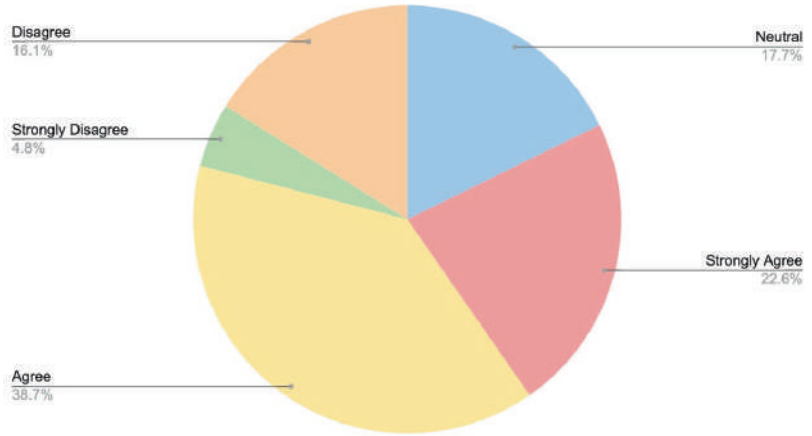


Figure 19.

There were varied opinions regarding the regular deletion of emails, with some participants advocating for regular deletion while others disagreed. However, the majority of participants believed that it is important to regularly delete unnecessary emails (Figure 19).

I tend to store my files on CDs/DVDs/sticks/hard disks

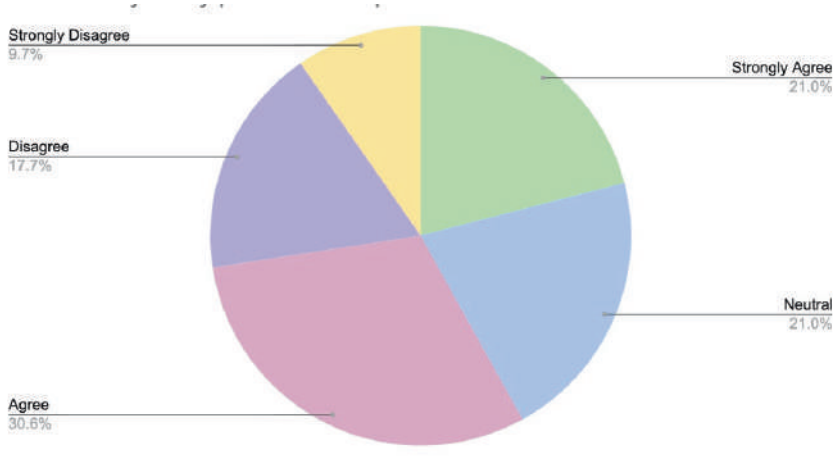


Figure 20.

The majority of participants agreed on how they store their files on external storage. Many reported using external hard drives, USB drives, or cloud-based storage services for their file storage needs (Figure 20).

I unplug my appliances when I am not using them

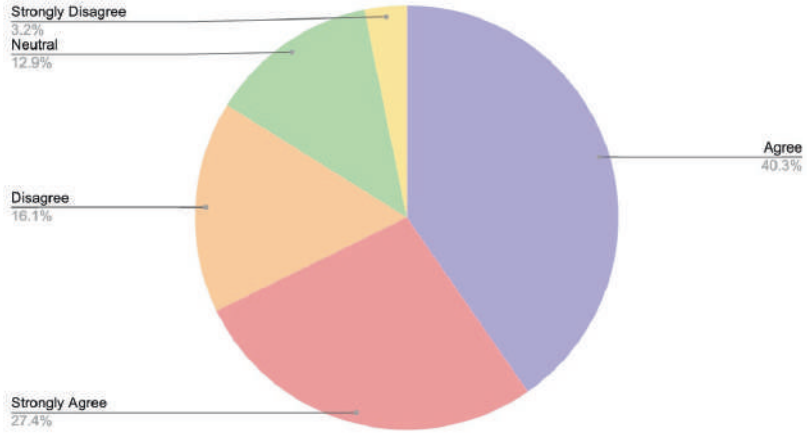


Figure 21.

A lot of people in Lebanon, 40% to be specific, unplug their appliances, due to the electricity shortage in the country (Figure 21.).

I am used to completely switching off my computer when I'm not using it

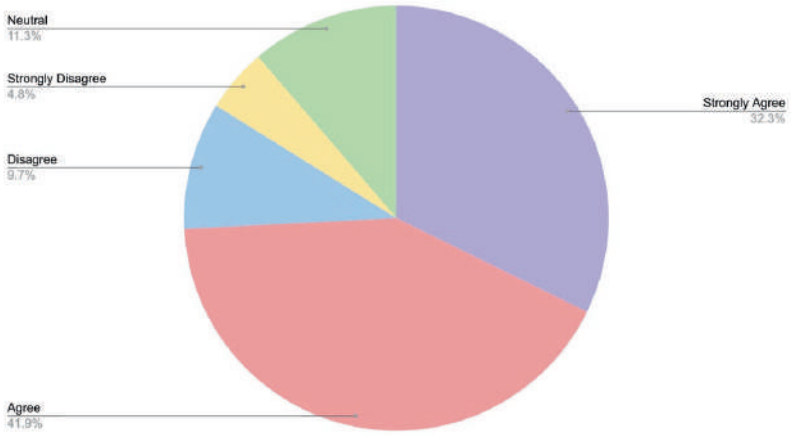


Figure 22.

Figure 22 reveals that 33% strongly disagreed while 42% agreed with the idea of completely switching off computers. This indicates a potential divide in opinion on the matter, which could be influenced by factors such as energy consumption, convenience, or knowledge. These findings can inform future initiatives to promote sustainable digital practices and reduce energy consumption.

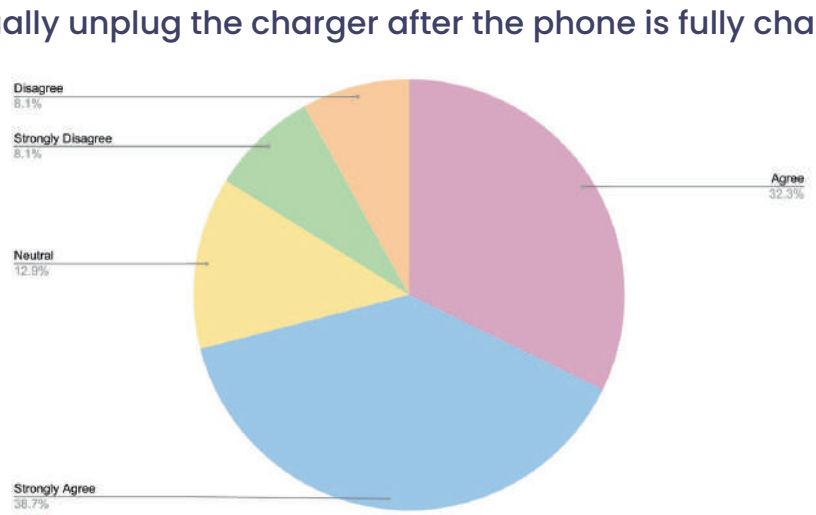


Figure 23.

According to the survey results, almost 80% of participants agreed that they unplug their phone once it's fully charged (Figure 23).

Conclusion

According to the survey results, it appears that those who participated in the survey, while they represent only a small portion of the population, have little to no awareness on digital waste and the impact their online behavior has on the environment.

This lack of awareness is a concerning trend, as the rapid growth of digital technologies has led to a significant increase in digital waste and carbon emissions. Educating individuals on the importance of responsible online behavior and the impact of their digital footprint on the environment is crucial in mitigating these negative effects.

By raising awareness and promoting eco-friendly practices such as energy conservation, proper electronic waste disposal, and reducing unnecessary digital clutter, we can work towards a more sustainable digital future.

Co-funded by
the European Union

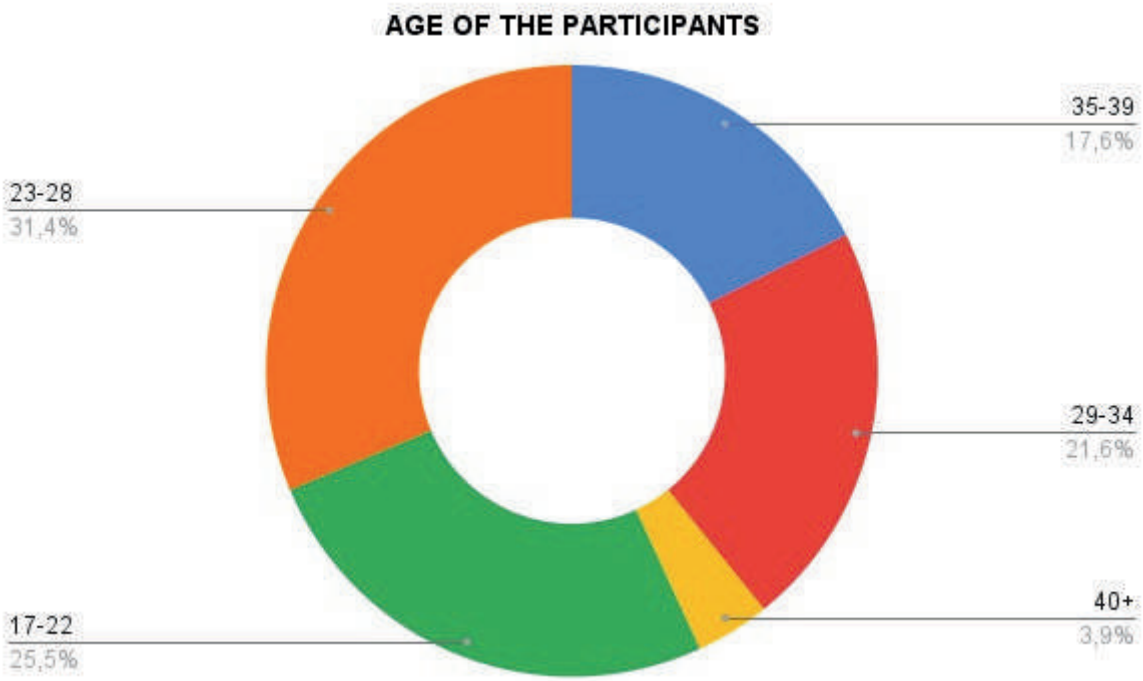
Eco-Digital Literacy and Citizenship for Our Planet and Future (Digital Waste)

2021-1-TR01-KA220-YOU-000028571

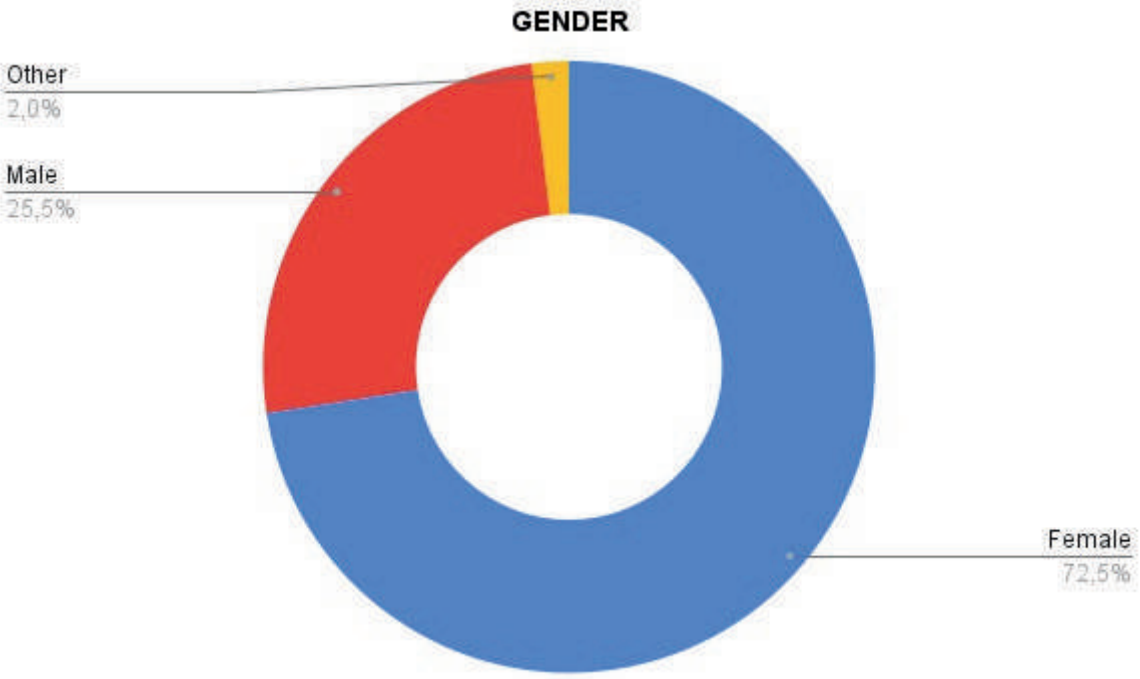
Results of the Needs Analysis

FRANCE

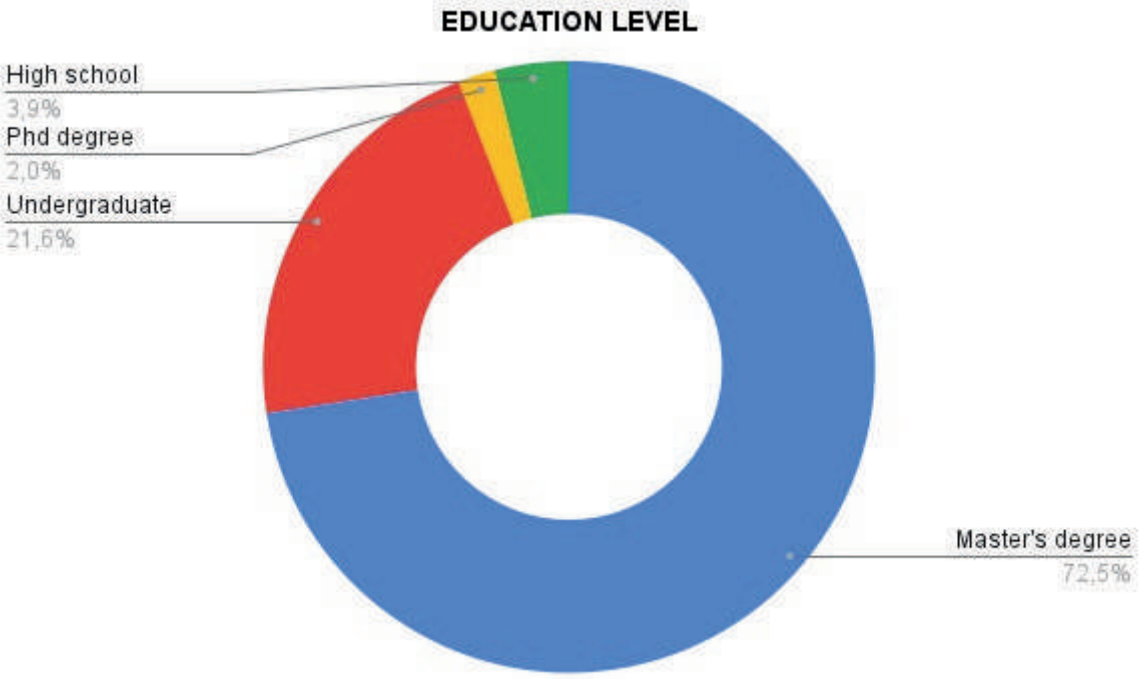
This report represents the result of a collaborative effort between all partners that led to the development of this questionnaire. This report illustrates the results of this survey conducted via the Internet among the French population to determine the level of awareness of the French population. The questionnaire reached 52 people and the figures represented by the graphs suggest results on the basis of which it is possible to initiate the study, which will be presented in this document.



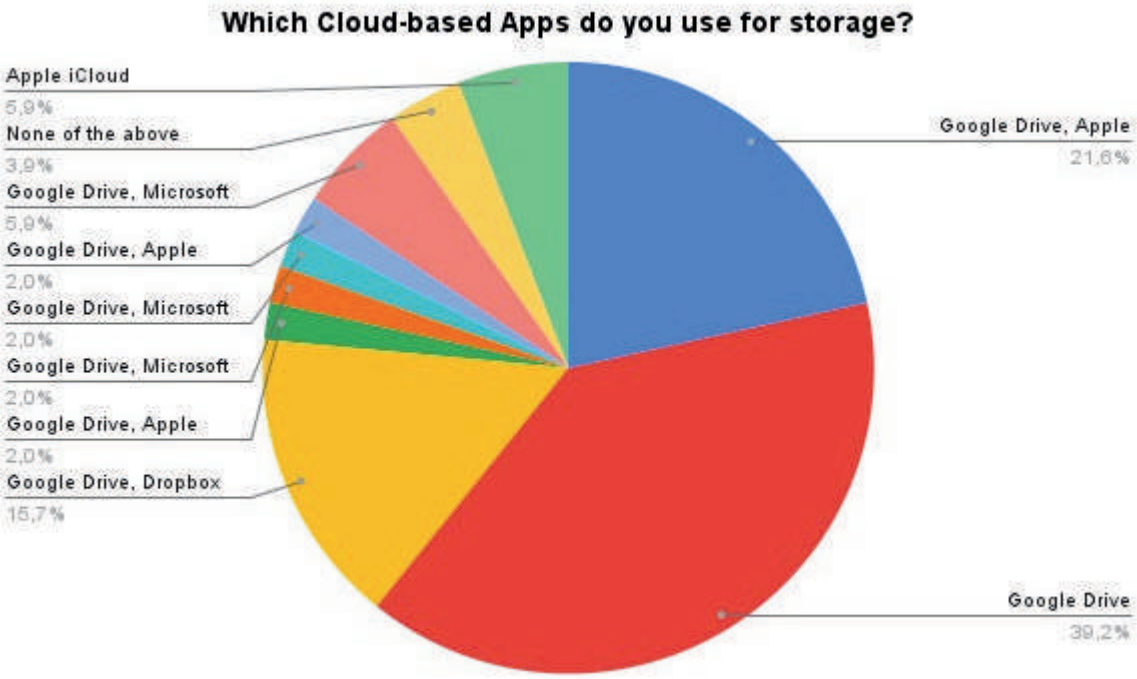
People between 23 and 31 years old responded the most to this questionnaire with a participation of more than 30%. Younger people aged 17-22 represent 25,5% of respondents to this questionnaire followed closely by the 29-34 years old who are 21,6%, meanwhile the 40+ are the least involved in this survey with only 3,9% of the responses.



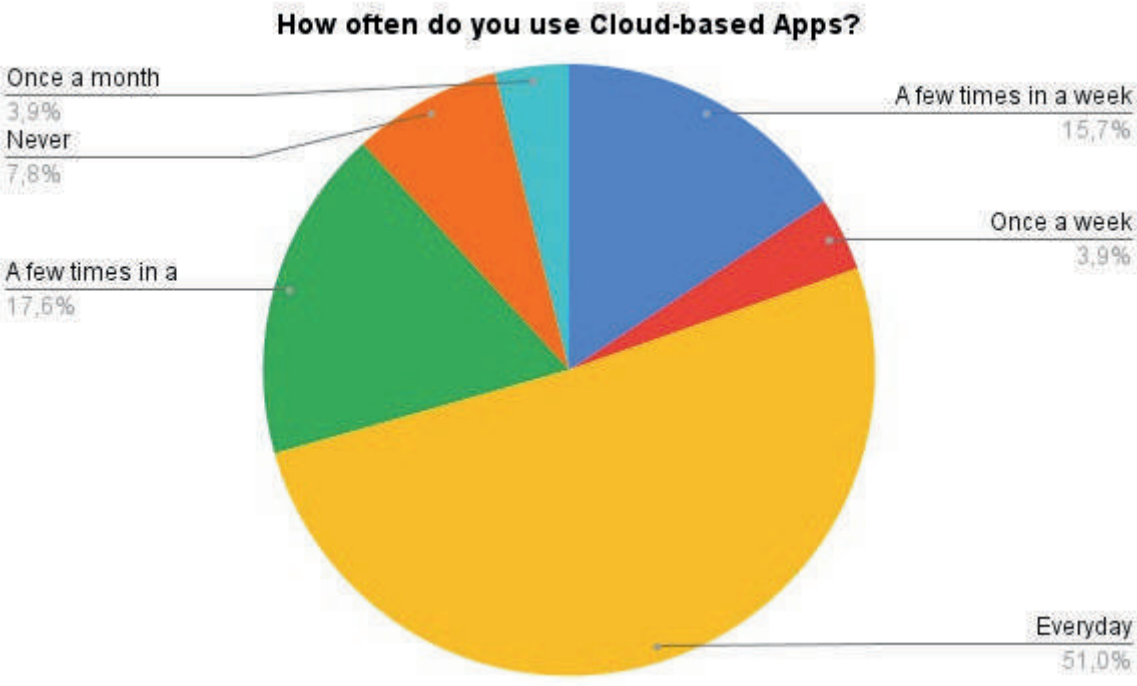
- As the graphic suggests, women participated the most in this survey, with more than 75% as opposed to men who, as indicated, participated 25,5%.



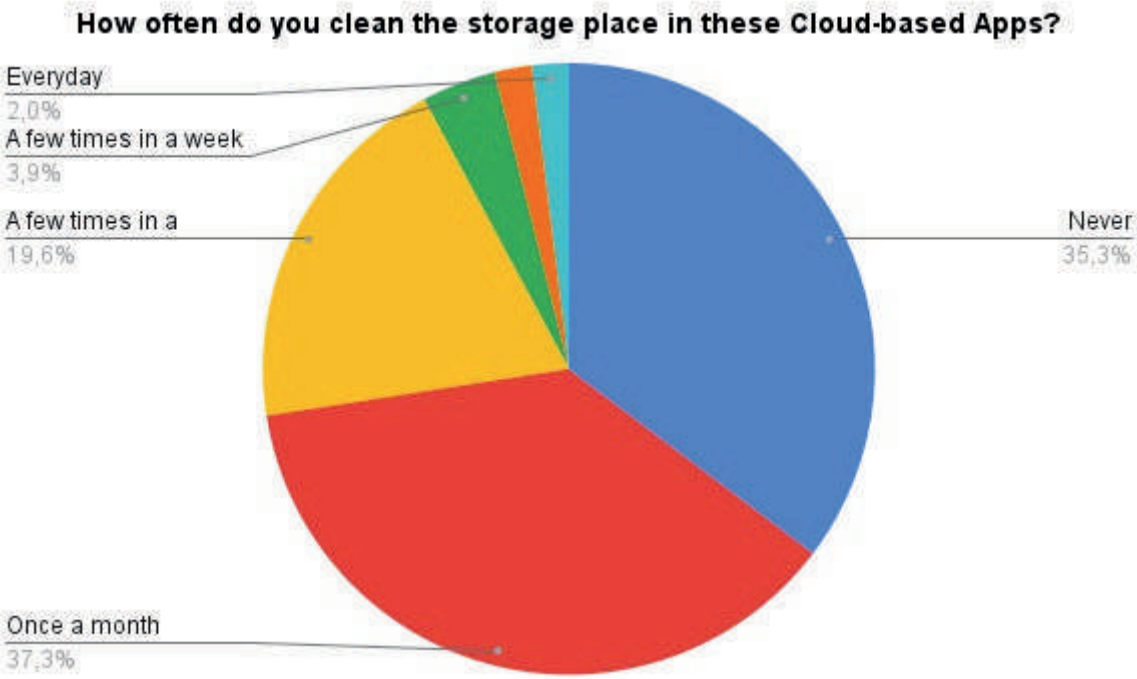
- Regarding the education level of the respondents to this questionnaire, we observe that 72,5% of them have a master's degree, while 21,6% are undergraduate students and just 3,9% are in high school.



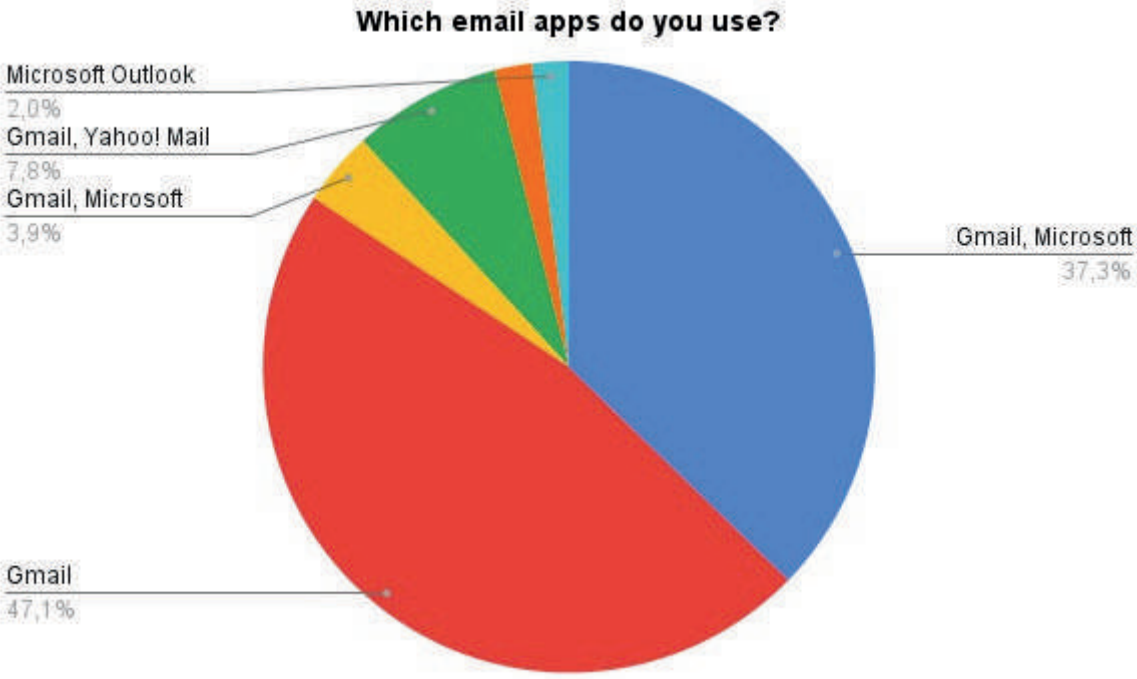
- As the figure indicates, Google Drive is the most used cloud application for storage. Dropbox and Apple remain in the second rank. We should also note that 3.9% of respondents do not use any of these applications for storage.



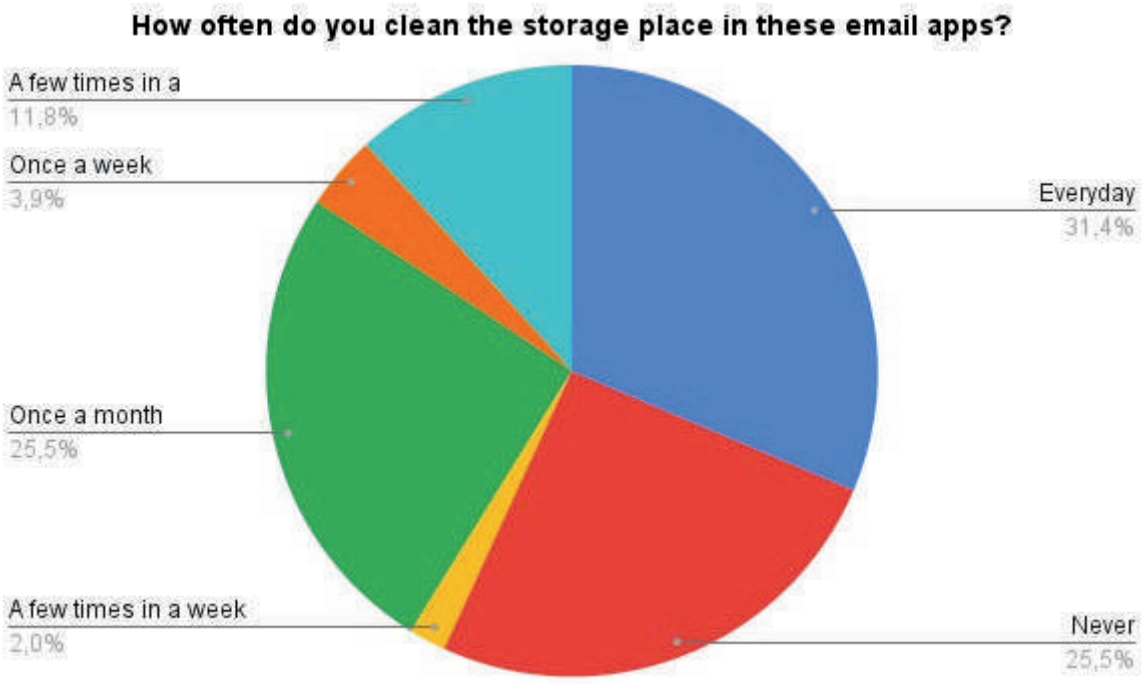
- These cloud-based applications are used every day by more than half of the participants, representing 51%. 17,6% of the participants are using these applications a few times in a month followed by 15,7% of those who use it a few times in a week.7,3% are using it either once a week, or once a month. Lastly, only 7,8% never use these Cloud-based apps.



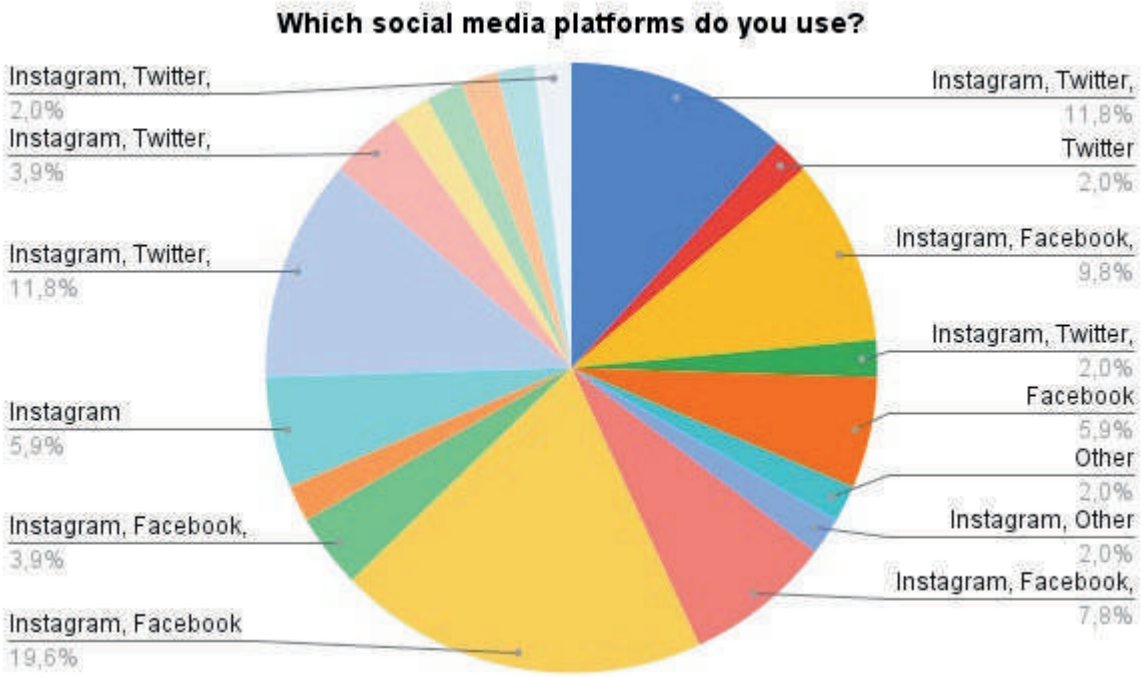
- Regarding the cleaning of the storage place in these cloud-based applications, 37,3% of participants clean it one a month, 35,3% do not clean up their storage at all. However, 2% of the participants do it every day.



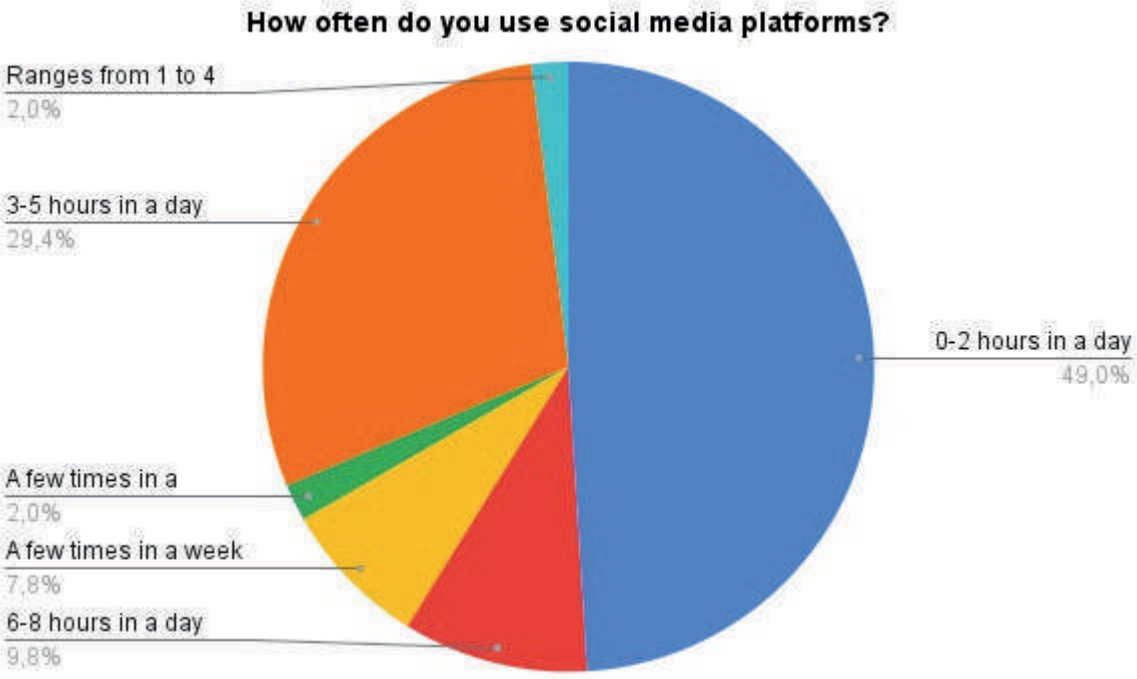
- According to the graphic, the most used email application is Gmail, which is used by 47,1% of the participants, followed by Microsoft Outlook with a usage of 37.3%. As for Yahoo, only 7,8% of them use it.



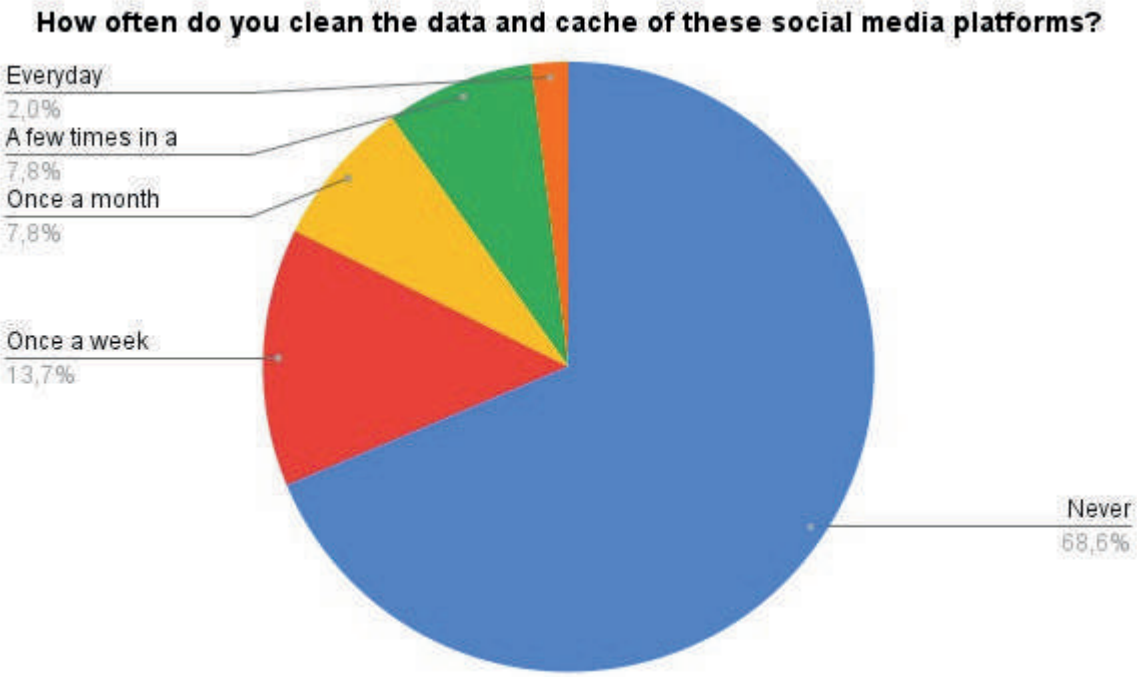
- Regarding cleaning the storage place of these email applications, 31,4% of the participants do it daily, while 25,5% of them do it either once a month, or never at all.



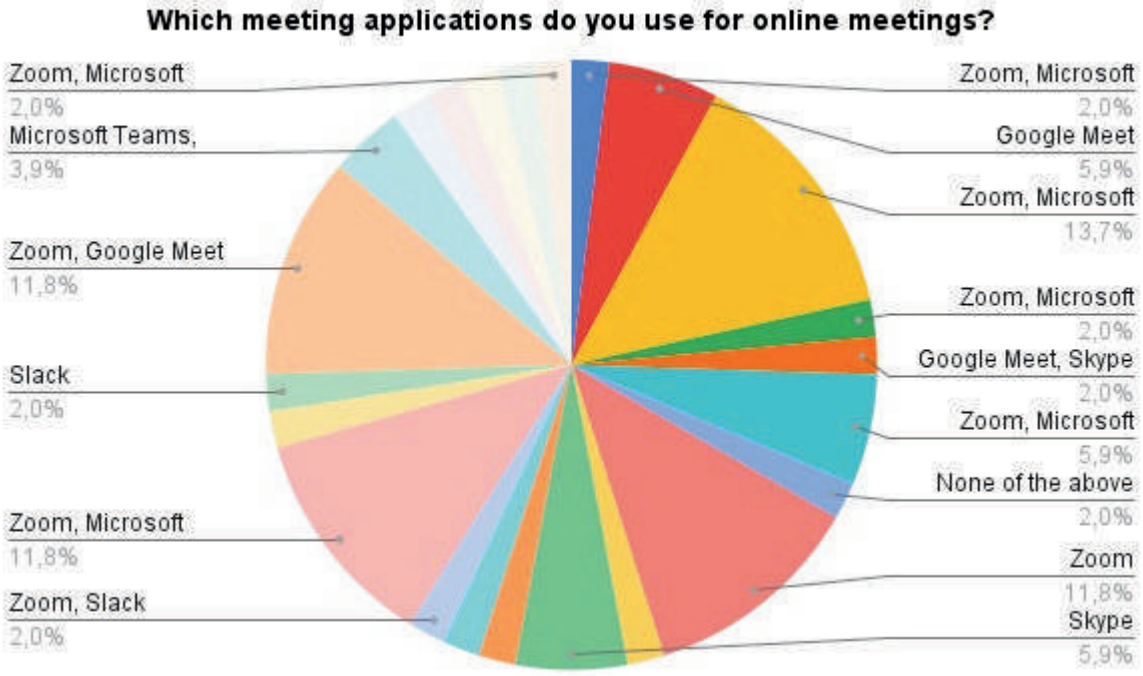
- As the graphic suggests, the most used social media platforms remain Instagram, followed by Facebook and Twitter. Pinterest and other apps are only rarely used by the participants who filled out this survey.



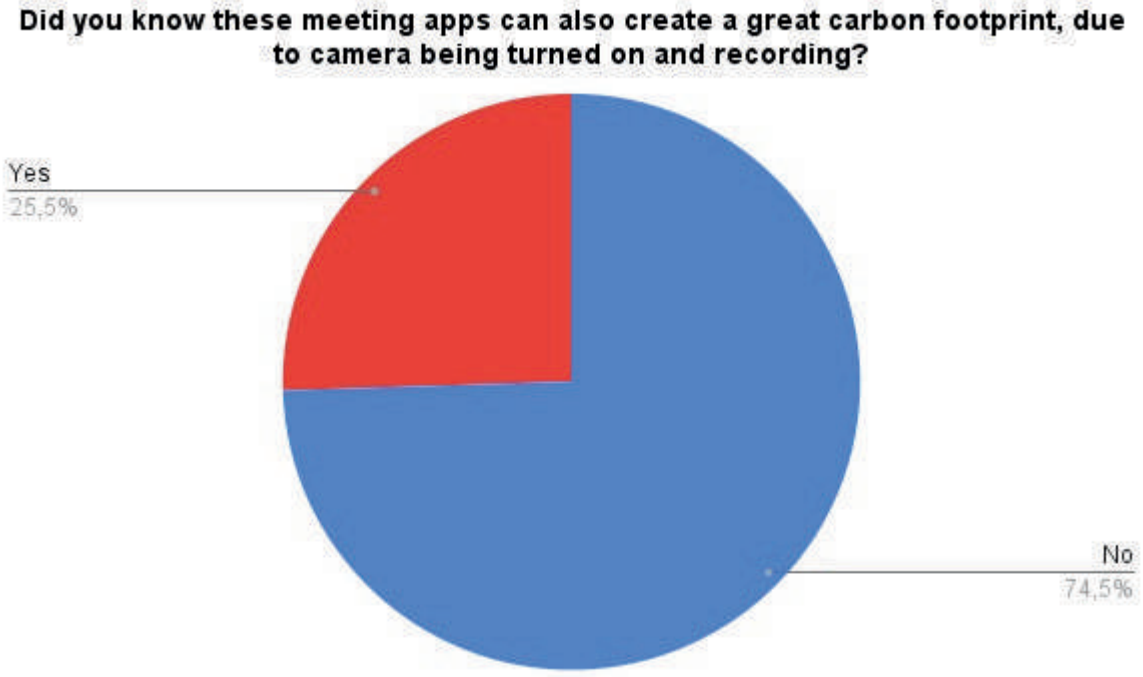
- In terms of social media platforms, 49% of people spend between 0 and 2 hours a day using them, 29.4% use them for 3 to 5 hours a day. Only 9,8% use them between 6 and 8 hours a day. Lastly, only 7,8% use these media platforms few times in a week.



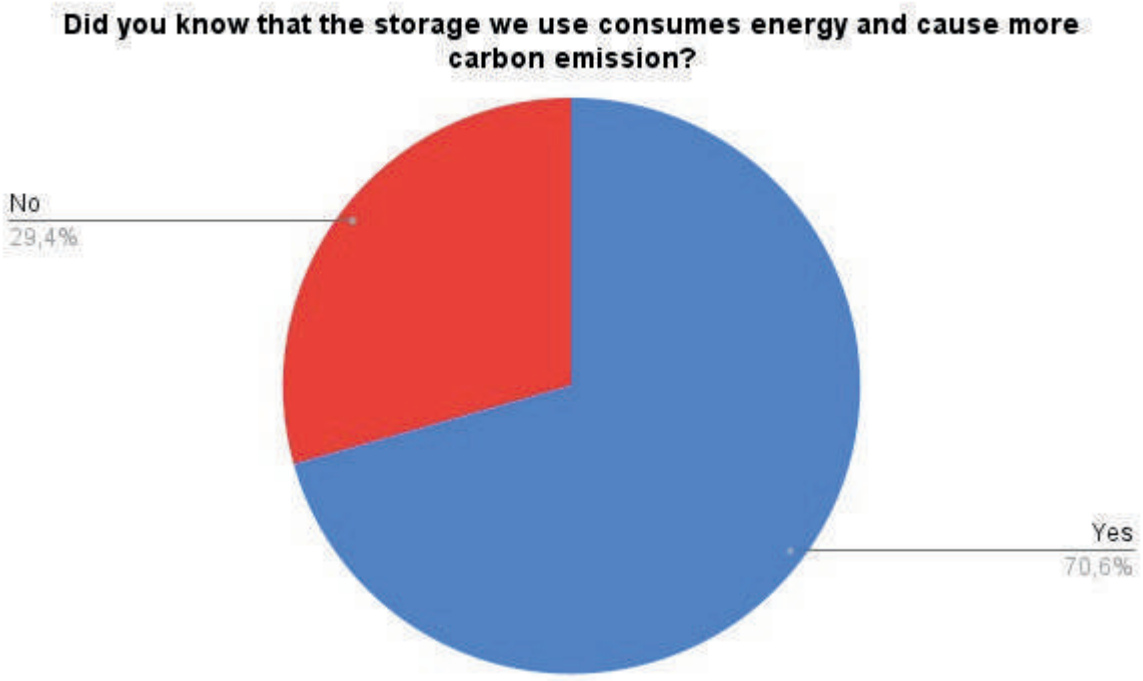
- 68,6% of respondents never clean the data and the cache of these social media platforms, 13,7% dot it once a week and 7,8% do it either once a month or few times in a month. However, we can notice that 2% do it every day.



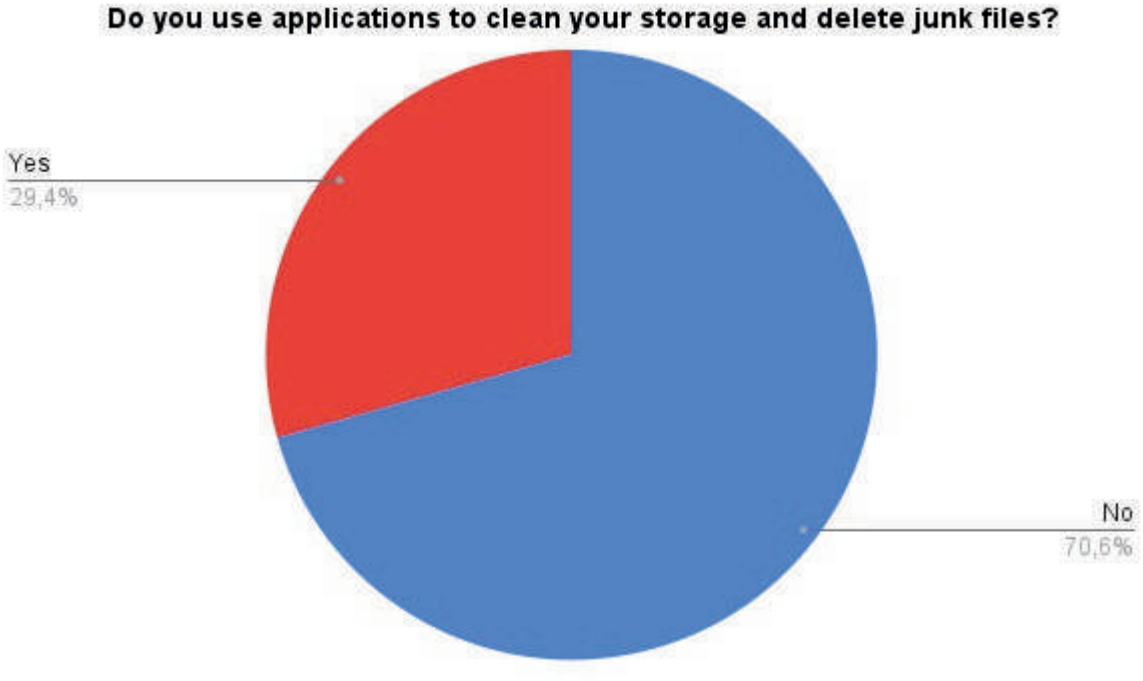
- As for the meeting applications used for online meetings. The most used application is zoom. It is followed by google meet and skype as well as Microsoft teams. 2% of the respondents either use Slack or none of these online meeting applications.



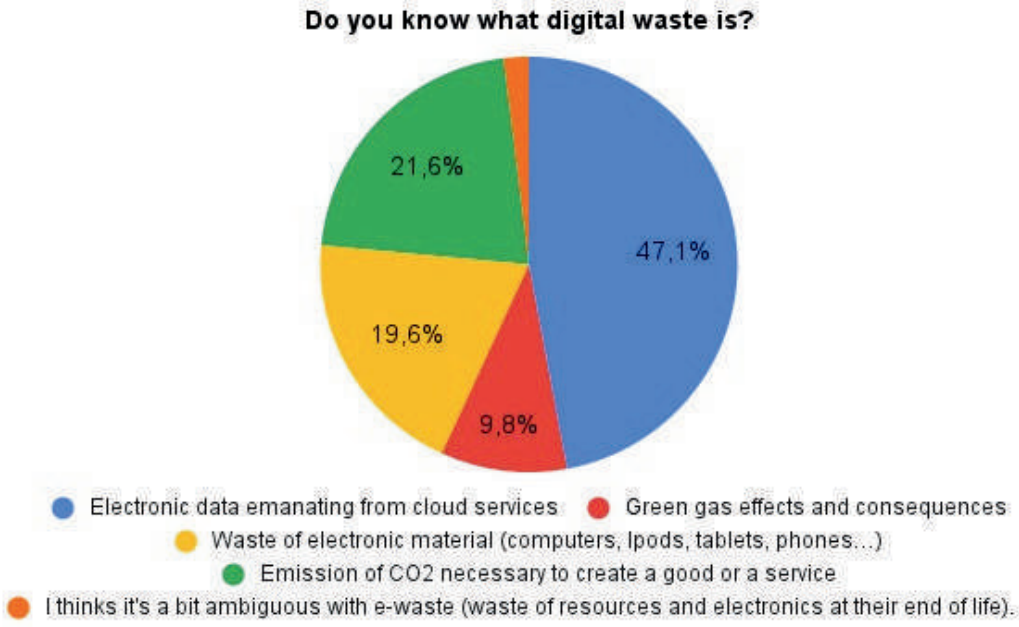
- As the figure illustrates, 74,5% of respondents didn't know that these meeting apps can also create a significant carbon footprint, due to camera turn-on and recording, compared to 25,5% of respondents who already knew.



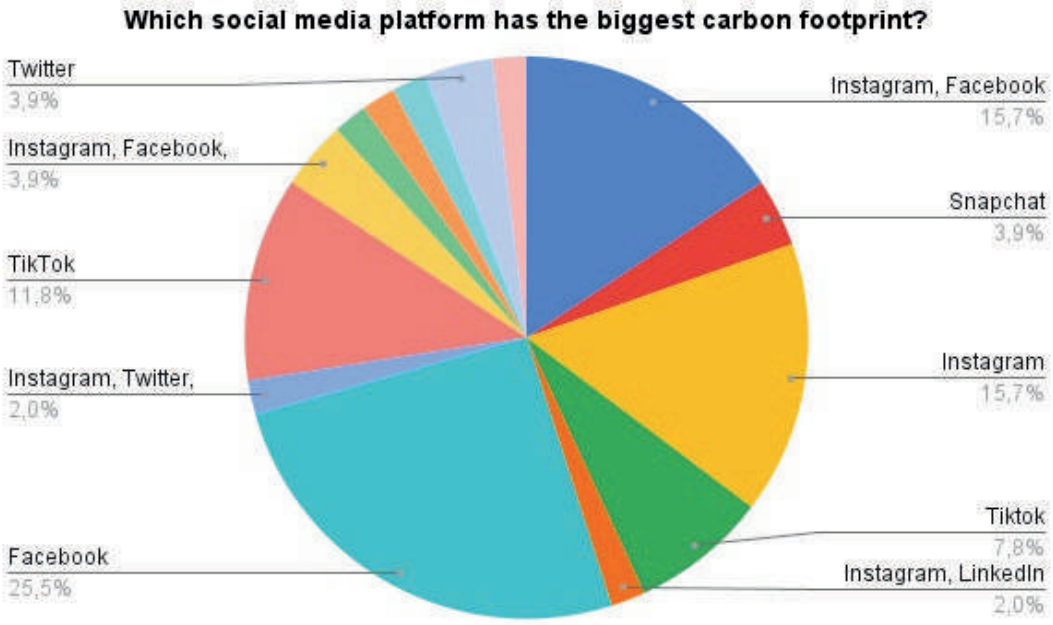
- 70,6% of respondents know that the storage we use consumes energy and causes more carbon emissions, while 20.8% are unaware of this fact.



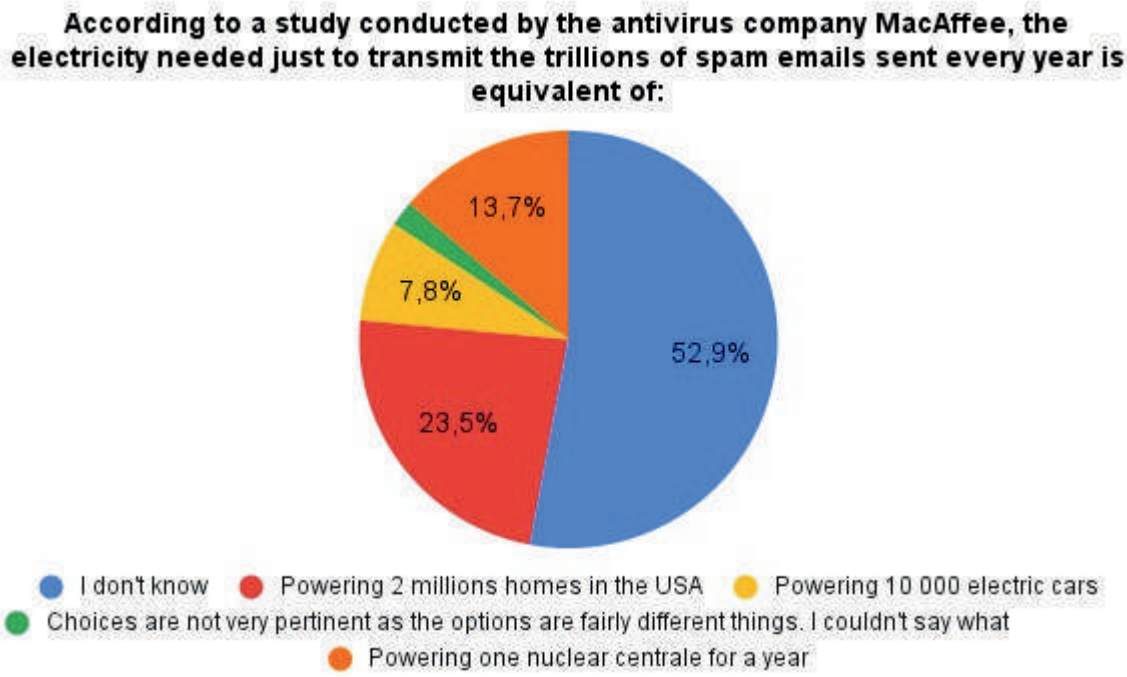
- 70,6% of respondents do not use any application to clean up their storage and delete junk files, as compared to 29,4% who use them.



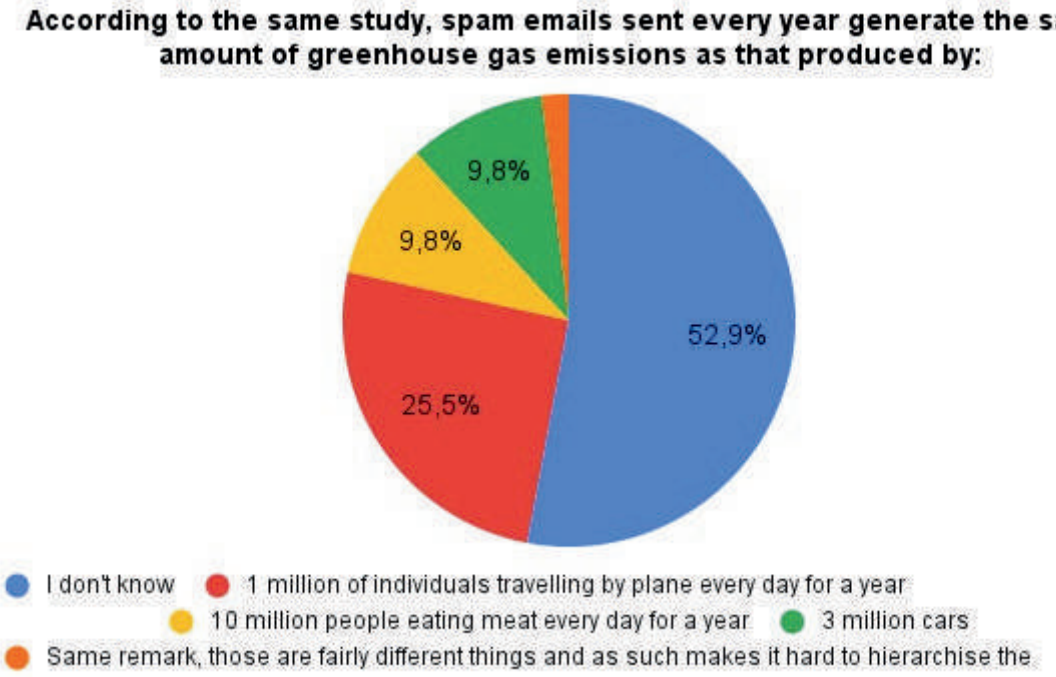
- 47,1% of respondents believe that digital waste is electronic data from cloud services, while 21,6% believe it is the CO2 emission required to create a good or service, 19,6% the waste of electronic equipment (computers, Ipods, tablets, phones...). Lastly, 9,8% consider it to be the effects and consequences of green gases, however, 2% of people find it a bit ambiguous.



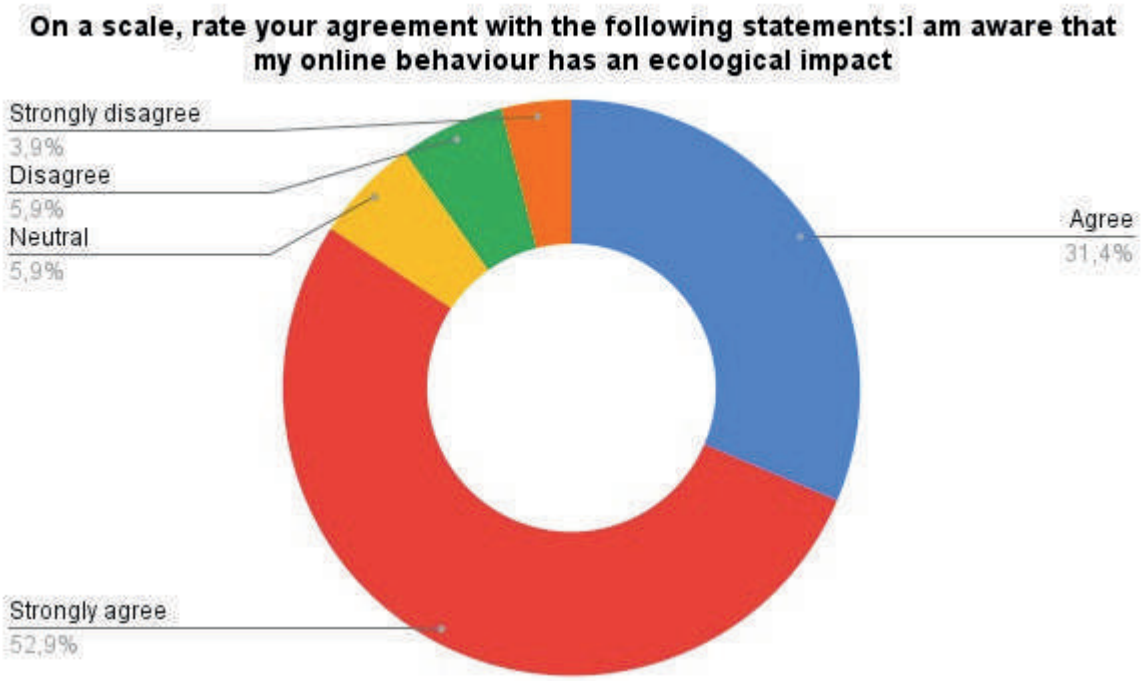
- As for which social media platform has the largest carbon footprint, respondents believe it is Facebook, followed by Instagram, then TikTok and Twitter. Snapchat and LinkedIn come in last, which makes it, still according to our participants, the application with the lowest carbon footprint.



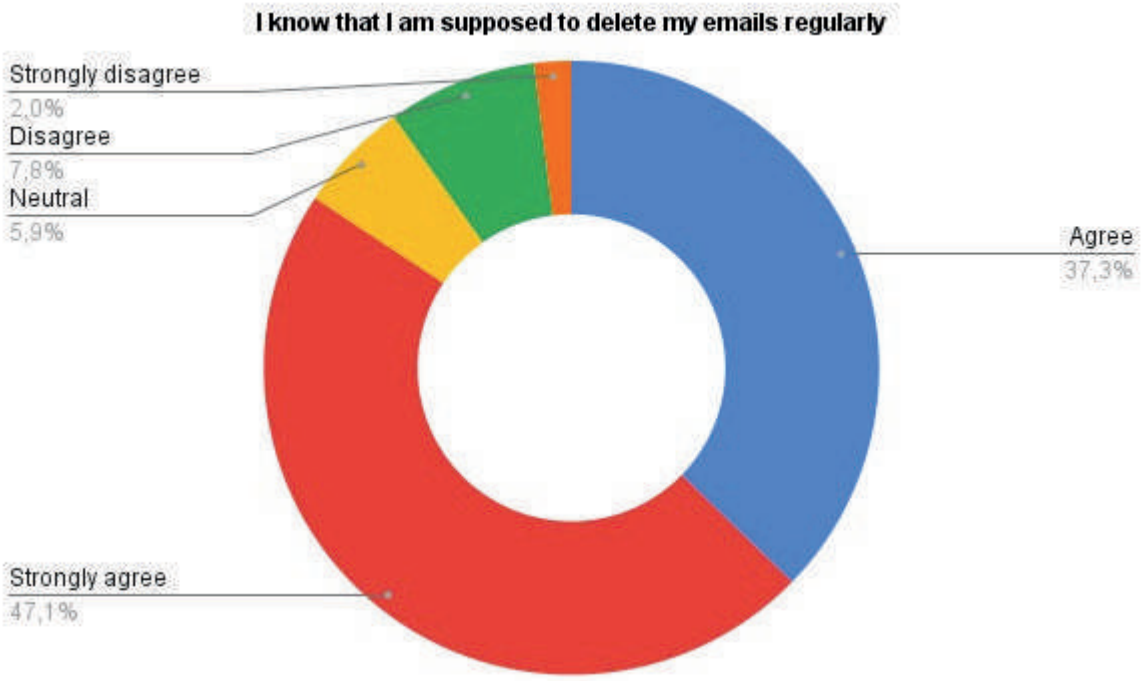
- As the chart shows, more than half, effectively 62.5% of respondents, do not know the equivalent amount of electricity required just to transmit the trillions of spam emails sent each year. 25% believe that it powers 2 million homes in the US, while 8.3% believe that it powers 10,000 electric cars.



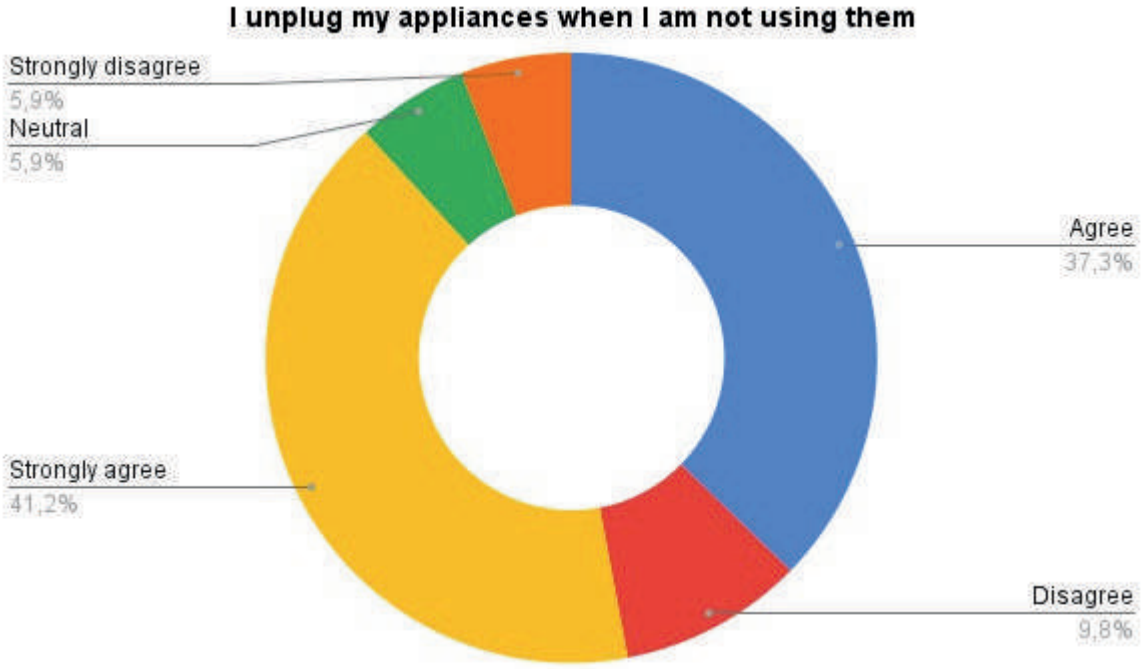
- As the graph shows, more than half of the respondents (52,9%) don't know the amount of emissions generated by spam sent each year. 25,5% believe it is the equivalent of 1 million people flying every day for a year. 9,8% estimated that it is either equal to 3 million cars or equivalent to 10 million people eating meat every day for a year.



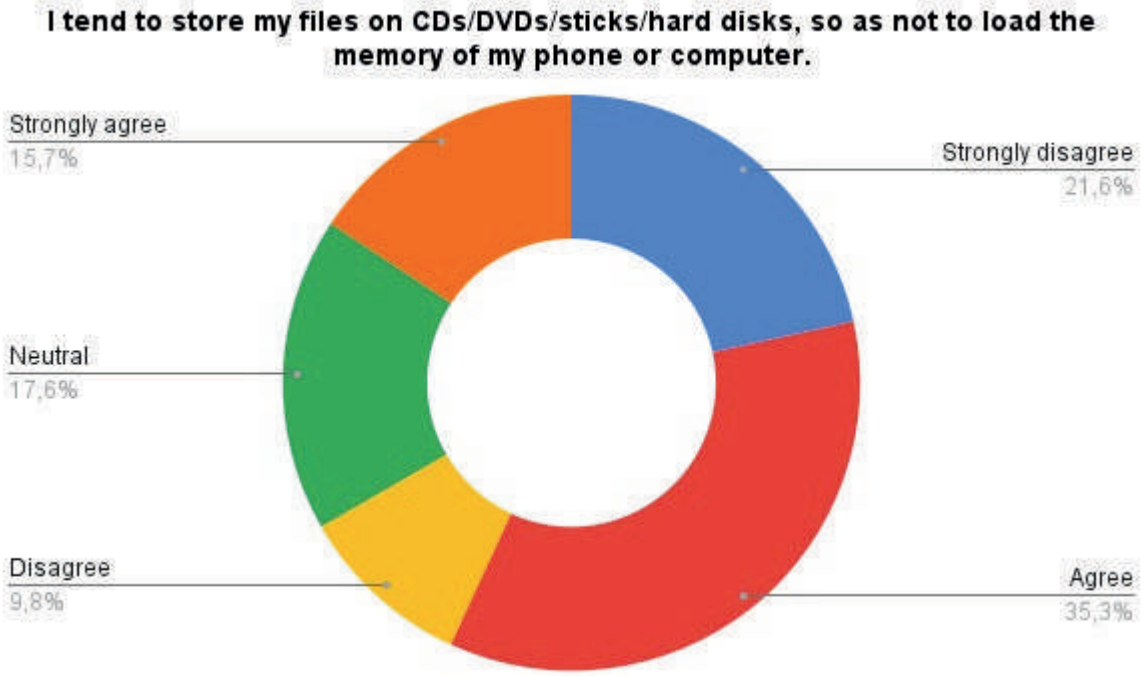
- Most people strongly agree that their online behavior has an ecological impact.



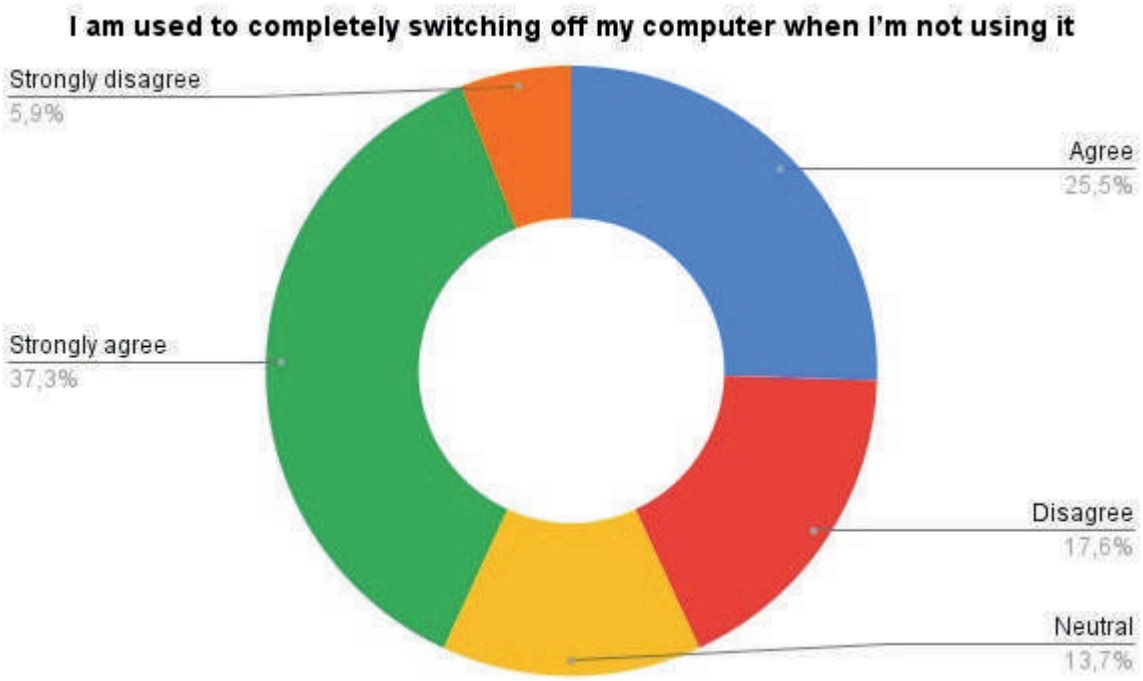
- Most people strongly agree that they are supposed to delete their emails regularly.



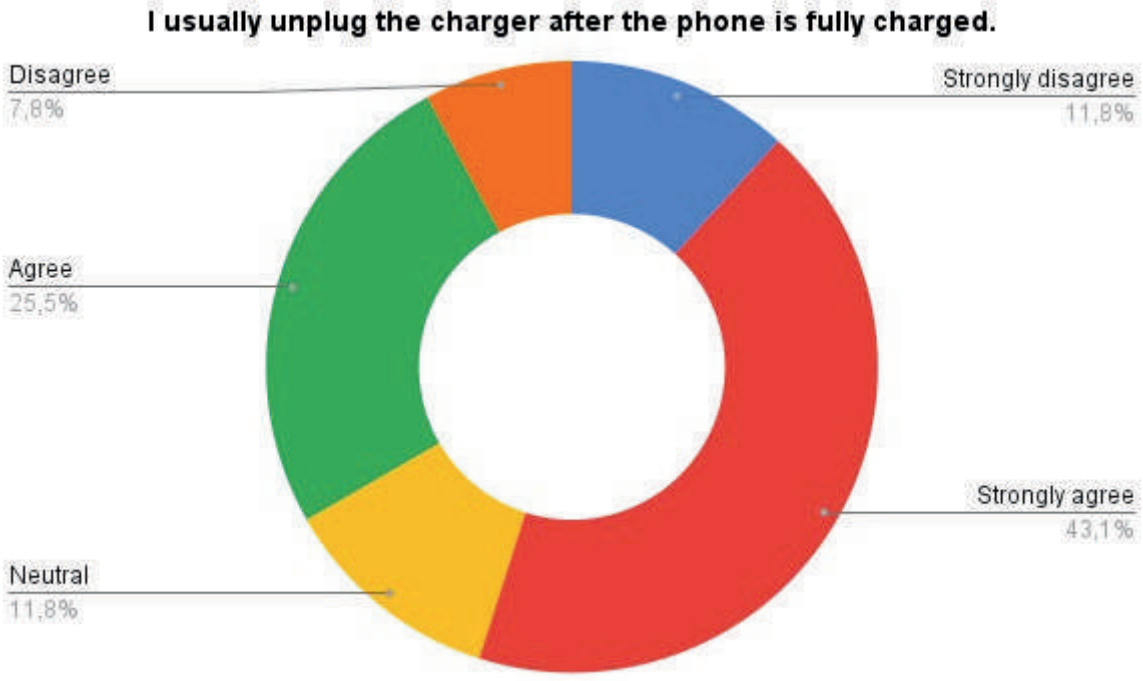
- Most people strongly agree that they unplug their appliances when they' re not being used.



- Most people agree or strongly agree that they tend to store their files on CDs/ DVDs/sticks/hard drives, so as not to load their phone or computer memory. Some respondents, however, strongly disagree or are neutral.



- Most respondents agree or strongly agree that they usually turn off their computer completely when they are not using it, but relatively few disagree with this statement.



- Finally, regarding that last statement, most people agree or strongly agree that they unplug the charger once their phone is fully charged.

Activities Done Under the Project

Activities Done Under the Project

Transnational Project Meeting (TPM) -1

Date: 1-2 October 2022

Venue: Ankara, Turkey

The first Transnational Project Meeting was attended by our Turkish, French, Lebanese, Portuguese and Romanian partners. In the meeting, a path was drawn for the project by planning 2 year project process. The meeting began with a brief presentation of our hosts and the other organizations involved in the project consortium. We familiarized ourselves with the structure and content of a mobile phone application aimed at detecting and deleting files that consume high amounts of energy. We started conducting a needs analysis for each country, the results of which were interpreted in the first Learning, Teaching, and Training (LTT-1) Activity, which took place in Mardin, Turkey.

Activities Done Under the Project

Learning, Teaching, Training (LTT) -1

Date: 10-16 October 2022

Venue: Mardin, Turkey

The first Learning, Teaching and Training activity of Digital Waste held under the coordination of Mardin Artuklu University, was done with the attendance of our partners Ovidius University (Romania), Solution: Solidarite & Inclusion (France), Aie Serve (Lebanon), Embaixada da Juventude (Portugal) with international students and young project workers. During the activities, the project teams analyzed and compared the preliminary results of a needs analysis conducted for each country, for the conclusions in this guide. Additionally, a set of workshops were conducted, aiming to design a logo and a prototype for the application that will be developed within the project over the process.

Activities Done Under the Project

Transnational Project Meeting (TPM) -2

Date: 21-22 January 2023

Venue: Beirut, Lebanon

During the second Transnational Project Meeting, our partners from Turkey, France, Lebanon, Portugal, and Romania were in attendance. The meeting primarily focused on assessing the digital waste mobile application prototype and making recommendations for its improvement. This collaborative effort allowed for a comprehensive evaluation of the application and ensured that all partner organizations had an opportunity to provide feedback and input.

Activities Done Under the Project

Learning, Teaching, Training (LTT) -2

Date: 1-7 May 2023

Venue: Porto, Portugal

LTT-2 in Porto was both fruitful and exciting with discussions about web and mobile app development, infographic design, street interviews, and video production. The focus of our project was "digital waste," which is the term used to describe the excessive collection of digital information and the detrimental effects it can have on our lives. In light of this, we first assessed the usability and accessibility of our website and mobile application. We improved the platforms to provide the best user experience while successfully delivering our main message.

Activities Done Under the Project

Transnational Project Meeting (TPM) -3

Date: 5-6 July 2023

Venue: Paris, France

The 3rd TPM took place in Paris, France. This TPM opened the floor for finalizing loose ends and sharing ideas on the mobile app and documentaries. It was a great opportunity for all the stakeholders to come together and share their thoughts on our mobile app's current version and new ideas for the upcoming documentaries related to digital waste management. We were really focused on spreading the word about responsible disposal of digital waste and encouraging eco-friendly practices.

Mobile Application Guidebook

Dijital Waste Mobile Application Guidebook

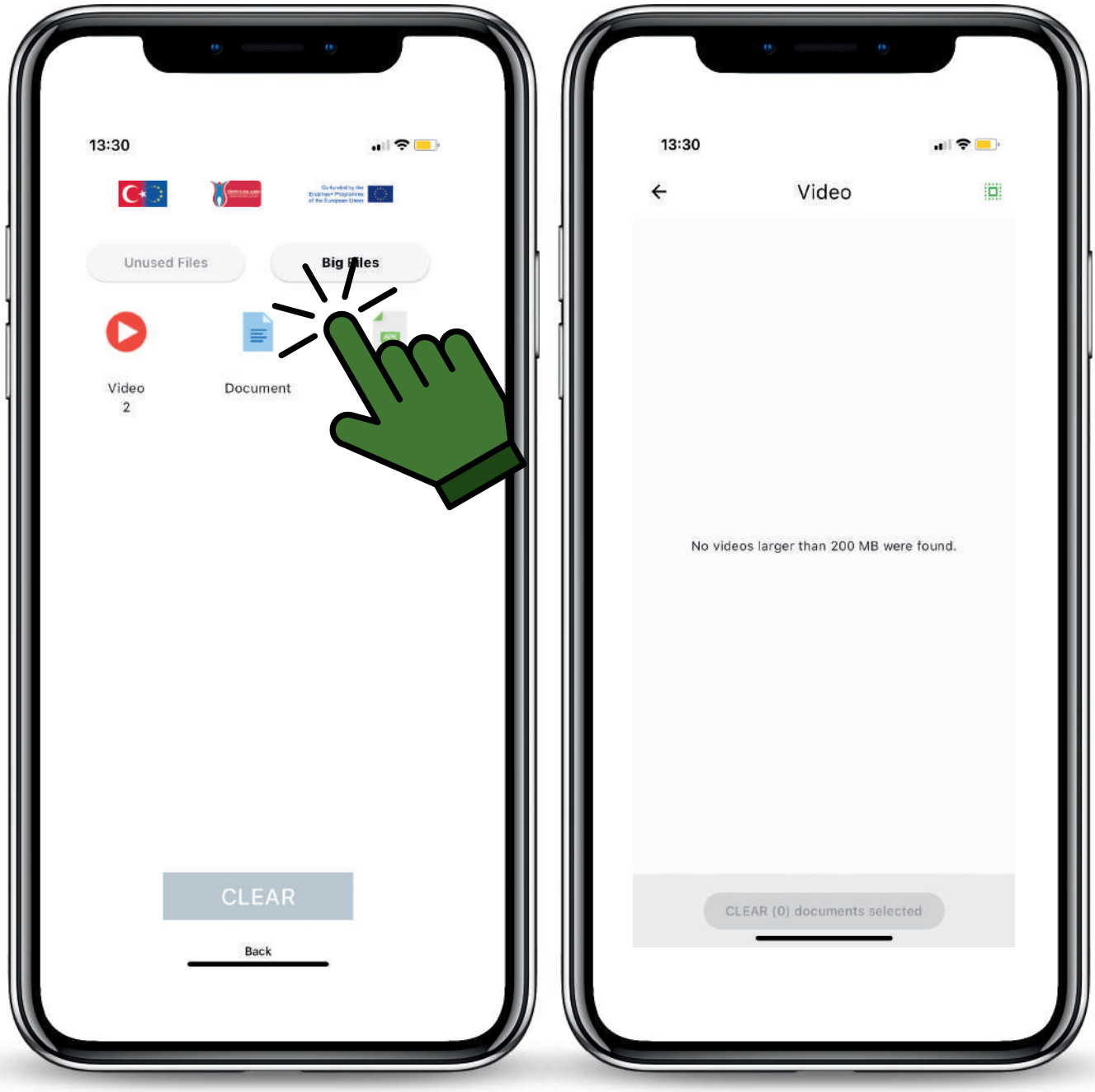
Based on our needs analysis data, we have developed our mobile application, which is available in 5 languages and can be downloaded in iOS, Android, and desktop formats. Once the application is downloaded from Google Play, the App Store, or as a desktop version, it is ready to start. It can be initiated by pressing the “Get Start” button..

You can select the language of the application by choosing from the main screen. The application is available in six languages: Turkish, English, Arabic, Portuguese, French, and Romanian.

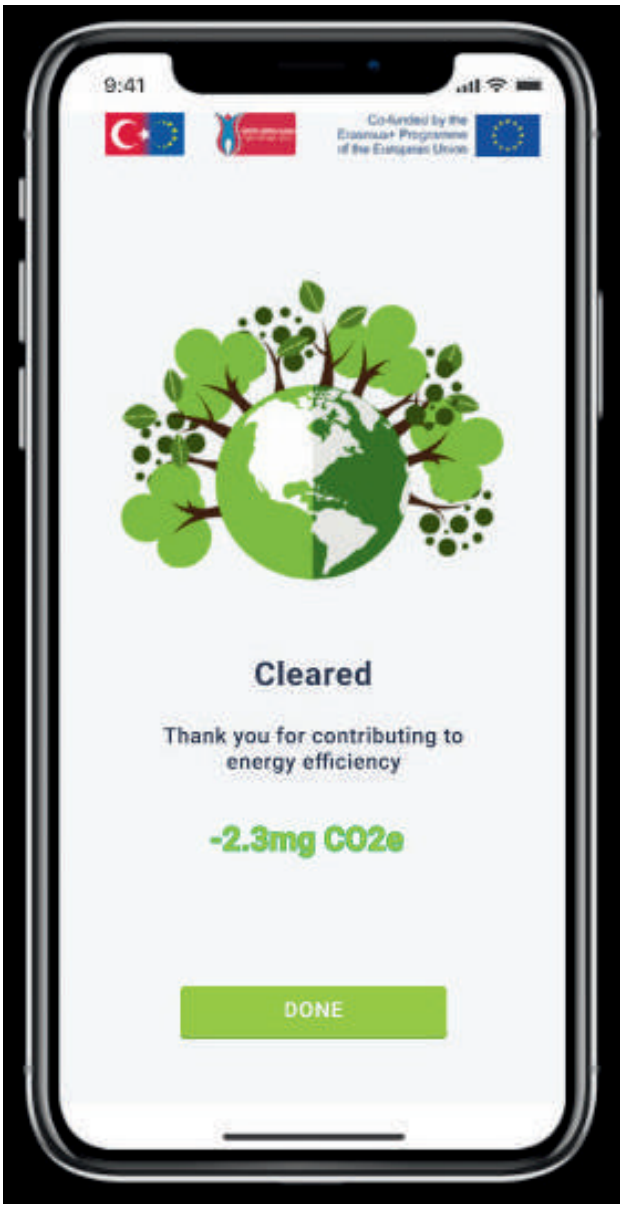
You can start data cleaning by clicking on the digital waste icon.

Fefore, scaning the data, application shows the tree that has no leaves and dry. The more you clean, the greener your tree will be. When you click on “scan” button it will strat the process.

After scanning for the photos, videos, audio, documents and apps on our phone, it shows the file size and suggestions on files to delete. By clicking on “Big Size” button, application will show if there are any files bigger than 200MB.

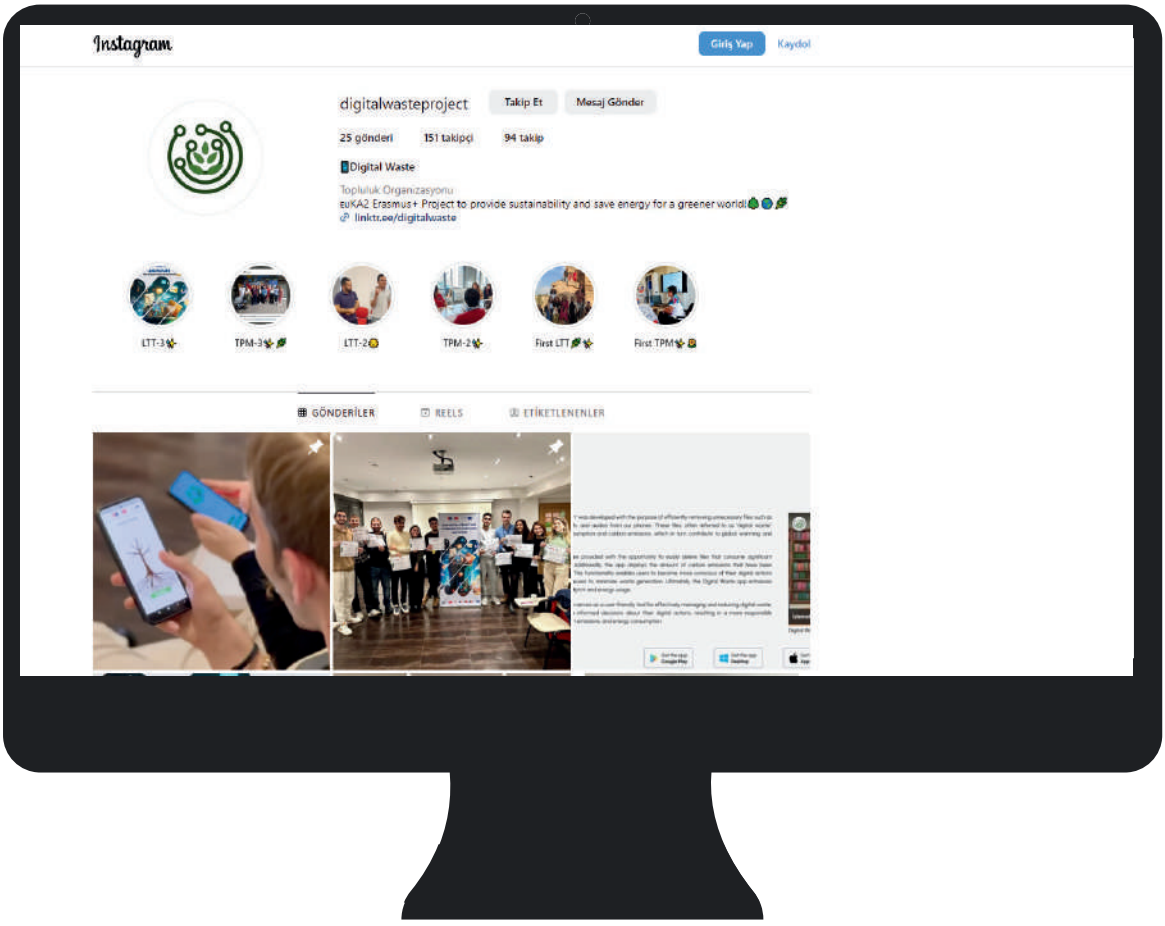


Mobile application; After obtaining approval to scan photos, videos, audio files, documents, and applications on our phone, it shows suggestions on file sizes and files that can be deleted. Users can decide which files the application can access. By clicking on the files you have allowed, you can open the files you want to delete.

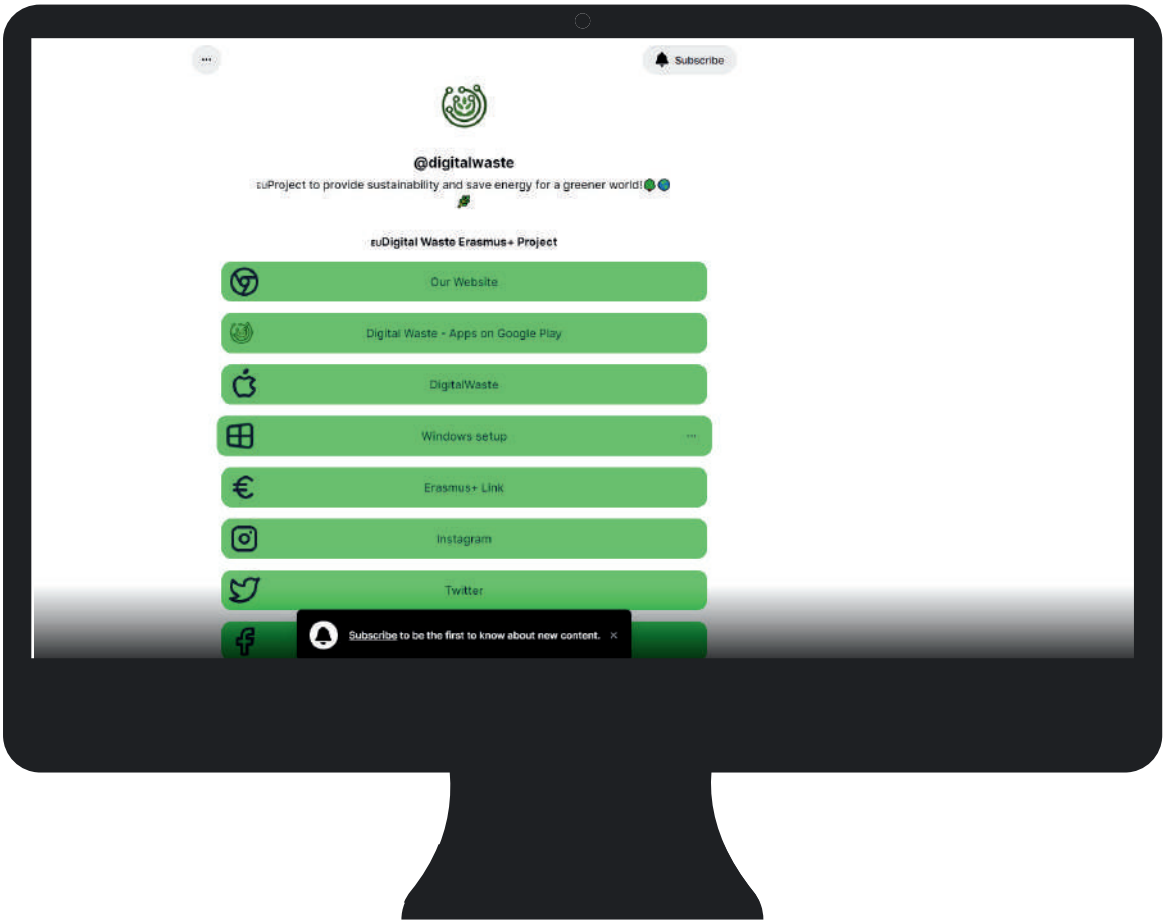


Desktop Guide

To access the installation file, go to @digitalwasteproject on Instagram and click on the "linktr.ee" link.
Click for Instagram address.
Click for Linktr.ee address.

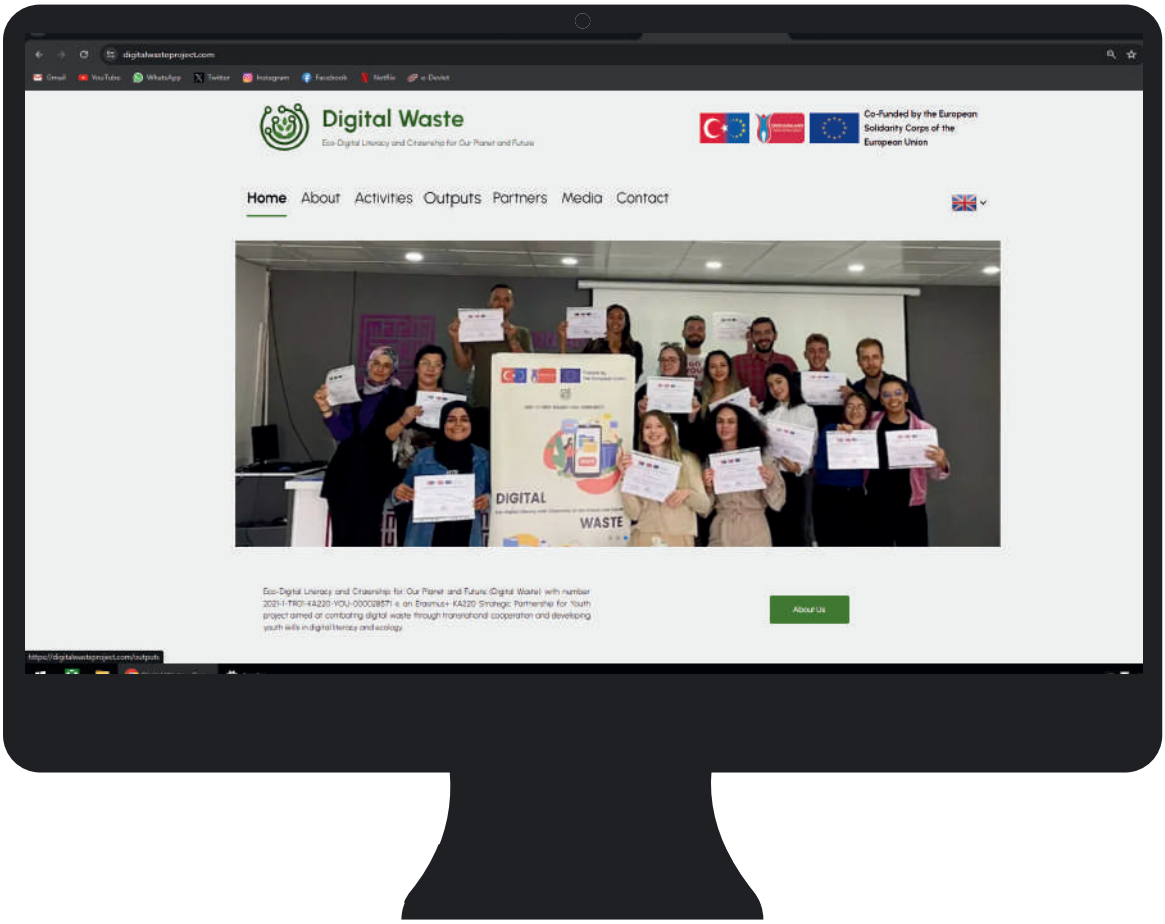


Way 1: Download the application by clicking on the “Windows Setup” tab. Way 2: Enter the project's website by clicking on the "Our Website" tab.

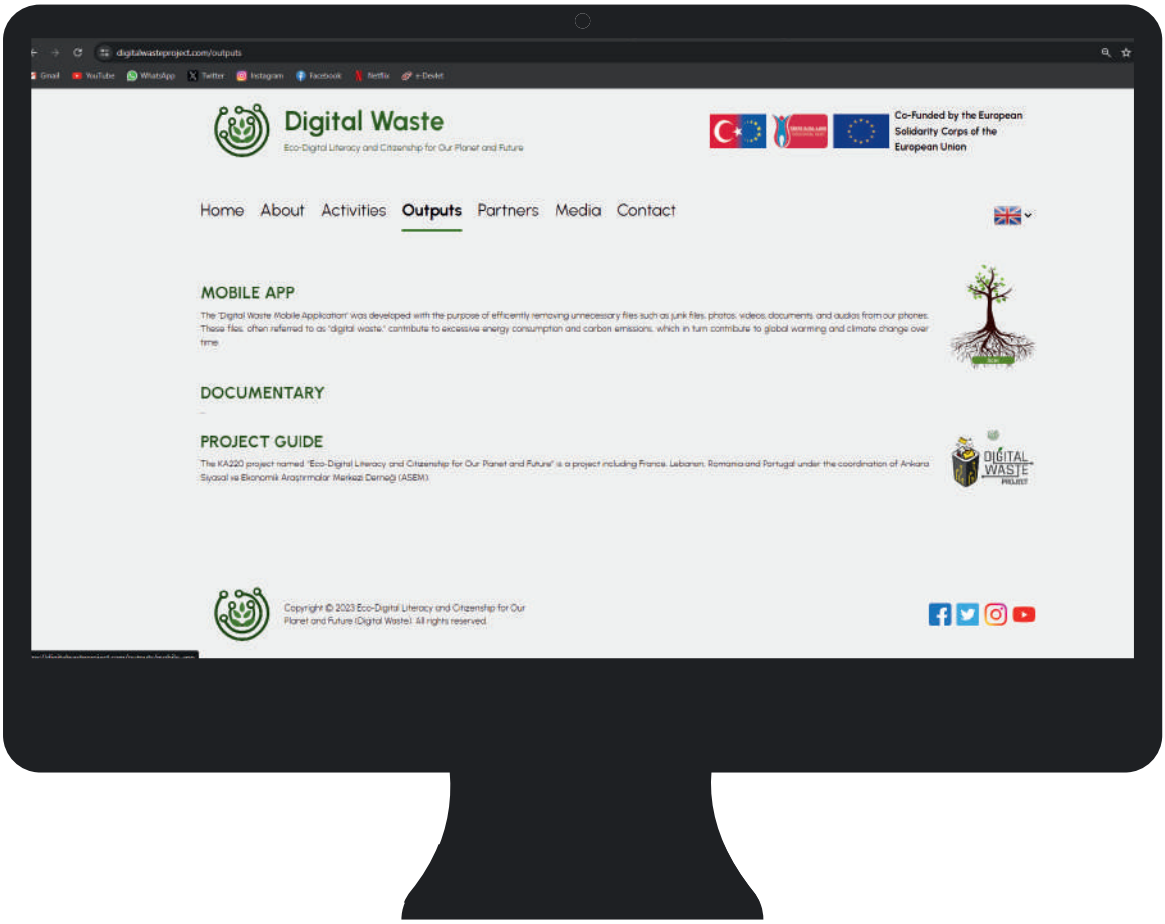


If you preferred to access the installation file from the project's website, you can continue by first selecting the language you want from the flag icon in the upper right corner of the project website.

After selecting the language, click on the “Outputs” tab.

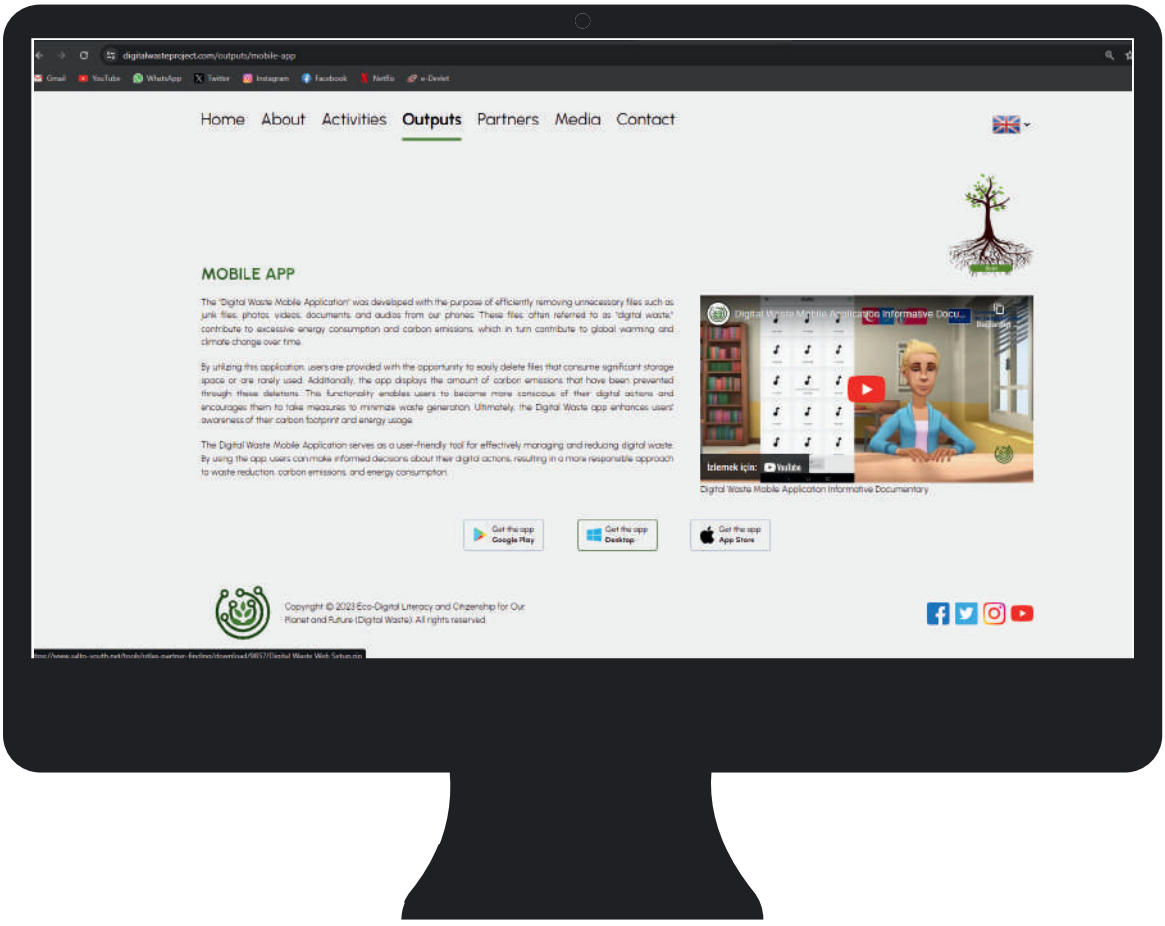


After clicking on the “Outputs” tab, the project outputs appear. Click on the "Mobile Application" heading here.



When you click on the “Get the application Desktop” icon at the bottom of the page you see, you will reach the installation file.

You can also access the mobile versions of the application from this page.

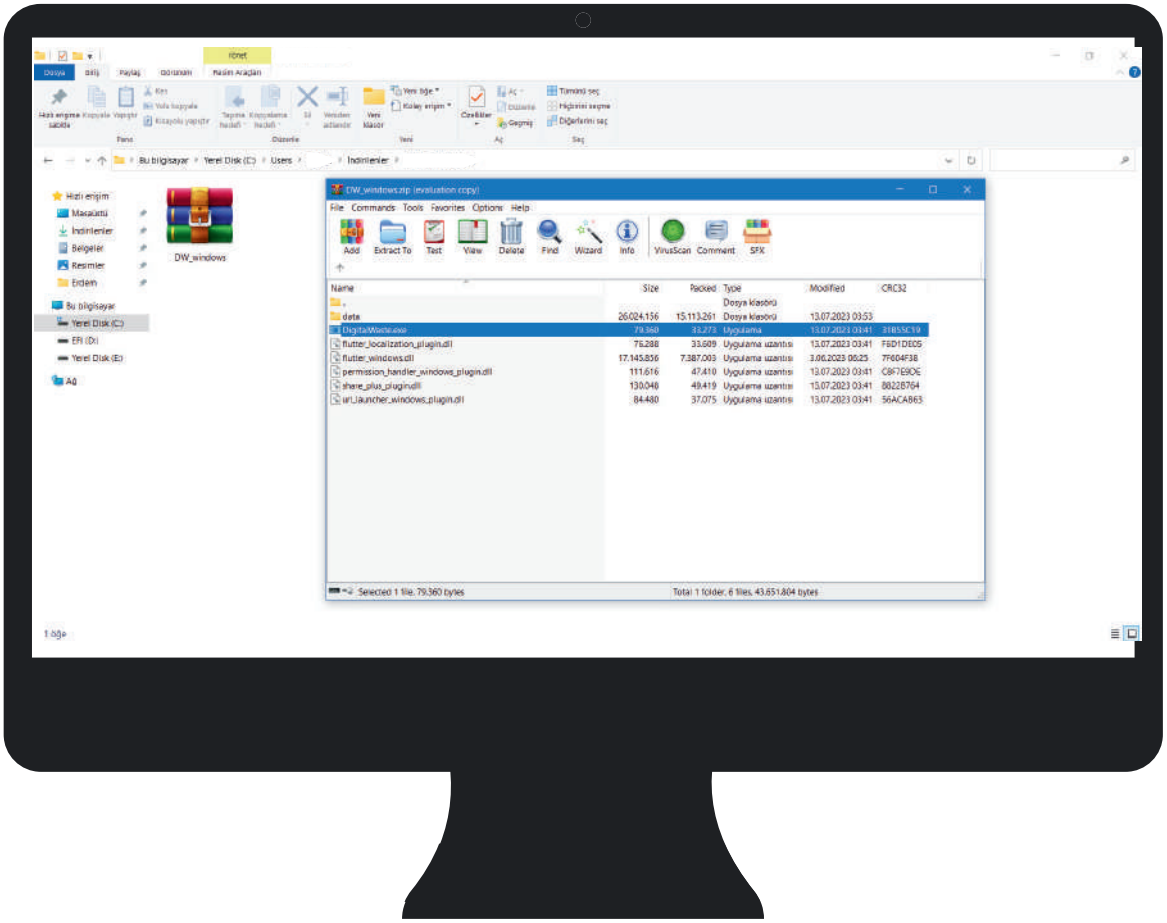


Open the compressed installation file you downloaded with a compression program such as “winrar”.

After unzipping the file, you can start the application by opening the “DigitalWaste.exe” file.

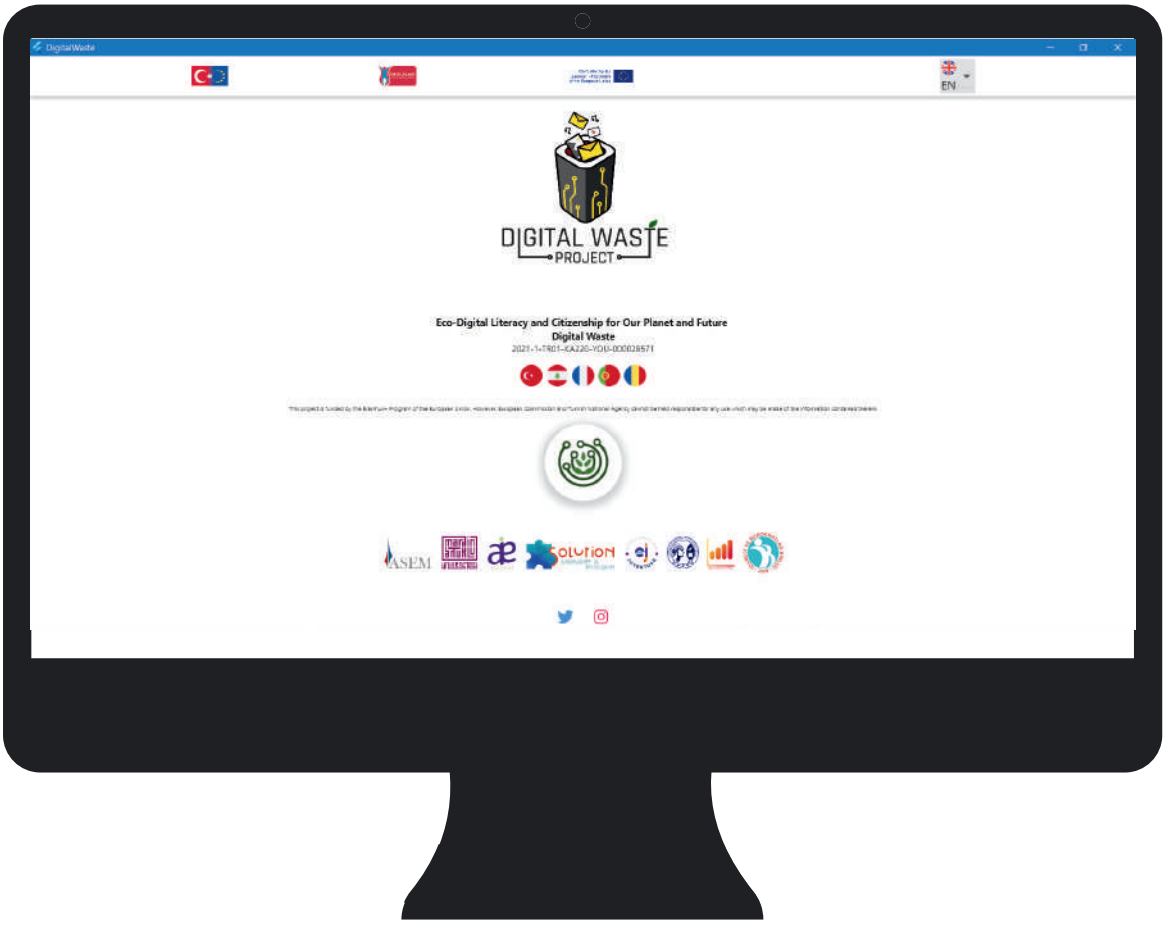
Note: One of the programs you can download to open compressed files --> When you click on the “Get the application Desktop” icon at the bottom of the page you see, you will reach the installation file.

You can also access the mobile versions of the application from this page.



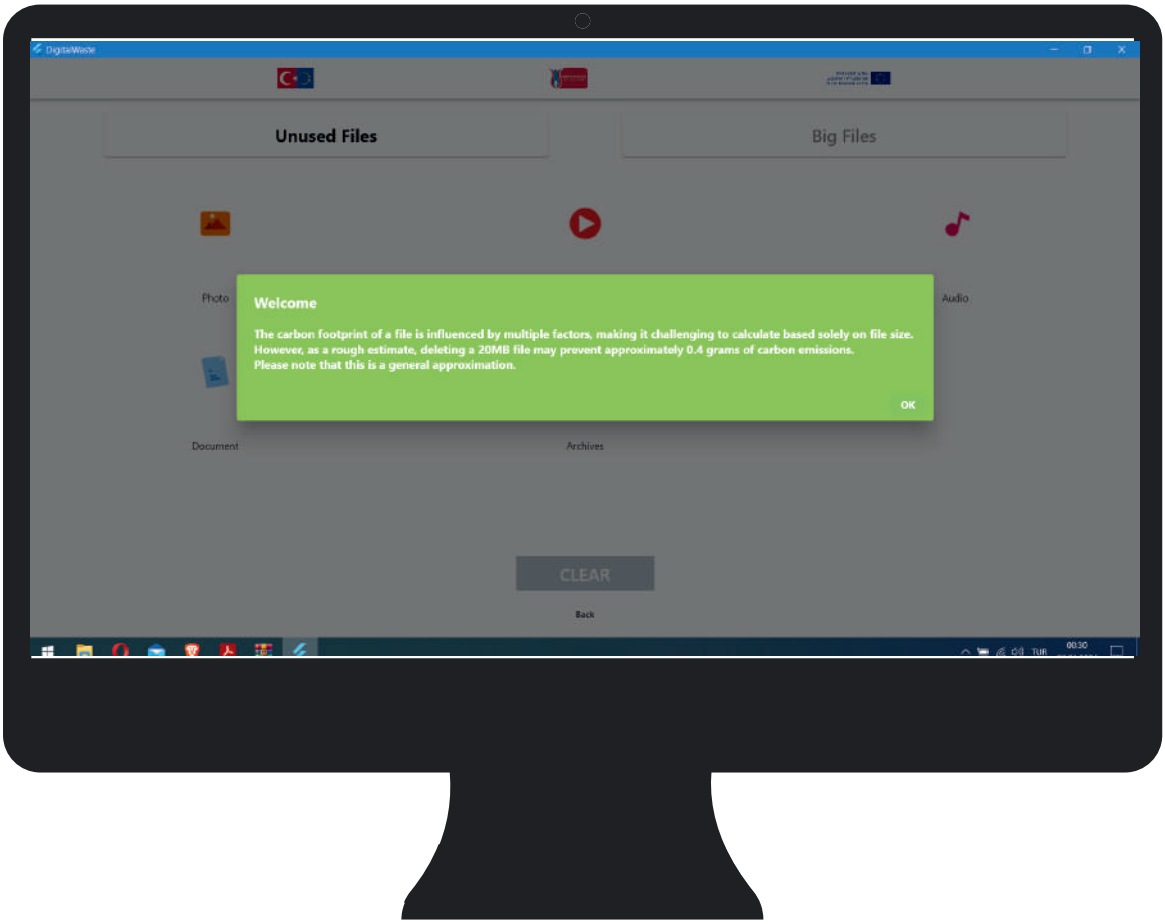
You can continue by selecting the language you want from the flag icon in the upper right corner of the application.

You can go to the "browsing" page by clicking the " " icon in the middle of the opened page.

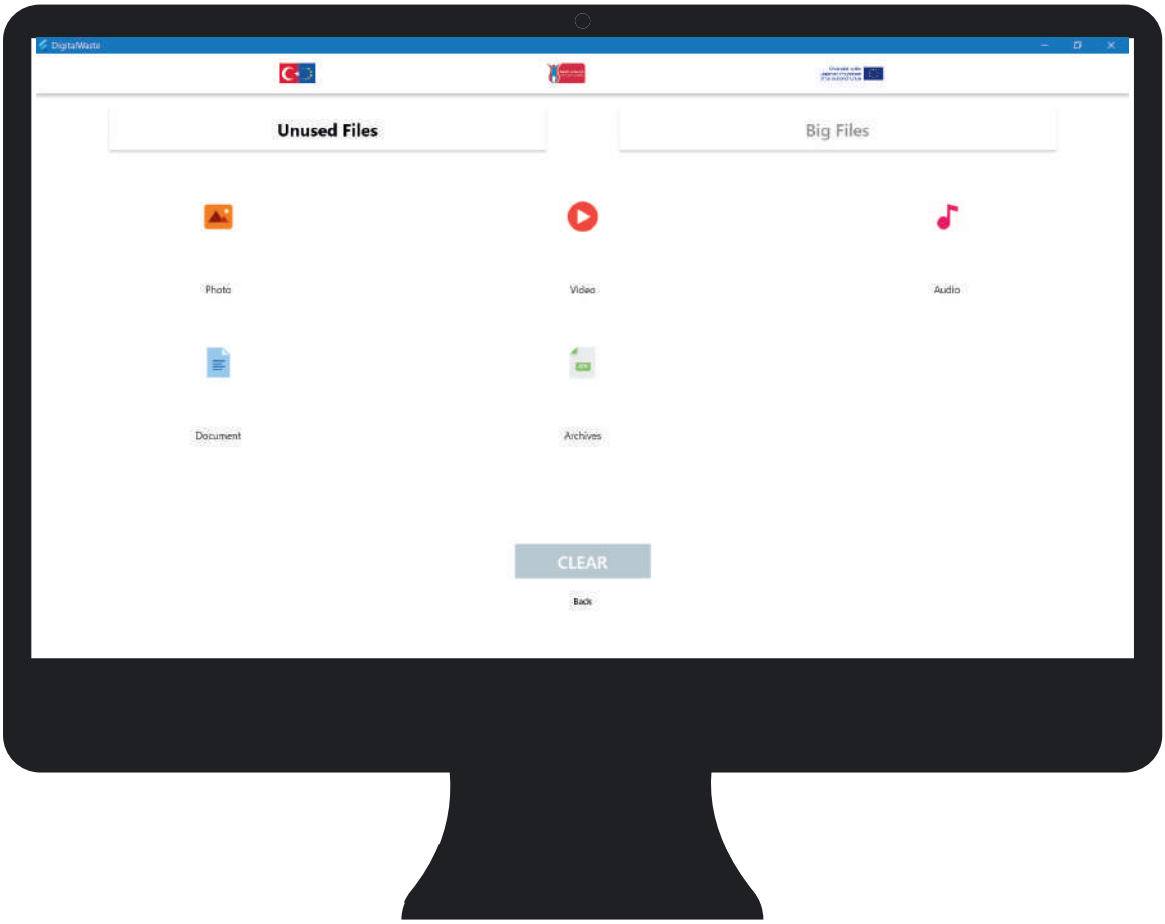


You can scan unnecessary files on your computer by pressing the “Scan” button.

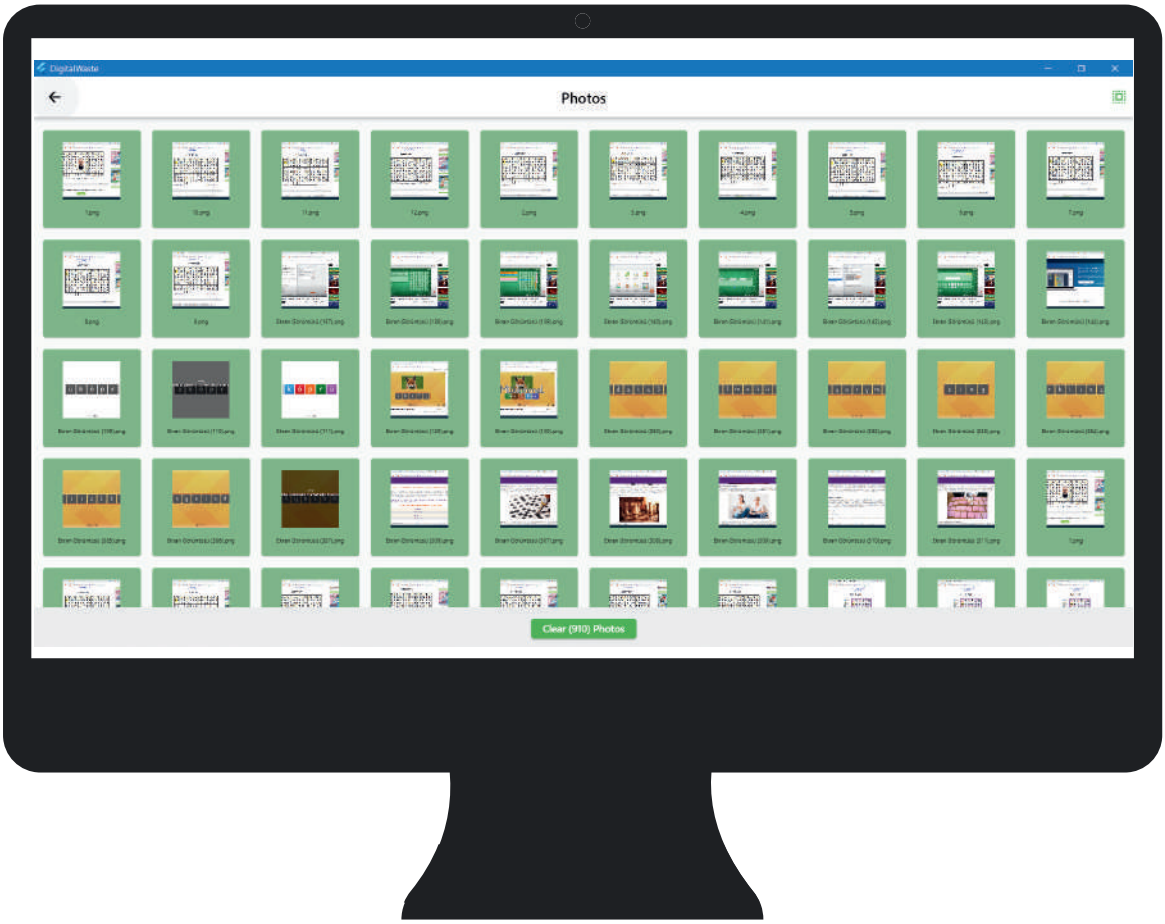
Before the scanned categories appear, you will see an information box stating that "every 20 MB file deleted prevents the release of 0.4 grams of carbon into nature." After reading the box, proceed by pressing the "OK" button.



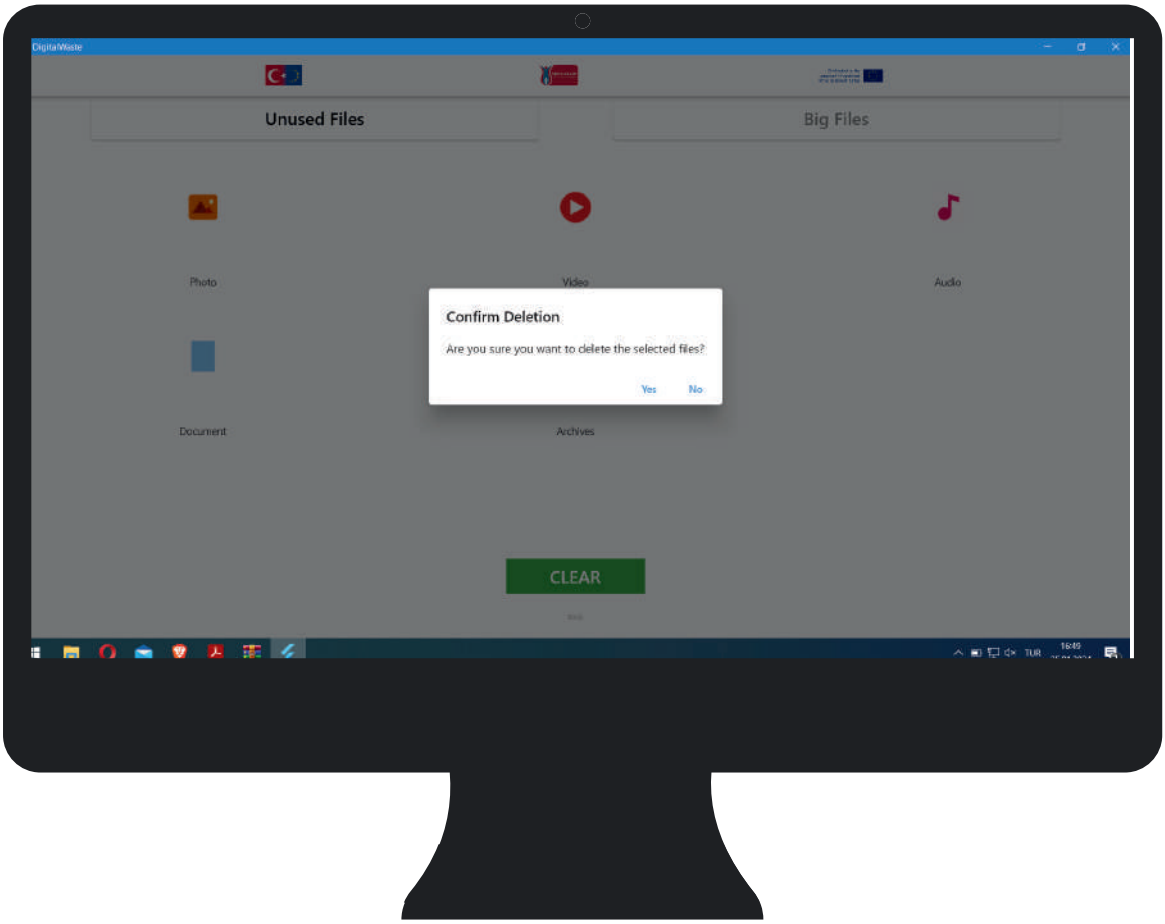
As a result of the scan performed on your computer, files that have not been used for a long time appear in categories. You can view and clean files by clicking on individual categories.



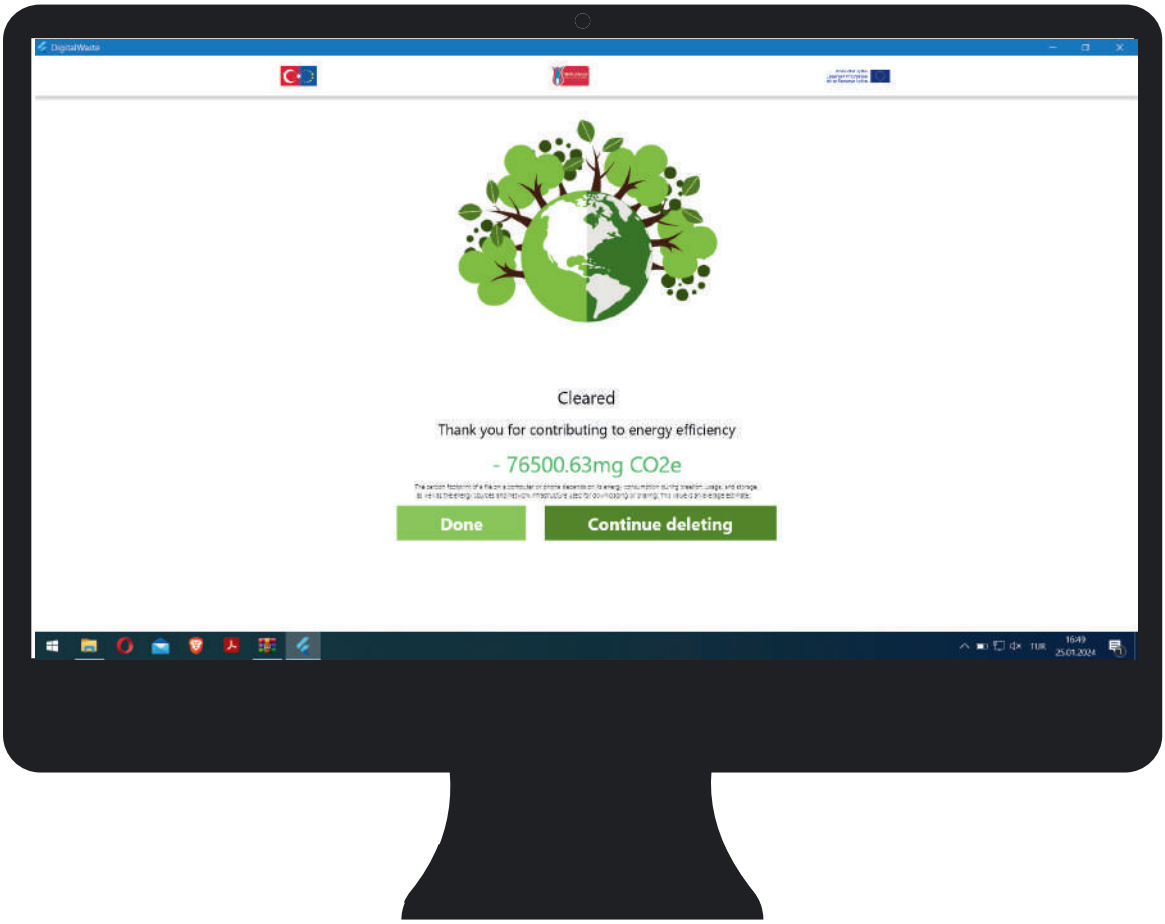
You can select the files you see one by one or click the “select all” icon in the upper right corner to select them all at once. After selecting the files to clean, you can delete your unnecessary files by pressing the "Clear" button and prevent 0.4 grams of carbon emissions for every 20MB file.



After clicking the **“Clear”** button, a checkbox for deletion opens. If you click **“Yes”** here, all unnecessary files you select will be deleted.



After deleting your unnecessary files, you will see how much carbon you have prevented from being released into nature. For every 20MB file, you prevent 0.4 grams of carbon emissions
.
From this screen, you can return to the main screen by clicking the "complete" box or return to deleting your unnecessary files by clicking the "continue deleting" box.



Project Partners

Project Partners

2.1. Ankara Siyasal ve Ekonomik Araştırmalar Merkezi Derneği

Ankara Siyasal ve Ekonomik Araştırmalar Merkezi Derneği

The Ankara Center for Political and Economic Research (ASEM) is a not-for-profit, independent think-tank. Its fields of interest and activity cover all kinds of political, economic, social and cultural topics of national or international import that are of concern to Turkey. ASEM hopes to contribute in this way to the making of sound decisions based on information and analysis, so that the future may be planned on a firmer basis and in parallel with the global dynamics.

Our organization is committed to carry out research on environment, education, international relations, family, democratization, women and children, human rights, climate change, natural disasters, defense, local governments, poverty, rural and village, development, disadvantaged groups, university-industry cooperation, entrepreneurship, innovation, EU process, EU cohesion policies, R&D, political participation, social and sports, economic, cultural, strategy and foreign relations, employment and unemployment, informatics, agricultural strategies and policies, sectoral analysis.

Project Partners

2.1. Ankara Siyasal ve Ekonomik Araştırmalar Merkezi Derneği

Ankara Siyasal ve Ekonomik Araştırmalar Merkezi Derneği

ASEM aims in particular to provide information and suggestions which would help detect and overcome those problems of a structural and deep-rooted nature that necessitate relatively longer-term efforts for their solution, but which are crucial for Turkey to realize its full potential.

In this context it offers academic studies and analytical reports for all individuals in public, private and civil society organizations who are in a position to contribute directly or indirectly to the decision and policy making processes. In order to render the knowledge and experience of Turkish and foreign experts accessible to decision and policy makers, it organizes conferences and seminars, publishes original works as well as translations, and prepares and carries out various projects.

http://www.asem.org.tr/

Project Partners

2.2. Mardin Artuklu Üniversitesi

Mardin Artuklu University is a university established in 2007. It started educating YouTube with 1.104 students in the first academic year between 2007-2008. Focusing on the human being in line with the mission of our university, adopting an original, innovative and critical perspective in the fields of education, research and development, culture-art, science and technology based on local and universal values; It continues to work towards raising exemplary individuals who are equipped with moral values, care about the environment, have social and professional responsibility, have assimilated to comply with institutional and quality standards, contribute to the accumulation of humanity, and become a leading university that conducts original research in these fields. Today, our university has 11 faculties (Faculty of Architecture, Faculty Of Engineering And Architecture, Faculty of Kızıltepe Agricultural Sciences and Technologies, Faculty of Letters, Faculty of Islamic Sciences, Faculty of Fine Arts, Faculty of Economic and Administrative Sciences, Faculty Of Medicine, Faculty of Science, Faculty of Health Sciences, Faculty of Tourism), 3 colleges, 8 vocational schools and 2 institutes. With 600 (40 foreign national) academic staff, 610 staff and 15 811 (about 2490 foreign national) students working in all units, it is on the way to achieving its goals.

Project Partners

2.2. Mardin Artuklu Üniversitesi

Syrian immigrant youth constitute the majority of foreign students. The geographical location of the city and the fact that the Arabic language is a widely spoken language have been effective in Syrian immigrants to prefer our university. Especially for Syrian students, 6 departments with 100% Arabic education have opened at our university. Again, 33 Syrian lecturers are employed in these departments. There are many facilities that young people can benefit from within the 30.000 m2 area arranged by the Health, Culture and Sports Department of our university. In these facilities, students can study art-painting; They can take part in many activities in the fields of health and sports. The Presidency enables students to benefit from arts and cultural activities to a wider extent by organizing painting and photography exhibitions, organizing concerts, conferences, theater and similar activities in the fields of art and culture and cooperating with institutions for this purpose. Cultural centers at our university organize activities such as free cultural courses, cultural competitions and Culture & Art Days. Spring festivals and various sports competitions (organized every year) are also among the activities prepared for young people.

Project Partners

2.2. Mardin Artuklu Üniversitesi

There are 64 student societies where young people interact and organize various activities. There are many centers on the campus where youth groups can come together and carry out social, cultural and sports activities. There is a semi-olympic swimming pool, a youth center where a wide variety of activities can be done and a library with a very rich content. As a city, Mardin has a very rich historical and cultural heritage. The city, which has hosted many civilizations and communities, has historical buildings reflecting hundreds of years of past. This rich structure also shows itself with language diversity today. Turkish, Arabic, Kurdish and Syriac are the languages spoken in the region. This ancient multiculturalism has brought tolerance with it. People are used to accepting all differences as wealth and the live with tolerance. Today, Mardin Artuklu University is progressing by focusing on technology in agriculture, tourism, trade, design and medicine with all these riches.

https://www.artuklu.edu.tr/

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2.3. İdareci ve Bürokratlar Birliği Derneği

It was established in August 2009 as the Association of Administrators and Bureaucrats and started its activities. In the 1st Ordinary General Assembly held on 12.02.2010, both bylaws and name changes were made. It continues its activities under the name of "Association of Managers and Bureaucrats Association", with its new statute and new management. Respect for people, basic human rights and freedoms, labor and the environment Democratic, respectful to beliefs, management based on law and justice, Participation, solidarity, transparency, accountability Compliance with ethical rules are the principles of the organization. For a country that has reached the administrative standards of the advanced world; To improve the professional dignity and personal rights of our members, To increase professional dignity, personal rights and ethical values, To influence public administration policies for the benefit of society, To develop education, research and management services, To establish national, regional and global cooperation, To develop professional and scientific standards, To develop national management policies To develop a strong, effective and participatory organization, to support research, to improve education, are among the main working subjects of our association.

https://www.burokratlarbirligi.org/

Project Partners

2.3. Solution: Solidarité & Inclusion

Solution: Solidarité & Inclusion is an NGO based in Paris carrying out educational activities to promote social cohesion through non-formal education. The objective of the association is to boost social inclusion among young people by proposing several kinds of actions fostering intercultural dialogue, encouraging democratic participation among groups that are excluded from social dynamics, increasing young people's soft and hard skills, designing educational programs to open minds and strengthening fair dynamics between generations. Solution operates in a multicultural and socially complex environment: in the east of Paris, there are more than 70 different ethnic communities whose young adults that may face economic difficulties, as well as social and labor exclusion. Such groups are often excluded from extra scholar offers, which may help them to acquire new skills enabling a better integration into society. Solution's mission is to propose these people non-formal education activities gathering different publics and stimulating. Besides, intercultural and intergenerational dialogue while promoting the acquisition of soft and hard skills useful for professional and social purposes though this way.

https://associationsolution.org/

Project Partners

2.5. Ovidius University of Constanta

Ovidius University of Constanta is the largest European Union university on the Black Sea coast. It was founded in 1961. In 1990, it became a multidisciplinary university with numerous curricula covering all three levels. Our goal is to be recognized as the regional leader in higher education and research, to be the first option of students from the Black Sea region and beyond. We are an Eastern gateway to Europe and we aim to attract a large number of Romanian and international students, as well as outstanding academic staff. We strive to achieve the highest European standards of quality education by offering bachelor's, master's and doctoral study programs, training our graduates for the competitive labor markets of Romania, the European Union and worldwide.

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2.5. Ovidius University of Constanta

The mission of Ovidius University of Constanta is to create, maintain and disseminate knowledge at all levels of society through European standard education, research and artistic creation. The university is actively engaged in the local community and has an impact over the entire Black Sea region, within Europe and beyond its borders. From the point of view of the educational offer, our university presents a great diversity and flexibility of study programs. The university is multidisciplinary, ensuring students training through programs covering all levels of education, from undergraduate to masters and PhD, various pedagogical training courses, courses for vocational training, Teaching Grades Residency, etc.. The areas of study cover a wide range, from Medical Studies to Engineering, from Humanities to Sciences, from Natural Sciences to Economics and Law, from Arts to Theology. Currently, the university has over 130 study programs (Bachelor degree programs and Master`s programs) and 5 Doctoral Schools in 7 domains of study.

http://en.univ-ovidius.ro/

Project Partners

2.6. Aie Serve

Aie Serve is a youth lead non-profit NGO that works on empowering youth through spreading the values of Respect, Acceptance, and Love.

The NGO consists of 3 programs:
1) Aie Skills:

This is the training arm of the NGO. It's all about providing youth with the needed soft skills, thus following Aie Serve's mission in youth empowerment with the tools they need to develop themselves at first and their society afterwards.
This is done through:

Public Workshops on soft skills covering different topics. These workshops are two hours long and held twice a month, thus reaching an average of more than 15 workshops a year, each with a different topic!
Advanced Training sessions about some specific topics, where we go in depth about such topics for one full day or even a two days camp!
The 6 months long Training of Trainers (ToT) that certifies around 10 new trainers every year so as to be able to deliver our training.
Club Initiation Management training for Aie Serve University Clubs.

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2.6. Aie Serve

2) Aie Clubs:

The Aie Clubs program aims at gathering groups of youth to implement projects that spread the values of respect, acceptance and love through empowering youth to become positive agents of change in their local communities. These clubs work on three pillars: Community Service, Community Development and Community Awareness

Aie Serve's Clubs are development, service and awareness clubs.
The clubs organize projects and activities to meet the unique needs of their campus or communities.
Clubs' members choose their club's projects, activities, events and fundraisers.

Aie Clubs Goals

Implement social, environmental and community service projects and awareness campaigns
Promote volunteerism, critical thinking and professionalism
Empower youth to have a bigger role in their community
Collaborate with other clubs or organizations with similar objectives
Conduct training workshops on 21st century skills, technical skills and topics of interest to their community.

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2.6. Aie Serve

Work Philosophy

Horizontal: Everyone should have the chance to decide on what is to be done and how to do it.

Transparency: All information is circulated to the team members, nothing is kept hidden. Budgets and procedures are accessible by all those who request them.

Position: Positions and titles give members the responsibility to accomplish tasks; Not the authority to boss others around.

3) Aie Exchange:

This program was created to help youth discover other cultures and work on projects with people from different backgrounds. In addition to that, it helps us as an organization to widen our network of partnerships internationally. The skills acquired throughout these exchanges are then replicated in Lebanon through the work of our members in their various projects.

https://www.aieserve.org/

Project Partners

2.7. Embaixada da Juventude

Embaixada da Juventude aims to boost the development of young people through national and international projects that facilitate access to a range of experiences, opportunities and knowledge for young people and the local community.

Main goals:
Reinforce the heritage, cultural and gastronomic identity of young people, encouraging their involvement with the city;
Build a functional network between the institutions (private and public) of the municipality of Paredes, with direct and indirect responses to youth
Contribute to the physical and intellectual development of young people in the Municipality of Paredes;
Develop and implement prevention and intervention projects with young people

All of these are integrated in international volunteering activities, with the presence of several ESC volunteers.

https://www.facebook.com/embaixadadajuventude/

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2.7. Bilgi Paylaşım Topluluğu

Bilgi Paylasım Toplulugu is a youth-led, non-profit, voluntary non-governmental organization which is run by youth workers. It has been primarily founded to advance the members' political, social, cultural, and/or economic objectives. This is accomplished through putting in place youth-oriented programs and/or participating in lobbying work to advance their cause.

It typically places a strong emphasis on supporting and upholding young people's democratic and social rights, encouraging their social and political participation at all levels of community life, and providing opportunities for personal and social growth through pastimes, volunteer work, and informal and non-formal learning.

It is a nonprofit organization run by young people with the mission of enhancing the programs and infrastructure that support and encourage the positive development of children and teenagers. By employing peer support and combining the perspectives of people who have encountered challenges in different environment, we make sure that the voice of youth is represented at all levels of policy and practice.

https://twitter.com/toplulugubilgi

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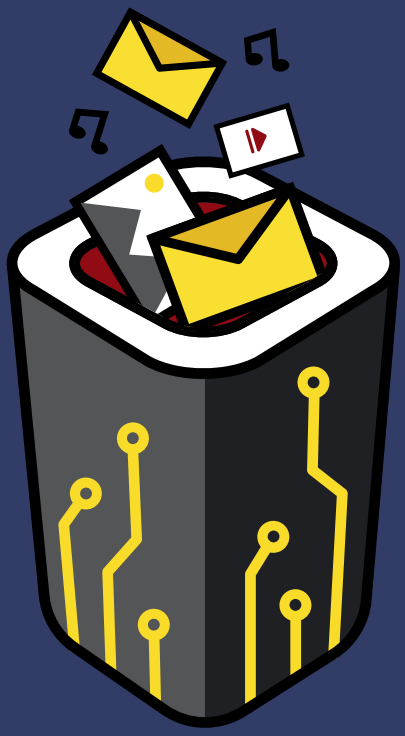

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