Reducing Digital Carbon Footprint through Social Media: Educating Users on Sustainable Consumption

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Abstract:

The widespread adoption of social media platforms has revolutionized connectivity and information sharing, but it has also contributed to a significant environmental concern: digital carbon footprint. This thesis investigates the potential of social media as a tool for mitigating digital carbon footprint through educating users on sustainable consumption practices. Drawing on theoretical frameworks such as the Theory of Planned Behavior, the research delves into the environmental impacts of social media usage, users' awareness of these impacts, factors influencing their attitudes and behaviors towards adopting eco-conscious practices, and the role of social media platforms in promoting environmental sustainability. Through interviews with users, insights are gathered to inform strategies for developing sustainable behaviors within the realm of social media. The findings highlight the importance of raising awareness, providing educational resources, and incentivizing eco-friendly practices on social media platforms to facilitate the transition towards a more sustainable digital future. Additionally, the study offers recommendations for future research, highlighting the need for further investigation into the efficacy of educational campaigns, the development of tools to manage social media usage, and the exploration of partnerships between social media platforms and environmental organizations to amplify sustainability initiatives.

Keywords:	Digital Carbon Footprint, Climate Change, Social Media Usage, Sustainable Consumption, Raising Awareness
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1 Introduction

1.1 Background Information

In today's age, where technology is seamlessly integrated into our lives, we are becoming more aware of the environmental ramifications of our online actions. The expansion of media platforms and growing digital connectivity contribute to our carbon footprint. My study delves into this relationship by examining how environmental awareness intersects with the use of social media platforms.

According to Hamid and his colleagues (2017), raising awareness about environmental sustainability is crucial for fostering the changes in attitudes and behaviors necessary to combat climate change and global warming. The pressing nature of this issue was highlighted in a statement from around 200 health journals, including publications like The New England Journal of Medicine (Atwoli et al., 2021), urging immediate action to address the consequences of global warming. Figure 1 depicts the rise, in temperatures and CO2 emissions over the past five decades. (CORE Econ 2019).

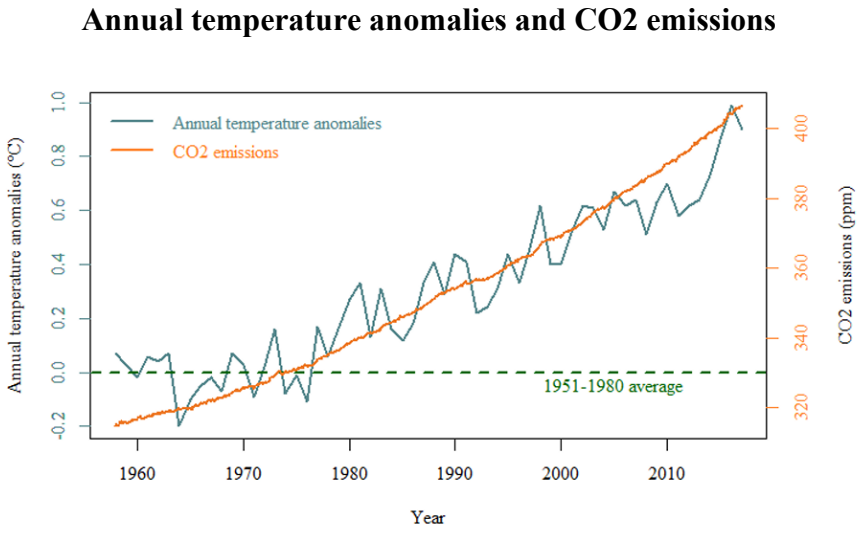

Figure 1. The link between CO2 and the rise in average annual temperatures from 1960 to 2020, using the 1951-1980 temperature average as a baseline. Sources: Goddard Institute for Space Studies (2019), US National Oceanic and Atmospheric Administration (2019)

The atmospheric blanket of greenhouse gases (GHG), in the atmosphere, such as carbon dioxide (CO_2) and methane (CH4), has sped up climate change, mostly due to human activities (Xu et al., 2015). Although human actions have significantly contributed to this crisis, advancements in technology in digital communication have had both positive and negative impacts. According to Naeem et al. (2023), the internet plays a role by enhancing connectivity while also generating carbon emissions through online activities.

Despite these challenges, the internet offers opportunities for environmental conservation. Arun Agarwal and his team (2020) explain how digital platforms remote work, thereby reducing the need for physical travel and subsequently cutting down carbon emissions. Additionally, the internet's capacity to efficiently share information has the potential to increase awareness and encourage eco-friendly behaviors among users.

Therefore my research aims to investigate whether informed individuals are more likely to adopt eco-friendly practices in their digital consumption habits. By examining how consciousness intersects with social media usage, I seek to determine if heightened awareness leads to reductions, in carbon footprints linked to digital media consumption. In this investigation, I aim to shed light on ways to create a more sustainable digital future.

To achieve these objectives, the thesis will address the following questions:

1. What are the environmental impacts of social media?

2. How aware are social media users of the environmental impact of their online activities, particularly in terms of carbon footprint?

3. What factors influence social media users' attitudes and behaviors towards adopting eco-conscious practices in their online interactions?

4. What role do social media platforms play in facilitating and promoting eco-friendly practices among their users, and how can they be incentivized to prioritize environmental sustainability in their operations and features?

In order to address these questions, I plan to take an approach that involves, conducting an in-depth review of the literature, defining key concepts, administering a survey to understand the environmental awareness and behaviors of social media users, and conducting follow-up interviews to explore the motivations and perspectives of participants. Through this methodology, my goal is to gain insights into the dynamics of environmental consciousness in the realm of social media. This will help me develop informed strategies and interventions to mitigate social media's ecological footprint.

1.2 Aim of the Study

The environmental impact of media encompasses various stages, including manufacturing, distribution, and disposal processes that all contribute to greenhouse gas emissions and electronic waste. Furthermore, data transmission integral to media consumption, requires energy and infrastructure leading to increased greenhouse gas emissions. Therefore, this research aims to reduce the carbon footprint associated with social media use while promoting sustainable consumption practices among users.

This study seeks to evaluate the awareness levels of social media users regarding their carbon footprint and explore whether individual actions can motivate users to lower their environmental impact.

1.3 Research Questions and Hypotheses

This study aims to address the following research questions:

1. What are the environmental impacts of social media?

2. How aware are social media users of the environmental impact of their online activities, particularly in terms of carbon footprint?

3. What factors influence social media users' attitudes and behaviors towards adopting eco-conscious practices in their online interactions?

4. What role do social media platforms play in facilitating and promoting eco-friendly practices among their users, and how can they be incentivized to prioritize environmental sustainability in their operations and features?

Additionally, the study seeks to explore and define the concepts of climate change, carbon footprint, digital carbon footprint, social media usage and sustainable social media practices to provide a comprehensive understanding of these interconnected phenomena.

1.4 Limitation of the Study

The exploration of digital carbon footprint represents a relatively new area of research, resulting in a scarcity of existing literature on the subject. This scarcity of these resources imposed constraints on the depth and breadth of my research work. Also, the prescribed time frame for completing the thesis further restricted my research. As a result, I was compelled to concentrate on the available resources and information within the allotted timeframe. Given more time, I would have been able to delve deeper into the topic and potentially broaden the scope of my study. However, due to the constraints of time, I endeavored to make the most of the available data and resources to the best of my ability.

1.5 Significance of the Study

This academic research aims to enhance knowledge by addressing the following objectives;

1. Raising Awareness: The study endeavors to increase public awareness regarding carbon footprint, thereby enhancing understanding of its implications.

2. Highlighting Environmental Impact: It aims to elucidate the detrimental effects of carbon footprint on the environment, fostering greater recognition of its significance.

3. Educating on Reduction Strategies: Through informative discourse, the study seeks to educate the public on practical measures to mitigate carbon footprint and contribute to environmental preservation.

4. Promoting Sustainable Practices: Additionally, the study aims to explore sustainable approaches to reducing carbon emissions, advocating for environmentally responsible behaviors.

1.6 Previous Studies

Until recently, there has been a lack of studies focusing on the environmental impact of social media usage and user awareness. In a study titled " The Effect of Social Media Usage on Digital Carbon Footprint: Analyzing Awareness Level of Social Media Users of Punjab" Naeem (2021) aimed to fill this research gap. This research aimed to assess

the awareness level among social media users in Punjab, Pakistan, regarding the concept of digital carbon footprint, and to identify pro-environmental behaviors that could encourage users to reduce their social media usage. Additionally, the study aimed to evaluate the extent of coverage given to the digital carbon footprint issue by English Dailies in Pakistan.

Using a quantitative approach with two research designs, namely survey and content analysis, the study analyzed data from DAWN and Express Tribune within the time frame of 2020-2022. The content analysis focused on key concepts such as Carbon Emissions, Internet carbon emissions, Electronic Waste, Gaming carbon emissions, and social media carbon emissions. The research employed the Agenda setting theory and Theory of planned behavior to guide the analysis. For the survey design, a simple random sampling technique was utilized to select 335 respondents aged between 18 and 26 from Lahore, Okara, Faisalabad, and Rawalpindi.

The findings revealed a lack of awareness among social media users in Punjab regarding digital carbon footprints, attributed to the limited coverage provided by print media on this issue. However, the results also underscored the potential of pro-environmental behavior to reduce social media usage, thereby indirectly decreasing the digital carbon footprint. Ultimately, the research aimed to cultivate a more environmentally conscious digital society by advocating responsible social media use and reducing the digital carbon footprint.

1.7 Methodology

To address the research questions, a comprehensive methodology is employed afterward a review of previously work and defining concepts, incorporating a survey administration, and follow-up interviews, finally conducting a statistical analysis. The methodology will involve:

1. Defining key concepts, such as Climate Change, Carbon Footprint, Digital Carbon Footprint, Social Media Usage and Sustainable Social Media, according to the most recent and the most influential literature cited.

2. Survey: Creating a survey tool that aims to assess awareness and behaviors among social media users. Ensuring that the survey questions are in line with the research goals and also cover the identified concepts. Including demographic information and relevant socio-economic factors. Sharing the survey with a group of social media users aged between 25 and 45 years old. Employing strategies to maximize response rates and minimize biases by using channels for distributing the survey.

3. Follow-up Interviews: Choosing a subset of survey participants for follow-up interviews to delve deeper into their motivations and perspectives. Conducting semi-structured interviews to allow flexibility in exploring emerging themes. Involving 6 individuals representing the target to capture perspectives.

4. More explanations about the statistical analysis will be supplemented.

This approach will offer a framework, for collecting and analyzing data, facilitating an exploration of public consciousness and actions concerning the use of social media platforms.

1.8 Definition of Concepts

1.8.1 Climate Change

Climate change is a multifaceted global phenomenon characterized by variations in Earth's climatic patterns, including rising global temperatures, shifting precipitation regimes, extreme weather events, sea-ice loss, rising sea levels, and shrinking glaciers (Appiah-Otoo et al., 2023). Climate change has broad impacts, posing threats to both natural environments and human societies. These consequences include disruptions to farming systems, and water sources, loss of biodiversity, frequent and severe natural disasters, and economic instability (Appiah-Otoo et al., 2023; World Bank, 2019).

Human activities, especially the burning of fossil fuels like oil and coal for energy generation are the main contributors to climate change that leads to the release of greenhouse gases into the atmosphere, particularly carbon dioxide (CO_2) (IEA, 2012; Radu et al., 2013). The significant rise in carbon dioxide emissions over time, surpassing 1.5 trillion tones since 1751, emphasizes the need for collective efforts to address climate change (Ritchie et al. 2020).

Global efforts to combat climate change are reflected in campaigns such as the United Nations' Sustainable Development Goals (SDGs). These goals aim to cut down on global greenhouse gas emissions and climate change impacts by 2030 (Appiah-Otoo et al., 2023). To achieve these goals, coordinated action at local, national, and international levels are required to reduce carbon emissions and foster sustainable development practices.

1.8.2 Carbon Footprint

The carbon footprint is defined as the “amount of carbon dioxide (CO_2) emissions associated with all the activities of a person or other entity” (Eckley Selin, 2022). The

concept of a carbon footprint has developed as a crucial data point for understanding and managing climate change. The carbon footprint, which represents the greenhouse gas emissions produced by human activities organizations, events or products and is usually measured in terms of carbon dioxide equivalents (CO_2e) is an essential measure of environmental impact (Radu et al., 2013; Wiedmann & Minx, 2008).

Fossil fuel burning, especially from transportation, energy production, and industrial operations, is the principal source of carbon dioxide emissions, accounting for the largest share of greenhouse gas emissions (Radu et al., 2013). Other greenhouse gases, including methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6), also contribute to the carbon footprint and are often converted into CO_2e for comparison purposes (Radu et al., 2013).

The term "carbon footprint," derived from the concept of the "ecological footprint," gained attraction in the 1990s as a measure of the impact of human activities on climate change (Ercin & Hoekstra, 2012). It is a powerful tool for analyzing, managing, and lowering greenhouse gas emissions, helping organizations and people to identify areas with high emissions and apply measures for mitigation and sustainability (Wiedmann & Minx, 2008; Radu et al., 2013). By quantifying emissions and their associated environmental impacts, the carbon footprint plays a crucial role in advancing sustainable development goals and mitigating the effects of climate change on a global scale.

1.8.3 Digital Carbon Footprint

Evangelidis (2021) defines the Digital Carbon Footprint as the CO2 emissions generated from the creation, usage, and data transfer of digital devices and infrastructure. The widespread use of tools like smartphones, computers, and data centers has led to a notable increase in the digital carbon footprint. Activities such as streaming videos, surfing the web, and engaging in social media contribute to digital

carbon footprint, with emissions rising incrementally for every minute spent online (Naeem et al., 2023).

The exponential growth of data centers, caused by the digitalization of numerous industries, has significantly contributed to the overall increase in carbon emissions since data centers consume significant amounts of energy; thus, addressing the power consumption issue is critical for reducing the carbon footprint associated with digital technology (Sharma & Dash, 2022). Furthermore, internet usage, including web surfing, streaming, and online communication, collectively contributes to the digital carbon footprint; estimates indicate that global ICT emissions account for up to 4% of global emissions (Climate Impact partners, 2021; Sjöström & Modin, 2022).

1.8.4 Social Media Usage

In contemporary discourse, social media includes websites and apps that allow individuals to produce, share content, and participate in social connections (Rouse, 2021). As defined by Obar and Wildman (2015), social media platforms are virtual spaces where people can create personal profiles, publish user-generated content, and connect with others to form online communities. Social media usage refers to a wide range of online activities and interactions within digital platforms that are designed to facilitate social networking, content creation, and information sharing among users. This term emphasizes the dynamic character of social media, which has become more prevalent in modern culture (Tullett-Prado et al., 2023).

Recent statistics underscore the continued growth and impact of social media usage globally. According to the DataReportal January 2024 global overview, more than half of the world's population (62.3%) now utilizes social media, with approximately 5.04 billion individuals engaging with social media platforms. Furthermore, the average daily time spent using social media has reached 2 hours and 23 minutes, indicating the significant role of social media in shaping daily routines and behaviors (DataReportal,

2024). This prevalence is more obvious in more developed countries, where social media usage surpasses 80% of the population (Countrymeters, 2021).

1.8.5 Sustainable Social Media

Sustainable social media refers to an evolution in the use of digital platforms to raise environmental awareness, promote responsible operations, and encourage pro-environmental behavior among users. According to De Leo (2016), incorporating principles of sustainability into social media initiatives provides a chance to attain sustainable development, as long as appropriate governance regulations allow broad access to these platforms. Since more than half of the world's population uses social media (DataReportal (2021), growing amounts of user-generated data are opening up opportunities for studying human interactions with the natural environment (Ghermandi et al., 2023).

From an operational standpoint, sustainable social media entails minimizing passive energy consumption and optimizing resource utilization. Recommendations include connecting only essential devices to the web, turning off unused applications, and managing wireless network usage to reduce energy consumption (Astikainen, K. & Puolanne, A. (2019)). Moreover, sustainable social media initiatives leverage partnerships and campaigns to raise environmental awareness and drive behavioral change. For instance, organizations collaborate with brands to advocate for sustainable practices, launch educational campaigns, and promote eco-friendly initiatives through social media platforms (Kääpä. P. 2018).

The Theory of Planned Behavior (TPB), developed by Icek Ajzen in 1991, offers a theoretical framework aimed at predicting human behavior. This theory suggests that attitudes toward behavior, subjective norms, and perceived behavioral control collectively influence behavioral intention. According to this theory, people's behavior is determined by their motivation and ability. In the context of social media usage and

pro-environmental behavior, TPB provides insights into how users' attitudes, subjective norms, and perceived behavioral control impact their intention to engage in sustainable practices on social media platforms. Initiatives promoting sustainable social media practices aim to cultivate positive attitudes, foster social norms that support sustainability, and enhance users' perceived control over their actions. These efforts contribute to the formation of intentions among users and subsequent changes in behavior (Naeem et al., 2023).

Educational campaigns and initiatives play a pivotal role in promoting sustainable social media practices and raising awareness about environmental issues. Individuals are encouraged to adopt environmentally conscious behaviors, both offline and online, such as reducing screen time, implementing energy-saving measures on electronic devices, and posting fewer resource-intensive content on social media platforms. By advocating for responsible digital behaviors and fostering a culture of sustainability within the social media ecosystem, sustainable social media endeavors contribute to mitigating global warming and advancing environmental conservation efforts (Naeem et al., 2023).

1.9 Thesis Structure

This paper is organized into several chapters, each addressing key aspects of the research process, methodology, analysis, and discussion. Following the introduction, the review of related literature will delve into existing scholarly works and empirical studies relevant to the research topic. Theoretical frameworks will also be employed to provide further context and clarity to the concepts discussed.

The third chapter will focus on the design and implementation of surveys and interviews.

Subsequently, the fourth chapter will present visual representations, such as charts, to illustrate the statistical findings derived from the surveys, enhancing clarity and accuracy. This section will be complemented by an interview analysis guided by the previously outlined research questions.

The fifth chapter will be dedicated to the discussion and analysis of the results obtained, leading to conclusions drawn from the data presented in the preceding chapters.

2 Theoretical Framework

2.1 Preamble

This chapter serves as a comprehensive review of existing literature relevant to the research topic, drawing upon the insights of various scholars and empirical studies. It aims to provide a theoretical framework that illuminates the concepts under investigation, thereby enhancing clarity and understanding

2.2 Literature Review

The intersection of social media consumption and user behavior has become a focal point in discussions surrounding environmental sustainability and digital footprints. This literature review synthesizes key findings from various studies to elucidate the complex dynamics shaping user behavior in the context of social media consumption and its environmental implications.

In the contemporary era, as the climate crisis escalates, media engagement has become an integral part of daily life for millions worldwide. The intersection of environmental concerns and social media usage is increasingly recognized as pivotal for effecting meaningful change towards environmental protection and sustainable societies (Vaughan, 2021). The carbon footprint of internet use extends beyond energy consumption to encompass various aspects of digital activity. For instance, the production and distribution of promotional materials, streaming of online content, and sharing of multimedia on social media platforms contribute to greenhouse gas emissions (Naeem et al., 2023).

According to Statista (2022), social media use ranks as one of the top online activities. By 2021, more than 4.26 billion individuals across the globe were utilizing social media, with an anticipated rise to nearly six billion by 2027. On average, people now spend two hours and 24 minutes daily on social media and messaging apps, which is thirty minutes more than they did in 2015. Not considering Covid-19's effect, internet usage contributes 3.7% of worldwide emissions, matching global air travel emissions. This is projected to double by 2025. (IRENA, 2022, Agarwal, A.et al. 2020, Atwoli, L. et al., 2021, McNamee, P. & Dang, H.T., 2009, Hampson-Curtis, C.J., 2022).

Furthermore, with the continuous growth of data storage and processing activities, particularly driven by data storage, mining, and sharing, concerns about the sustainability of these practices have arisen. Data centers heavily rely on water for cooling and electricity generation, and the immense energy consumption of servers exacerbates their environmental impact. (Al Kez et al., 2022). The CO_2 levels in the atmosphere are significantly impacted by energy consumption of data centers (Karabatak, S., & Alanoglu, M., 2021). Thus, this has been the primary factor linked to the rising carbon footprint of digital technology.

According to a study commissioned by OVO Energy (2019), the UK's top independent energy provider, decreasing the number of emails sent by every email user in the UK by one per day could reduce emissions by 16,433 tons of CO_2, which is equivalent to 81,152 flights from London to Madrid. CORE Econ (2019) found a significant link

between carbon footprint and the use of cloud computing applications, while also showing that the annual CO_2 emissions from photos uploaded on social media platforms like Facebook, Instagram, and WhatsApp are substantial (Fig 2). Each day, 80 million, 350 million, and 4.5 billion images are shared on each of these three platforms, resulting in a rise in CO_2 emissions annually. A study by Marks et al (2020) found that online streaming accounts for 58-60% of internet traffic and produces 300 million tons of carbon dioxide annually, roughly 1% of total emissions. According to BBC, video streaming makes up 58% of downstream internet traffic, with web browsing at 17%, gaming at 7.8%, and social media at 5.1%. Additional types of media streaming consist of YouTube at 11.4 percent, embedded video on websites at 13.1 percent, and web searching at 7.8 percent (Wakefield, 2018).

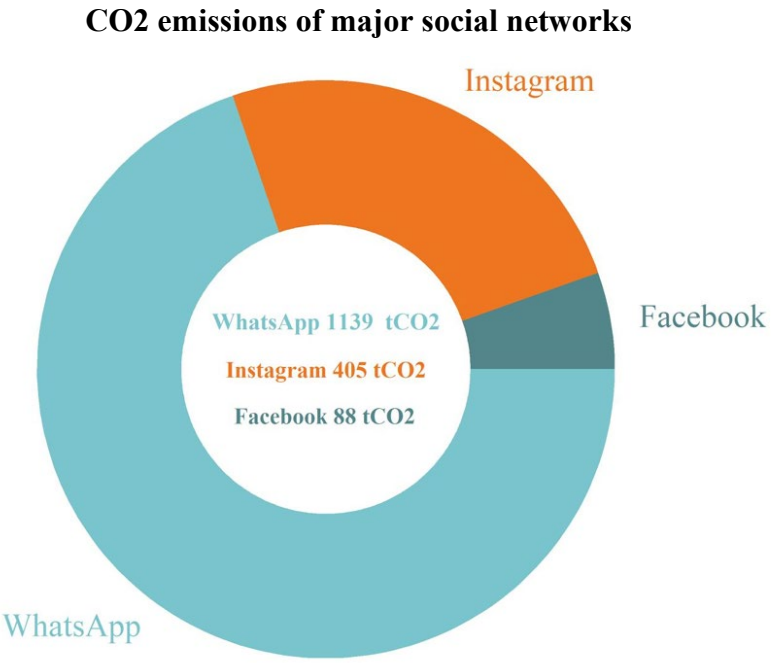

Figure 2. Average annual CO2 emissions from Facebook, Instagram, and WhatsApp. It is important to note that a single picture uploaded to Facebook and WhatsApp weighs significantly less than one uploaded to Instagram. Sources: Facebook (n.d.), WhatsApp (n.d.) and Instagram Press (2015).

Al Kez et al. (2022) highlight the role of data management policies in mitigating the environmental impact of digital consumption, stressing the importance of collective action in fostering sustainable online behavior. They emphasize the need for awareness campaigns and behavioral prompts to encourage environmentally responsible practices among internet users. They highlight, even minor actions such as capturing and sharing a photo on social media result in the creation of two forms of dark data, consisting of both the image and its associated metadata.

Additionally, Kääpä (2018) addresses the wider socio-environmental impact of the media industry, particularly in the context of digital communication. They emphasize the substantial energy consumption associated with data server farms and terminal devices, highlighting the environmental significance of pervasive media consumption habits.

According to Sharma and Dash (2022), raising awareness among users about the environmental consequences of their digital activities is essential for fostering sustainable behaviors. Educating individuals about the carbon footprint of social media usage and encouraging responsible digital consumption can contribute to mitigating environmental degradation.

The adoption of pro-environment behaviors can lead to a reduction in social media usage, thereby indirectly lowering the digital carbon footprint and fostering an eco-friendlier digital society through the promotion of responsible social media usage and carbon footprint reduction efforts (Naeem et al., 2023, p. 1).

Hamid et al. (2017) discuss two perspectives on behavioral change in relation to environmental sustainability. The first perspective emphasizes raising awareness and fostering appropriate attitudes to induce behavioral change, as exemplified by community-based social marketing programs (McKenzie-Mohr, 2000). This aligns with theoretical models like the transtheoretical model (Prochaska and Velicer, 1997) and empirical studies by Swaim and colleagues (2014) and Halady and Rao (2010), which highlight the importance of increasing environmental sustainability awareness as a catalyst for behavioral change.

Social media platforms like Facebook serve as powerful tools for promoting sustainability, enabling the formation of online communities where ideas, images, and multimedia content are shared instantaneously, facilitating the rapid dissemination of information worldwide (Hamid et al., 2014). This allows organizations to showcase their efforts towards environmental conservation, potentially raising awareness within

broader society. Moreover, social media can influence attitudes and behaviors by conveying relevant information. Therefore, the active engagement of eco-conscious individuals on social media platforms can inspire greener actions and attitudes, demonstrating the transformative potential of social media in promoting sustainability initiatives (Hamid et al., 2017).

In a study by Hamid et al. (2017), the research aims to explore the potential of social media, particularly platforms like Facebook, in promoting environmental sustainability awareness among higher education students. The study underscores the importance of integrating environmental sustainability topics into the curriculum and suggests that leveraging social media tools in teaching methods can effectively deliver this education to students. The research calls for further investigation into the efficacy of social media in raising awareness and influencing students' behaviors regarding environmental sustainability. Additionally, the study highlights social media's role in fostering active participation and engagement, such as encouraging involvement in environmental initiatives.

The lack of awareness among users about the digital carbon footprint of social media consumption and the limited coverage of the issue in print media pose a major challenge to mitigating the environmental impact of digital technologies. This necessitates both individual and global efforts to reduce CO_2 emissions from digitalization to enhance people's safety and well-being, with the issue becoming increasingly pressing in the future. Addressing this challenge is vital, as limited media coverage reduces the public's understanding of how their digital behaviors contribute to environmental pollution. Using print media as a reliable source of information will successfully spread this message and empower readers to make informed decisions and act ethically in their digital consumption, individually and within organizations (Naeem et al., 2023).

Despite some research exploring the impact of social media usage on digital carbon footprint, there is a notable lack of investigation into individual behaviors, such as content creation, sharing, or engagement, and their contributions to carbon emissions. Examining the extent of coverage in the print media, including newspapers and

magazines, on the subject of digital carbon footprints is vital to understanding information transmission and its possible impact on public perception (Naeem et al., 2023).

2.3 Theoretical Framework

2.3.1 Theory of Planned Behavior

The theoretical framework of this thesis is based on the Theory of Planned Behavior (TPB) to explain the relationship between social media use and pro-environmental behavior. TPB, introduced by Icek Ajzen in the 1980s and expounded in his seminal paper "From Intentions to Actions: A Theory of Planned Behavior ", provides a comprehensive framework for understanding human behavior (Ajzen, 1991). TPB argues that an individual's behavioral intentions and attitudes are shaped by their beliefs about the behavior, subjective norms, and perceived behavioral control.

According to TPB, attitudes reflect individuals' personal evaluations of a behavior, including perceptions of its outcomes (Ajzen, 1991). Behavioral intentions, on the other hand, represent the motivational influence driving a specific behavior. Subjective norms reflect individuals' beliefs about societal approval or disapproval of their behavior, influenced by peer and societal opinions. Furthermore, social norms encompass collective behaviors, traditions, and expectations within a group or society. Perceived power and perceived behavioral control refer to an individual's perception of factors facilitating or impeding behavior performance and the ease or difficulty of behavior execution, respectively.

The study's focus on environmental behavior, particularly pro-environmental behaviors, aligns with the broader aims of TPB. Environmental behavior encompasses all actions

individuals undertake that either positively or negatively impact the environment, with behaviors beneficial to the environment termed pro-environmental behaviors (Tolppanen & Kang, 2021). TPB's incorporation of perceived behavioral control underscores the importance of individuals' beliefs in their capacity to execute planned actions, which is crucial in the context of environmental behavior modification (Ajzen, 1991).

By applying the principles of TPB, this study aims to elucidate how individual attitudes toward social media consumption influence pro-environmental behaviors. Social media, as an integral facet of information and communication technology (ICT), exerts a profound influence on human activities, necessitating an examination of its environmental impact (Naeem et al., 2023). By understanding the determinants of social media usage behaviors through the lens of TPB, this study seeks to identify strategies for promoting pro-environmental behaviors among social media users.

3 Research Methodology

3.1 Data Collection Methods

Two sources of data collection were used:

3.1.1 Primary Data

Primary data was gathered through a dual approach employing online surveys and follow-up interviews, with interviews being recognized as the most important method for data collection in qualitative research. These methodologies were divided into two distinct phases. Initially, an online questionnaire was crafted using Google Forms and distributed among participants. Following this, semi-structured interviews were

conducted to explore in greater depth the behaviors of social media users regarding their awareness and actions concerning the social media carbon footprint.

3.1.2 Secondary Data

Secondary data was gathered from a variety of sources, including books, journals, research papers, dissertations and articles. This approach helped to develop a strong theoretical foundation for describing the problem, testing hypotheses, and aligning study findings with existing literature.

3.2 Data Analysis Method

The information gathered from both primary sources via questionnaires and interviews and secondary sources underwent statistical presentation and analysis, employing simple percentage calculations, which were then represented through tables. This method of presentation offers clear visibility to the attributes of data under analysis.

4 Data presentation and analysis

4.1 Preamble

The focus of this chapter is to present and analyze the collected data. The data was analyzed utilizing percentages and statistical description tables and charts. A total of 20 questionnaires were distributed via Google Forms and collected for analysis. Additionally, 6 follow-up interviews were conducted to complement the survey data. Thus, the analysis presented here is based on the responses gathered from both the questionnaires and the interviews.

4.2 Data Collection

4.2.1 Survey

Survey research involves gathering information from a subset of individuals by eliciting their responses to inquiries (Check & Schutt, 2012, p. 160). This methodology offers flexibility in participant recruitment, data collection, and instrumentation techniques. Surveys can employ quantitative approaches, such as structured questionnaires with scaled responses, qualitative methods like open-ended queries, or a combination of both, known as mixed methods. Given their utility in investigating human behavior, surveys are commonly employed in social and psychological inquiry (Singleton & Straits, 2009).

In the data collection phase of this study, a total of 20 participants engaged in the questionnaire, representing an age range of 25 to 45 years old. The questionnaire encompassed various aspects of social media usage and participants' environmental awareness. Participants were queried about their daily time allocation to social media platforms, their primary platforms of use, and the underlying motivations driving their social media engagement. Additionally, participants were prompted to ascertain their familiarity with the concept of carbon footprints associated with social media usage.

Further inquiry delved into participants' perceptions and behaviors concerning the environmental impact of their social media activities. Participants were asked to gauge their level of concern regarding the environmental repercussions and whether they had undertaken any measures to mitigate their social media carbon footprint, such as reducing usage or sharing eco-friendly content.

Within the "Educational Initiative" segment, participants were presented with the opportunity to express interest in acquiring further knowledge about the carbon emissions attributed to their social media usage. Additionally, they were provided access to a "Social Carbon Footprint Calculator" to estimate the CO_2 emissions

stemming from their average social media engagement. A comparative metric was presented, illustrating the environmental impact of social media usage in terms of carbon emissions equivalent to driving a car for a specified distance.

Participants were encouraged to partake in a follow-up activity aimed at fostering self-awareness and reflection on their social media habits in light of the carbon footprint information provided. They were prompted to monitor their social media usage over the subsequent week, noting platforms used, time spent, and reasons for usage. Following this observation period, participants were encouraged to reflect on any behavioral adjustments and share their insights and experiences in a follow-up interview.

In conclusion, the participation of all respondents is deeply appreciated, with gratitude extended for their valuable contributions to this research endeavor. Their cooperation and support have been instrumental in advancing the understanding of the effectiveness of awareness initiatives in addressing social media carbon footprint concerns.

4.2.2 Interview

The interview serves as a technique for acquiring both qualitative and quantitative data through questioning (Taherdoost, 2021). Quantitative inquiries involve respondents selecting from predetermined response options provided by the researcher, while qualitative queries seek descriptive responses from interviewees. Despite various methods available for qualitative data collection, including text analysis, document reviews, diaries, and participant observation, interviews stand out as the predominant approach for primary qualitative data gathering due to their ability to foster a natural and relaxed environment for participants (Taherdoost, 2021; Taherdoost, 2022).

Hence, interviews serve as a means to delve into participants' experiences and interpret them comprehensively (Doody, 2013; Bolderston, 2012). Through this interaction, researchers have the opportunity to document various aspects of participants' lives.

During interviews, interviewers attentively listen to participants' narratives, recording their interpretations to capture individuals' perceptions, thoughts, and ideas.

Consequently, the key advantage of the interview method lies in participants' ability to freely and privately express their viewpoints without constraints (Doody, 2013; Bolderston, 2012). Nonetheless, researchers must carefully structure their questions to ensure alignment with the research objectives. Additionally, interviewers should employ interpersonal skills to effectively engage participants in the process (Bolderston, 2012). Failure to adequately prepare for interviews can result in time-consuming endeavors. Therefore, this article reviews essential steps in the interview process, ranging from formulating questions to addressing ethical considerations (Bolderston, 2012; Taherdoost, 2022).

Interviews for this study took place in April 2024. Each interview was allotted a one-hour time slot, with durations typically ranging from 30 to 45 minutes. Three interviews were conducted in person, while the remaining three were conducted online using online platforms such as Google Meet and WhatsApp. These interviews were conducted in both English and Persian languages, with only one interview conducted initially in Persian and later translated into English.

The interviews began with a review of the interview guide, which had been provided to respondents beforehand along with a calendar invitation for the meeting. Out of 20 survey participants, 6 agreed to participate in the interviews. Each interview commenced with an introduction to the purpose of the interview, reminding participants of the related survey, and assuring them that participation was voluntary and anonymous. Subsequently, the interviewees provided their consent, acknowledging their understanding that the interviews would be recorded and transcribed. They confirmed their willingness to proceed with the interview process. The recordings were made using the "Dictate" feature of Microsoft Word Office and the Android Voice Recorder app. The raw text data was then transcribed into a comprehensible format later. Ultimately, these transcriptions produced 18 pages of anonymous primary data for analysis from each interview.

4.2.3 Interviewees

In this study, the participants who contributed their insights through interviews are referred to as "interviewees" and are identified numerically from 1 to 6, such as "Interviewee 1." All interviewees were born between 1982 and 1995, hold university degrees, and engage in various occupations. Prior to the interviews, they completed a questionnaire and calculated their social media usage carbon footprint using a provided link.

4.3 Data presentation and Analysis

4.3.1 Survey

Section A

Age distribution of respondents

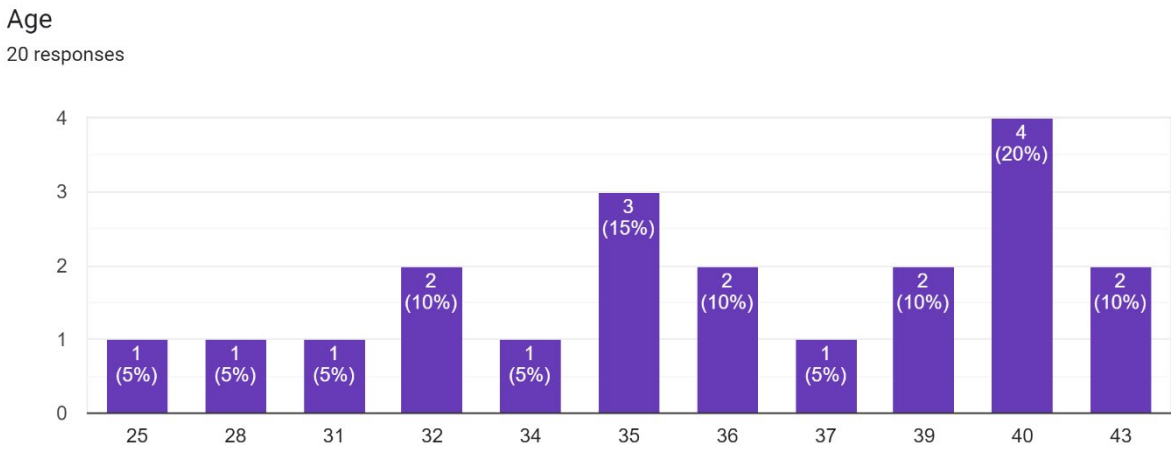

Figure 3. Age distribution of respondents

Table 1. Age distribution of respondents

Variables	**Frequency**	**Percentage**
18-25	1	5%
26-30	1	5%
31-35	7	35%
36-40	5	25%
40 and Above	6	30%
Total	**20**	**100%**

The data provided in Table 1 illustrates the age distribution of respondents. The largest percentage of respondents falls within the age group of 31 to 35, comprising 35% of the total respondents. Following this, the age groups of 36 to 40 and 40 and above represent 25% and 30% of respondents, respectively. Meanwhile, the age groups of 18 to 25 and 26 to 30 each have a 5% representation among the respondents.

Gender distribution of respondents

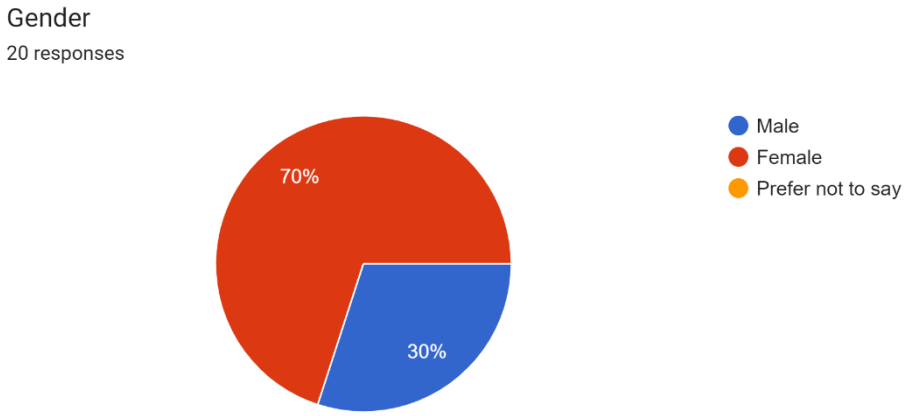

Figure 4. Gender distribution of respondents

T able 2. Gender distribution of respondents

Variables	**Frequency**	**Percentage**
Male	6	30%
Female	14	70%
Prefare not to say	0	0
Total	**20**	**100%**

The provided data in Table 2 outlines the gender distribution of respondents of the survey. The respondents are categorized into three groups: Male, Female, and Prefer not to say. The majority of respondents, comprising 70% of the total, are Female and Male respondents represent 30% of the total respondents. Notably, there are no respondents who chose to identify as Prefer not to say.

Section B

Social Media Usage Time

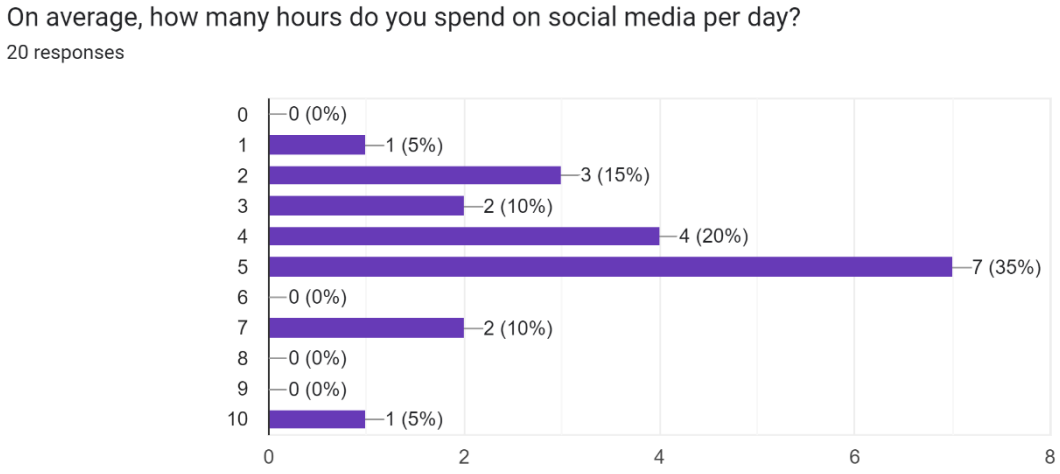

Figure 5. On average, how many hours do you spend on social media per day?

Table 3. On average, how many hours do you spend on social media per day?

Variables	**Frequency**	**Percentage**
0	0	0
1	1	5%
2	3	15%
3	2	10%
4	4	20%
5	7	35%
6	0	0
7	2	10%
8	0	0
9	0	0
10	1	5%
Total	**20**	**100%**

Table 3 presents the distribution of respondents based on the average number of hours spent on social media per day. The respondents' answers range from 0 to 10 hours per day. 5% of respondents spend 1 hour daily on social media. Following this, 15% of respondents spend 2 hours, 10% spend 3 hours, and 20% spend 4 hours on social media per day, respectively. The majority of respondents, comprising 35%, report spending 5 hours daily on social media, indicating a significant portion of the sample with a moderate usage pattern. Additionally, 10% of respondents each spend 7 hours per day, while 5% spend 10 hours per day on social media and there are no respondents who report spending 0, 6, 8, or 9 hours on social media per day.

The Most Used Social Media Platforms

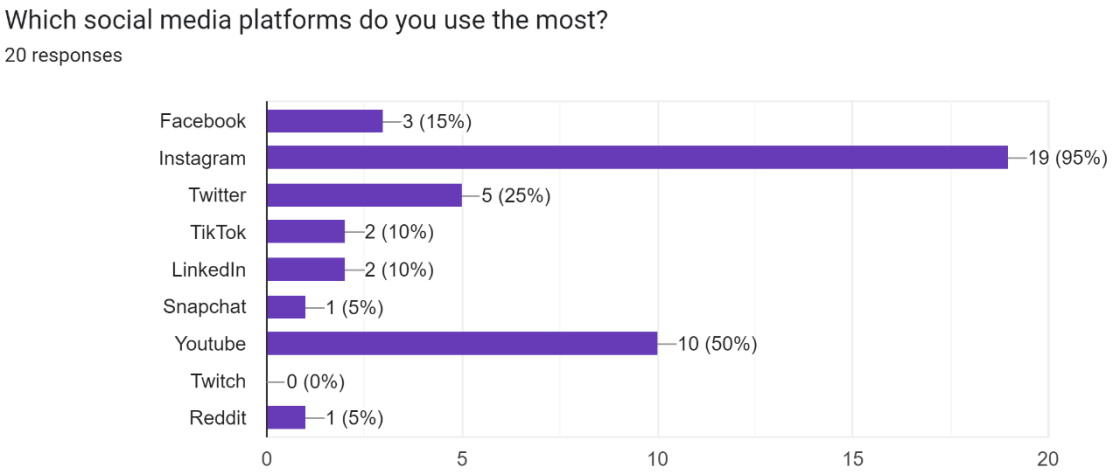

Figure 6. Which social media platforms do you use the most?

Table 4. Which social media platforms do you use the most?

Variables	**Frequency**	**Percentage**
Facebook	3	15%
Instagram	19	95%
Twitter	5	25%
TikTok	2	10%
LinkedIn	2	10%
Snapchat	1	5%
YouTube	10	50%
Twitch	0	0
Reddit	1	5%
Total	**20**	**215%**

In Table 4, respondents were asked to specify the social media platforms they use most frequently, with the option to select more than one platform. Instagram emerges as the most popular platform, with 95% of respondents indicating it as their primary choice. YouTube is the second one, with 50% of respondents selecting it as their preferred platform. Twitter and LinkedIn both garner a usage rate of 25%, while TikTok and Reddit are chosen by 10% of respondents each. Facebook and Snapchat are the least used platforms, with 15% and 5% of respondents, respectively. Twitch receives no mention as the preferred platform among respondents in this survey.

Section C

Reasons for Social Media Use

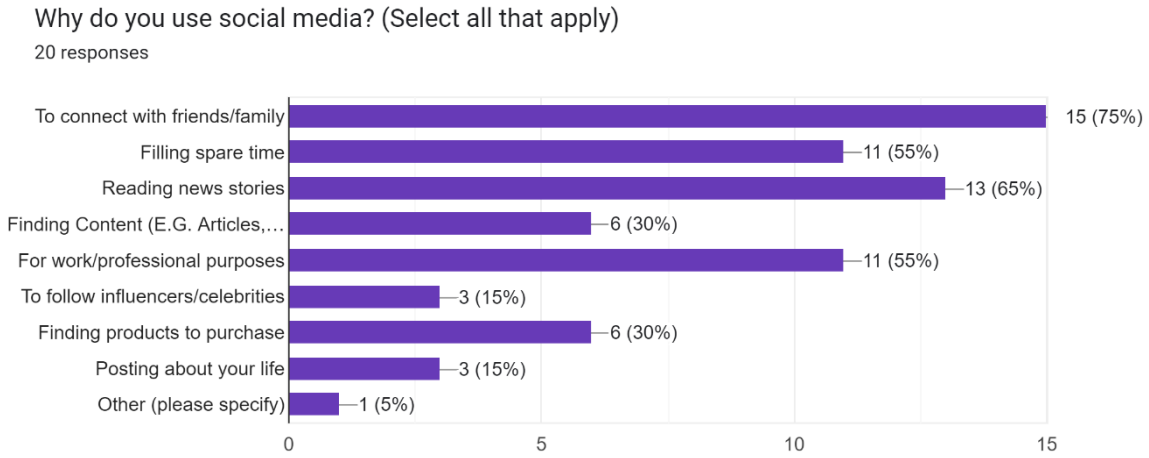

Figure 7. Why do you use social media?

Table 5. Why do you use social media?

Variables	**Frequency**	**Percentage**
To connect with friends/family	14	70%
Filling spare time	12	60%
Reading news stories	13	65%

Finding Content (E.G. Articles,…)	7	35%
For work/professional purposes	10	50%
To follow influencers/celebrities	3	15%
Finding products to purchase	6	30%
Posting about your life	3	15%
Other (please specify)	1	5%
Total	**20**	**365%**

In Table 5, respondents were asked about their reasons for using social media, with the option to select multiple motivations. The data presents the frequency and percentage of respondents who indicated each reason for using social media. Notably, the percentages in this table sum to more than 100% as respondents were allowed to select multiple reasons.

The most common reason cited for using social media is to connect with friends and family, with 70% of respondents selecting this option. Filling spare time closely follows, with 60% of respondents indicating it as a motivation. Reading news stories is also a significant factor, selected by 65% of respondents.

Additionally, half of the respondents (50%) use social media for work or professional purposes, while 35% utilize it for finding content such as articles. 30% of respondents use social media to find products to purchase, while 15% follow influencers or celebrities and post about their own lives. Finaly, 5% of respondents selected "Other" as their reason for using social media.

Section D

Awareness of Carbon Footprint

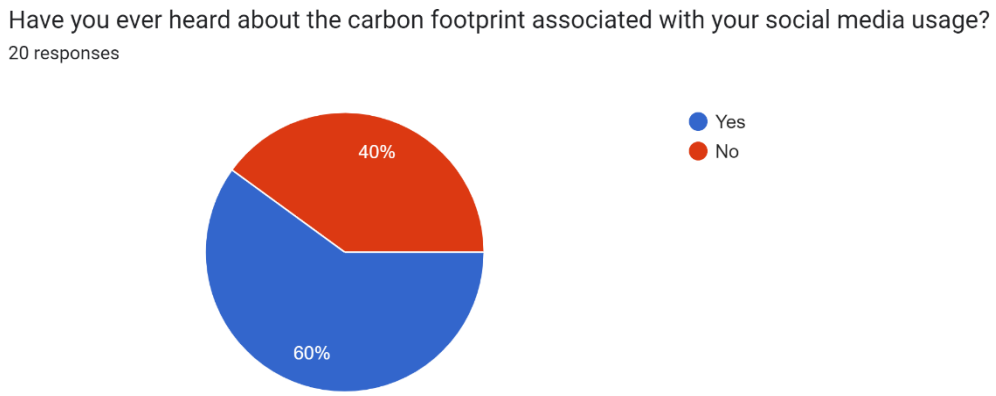

Figure 8. Have you ever heard about the carbon footprint associated with your social media usage

Table 6. Have you ever heard about the carbon footprint associated with your social media usage?

Variables	**Frequency**	**Percentage**
Yes	12	60%
No	8	40%
Total	**20**	**100%**

Table 6 presents respondents' awareness of the carbon footprint associated with their social media usage. The data displays the frequency and percentage of respondents who have heard about this environmental impact. Among the respondents, 60% indicated that they have heard about the carbon footprint associated with their social media usage, while 40% reported not being aware of it.

This data shows that a majority of the surveyed population possesses some level of awareness regarding the environmental implications of their social media usage.

Understanding this awareness can be crucial for exploring attitudes towards sustainability and environmental responsibility among social media users.

Section E

Perceptions and Behavior

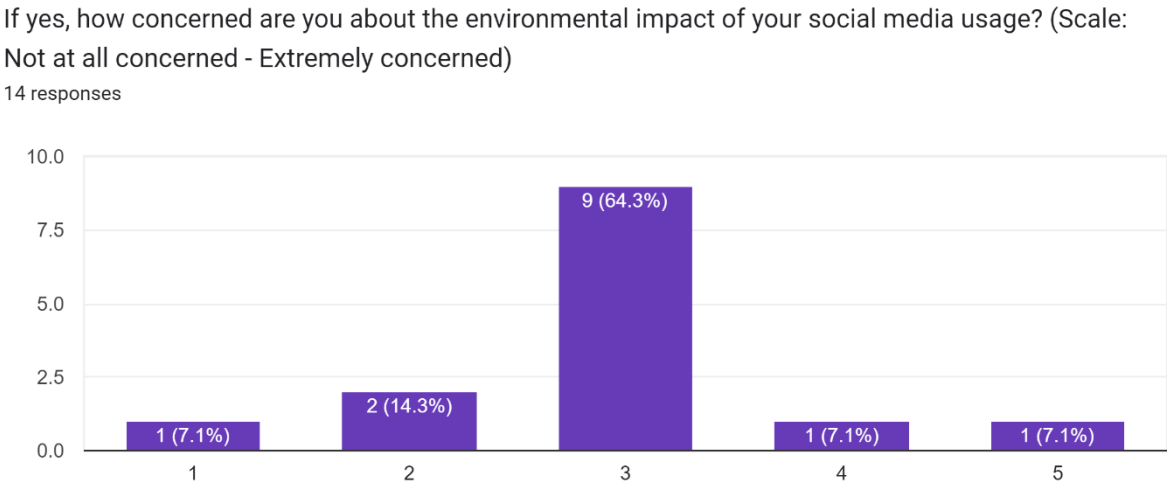

Figure 9. If yes, how concerned are you about the environmental impact of your social media usage? (Scale: Not at all concerned – Extremely concerned)

Table 7. If yes, how concerned are you about the environmental impact of your social media usage? (Scale: Not at all concerned – Extremely concerned)

Variables	Frequency	Percentage
1	1	7.1%
2	2	14.3%
3	9	64.3%
4	1	7.1%
5	1	7.1%

Total	**14**	**100%**

Table 7 provides insights into respondents' levels of concern regarding the environmental impact of their social media usage. The data displays the frequency and percentage of respondents' responses on a scale from "Not at all concerned" to "Extremely concerned."

The majority of respondents (64.3%) expressed a moderate level of concern, selecting option 3 on the scale. Additionally, 14.3% of respondents each indicated a somewhat higher level of concern by selecting options 2 and 4. Meanwhile, 7.1% of respondents chose options 1 and 5, representing the lowest and highest levels of concern, respectively.

Overall, this data indicates a range of attitudes towards the environmental impact of social media usage among the surveyed population, with a notable portion expressing a moderate level of concern. Understanding these levels of concern can inform strategies for promoting environmentally sustainable social media practices.

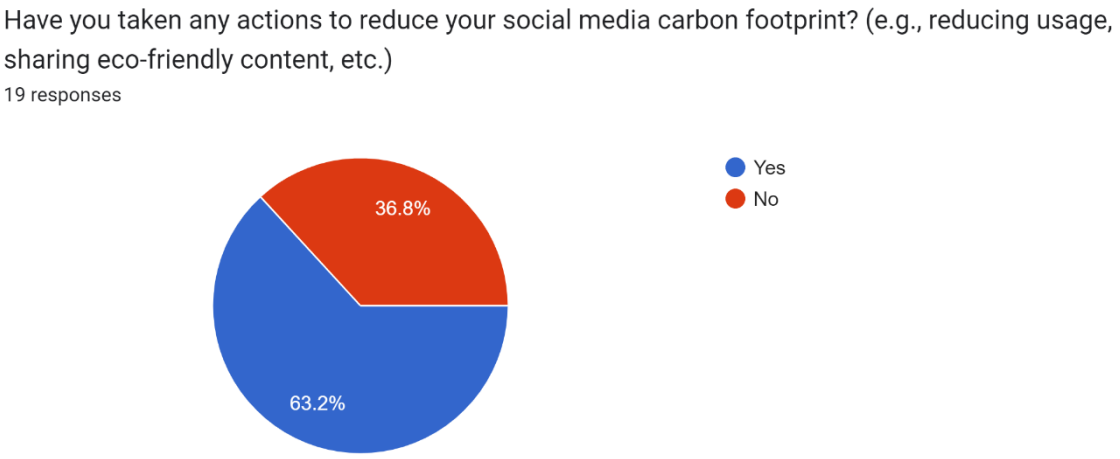

Figure 10. Have you taken any actions to reduce your social media carbon footprint? (e.g., reducing usage, sharing eco-friendly content, etc.)

Table 8. Have you taken any actions to reduce your social media carbon footprint? (e.g., reducing usage, sharing eco-friendly content, etc.)

Variables	**Frequency**	**Percentage**
Yes	12	63.2%
No	7	36.8%
Total	**19**	**100%**

Table 8 outlines respondents' actions taken to mitigate their social media carbon footprint. The data presents the frequency and percentage of respondents who have or have not taken such actions. Of the respondents, 63.2% reported taking actions to reduce their social media carbon footprint, while 36.8% indicated that they have not taken any such actions. This data suggests that a majority of the surveyed population has actively engaged in behaviors aimed at lessening the environmental impact of their social media usage.

Section F

Educational Initiative

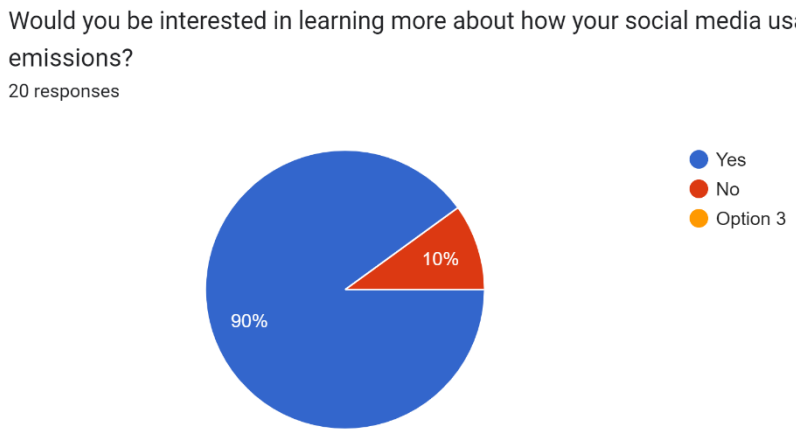

Figure 11. Would you be interested in learning more about how your social media usage contributes to carbon emissions?

Table 9. Would you be interested in learning more about how your social media usage contributes to carbon emissions?

Variables	**Frequency**	**Percentage**
Yes	18	90%
No	2	10%
Total	**20**	**100%**

Table 9 presents respondents' interest in learning more about how their social media usage contributes to carbon emissions. The data displays the frequency and percentage of respondents who expressed interest or lack thereof in acquiring such knowledge.

A significant majority of respondents (90%) expressed interest in learning more about how their social media usage contributes to carbon emissions, indicating a strong desire for information regarding the environmental impact of their online activities. Conversely, only 10% of respondents stated that they are not interested in acquiring this knowledge.

This data underscores the importance of environmental awareness among social media users and highlights their willingness to engage with information aimed at reducing their carbon footprint.

4.3.2 Answering Research Questions

In this section, I dive into the insights shared by the participants during the interviews. The interviewees offered unique perspectives on the relationships between social media, its impacts on the environment, and their daily habits. After carefully studying their responses, I discovered themes that shed light on social media's environmental

consequences, users' awareness of these impacts, and the factors that influence their attitudes and behaviors toward eco-friendly practices. I also explored the role of social media platforms in promoting sustainability and the challenges and opportunities that arise when it comes to promoting environmental responsibility in our online interactions.

I analyzed Interview responses using a coding approach to identify key themes and insights related to the research questions and theoretical frameworks. The following codes were applied to categorize and analyze the data:

1. Environmental Impact Awareness: This code captures interviewees' awareness of the environmental implications of social media usage, including references to carbon footprint, energy consumption, and digital footprints.

2. Behavioral Changes: Responses indicating any modifications in social media consumption habits or behaviors subsequent to becoming aware of environmental impacts were coded under this category. Examples include reducing usage, selecting eco-friendly platforms, or implementing digital well-being restrictions.

3. Factors Influencing Attitudes and Behaviors: This code contains responses related to factors influencing attitudes and behaviors toward adopting eco-conscious practices. It includes mentions of education, awareness campaigns, personal preferences, and efforts to shorten social media usage.

4. Role of Social Media Platforms: Responses discussing the role of social media platforms in facilitating and promoting eco-friendly practices were coded under this category. This includes features, policies, and initiatives aimed at reducing environmental impact.

5. Challenges and Concerns: Responses highlighting challenges or concerns associated with promoting environmental sustainability on social media platforms were categorized under this code. Examples include conflicting interests, user engagement strategies, or business models.

6. Recommendations and Solutions: Responses suggesting recommendations or solutions for promoting environmental sustainability on social media platforms were coded under this category. This includes suggestions for platform enhancements, user education, or policy adjustments.

7. Theoretical Frameworks: Responses aligning with theoretical frameworks such as the Theory of Planned Behavior or other relevant theories mentioned in the thesis were coded accordingly.

By applying these codes, the interview data were systematically analyzed to uncover patterns, themes, and insights relevant to the research objectives and theoretical underpinnings of the study.

Research Question 1: What are the environmental impacts of social media?

Interviewee 1 points out the significant environmental implications of social media, citing the energy consumption of data centers and the resulting carbon emissions and digital footprints. They have taken proactive steps to reduce unnecessary data use and support eco-friendly practices.

> *"I think every link we share contribute to the energy consumption of the vast data centers, increasing the carbon emission and environmental stain and our digital footprint (Interviewee 1)."*

Similarly, Interviewee 2 mentions the carbon footprints generated by large servers and their environmental consequences. The other interviewees demonstrate varying levels of

prior knowledge regarding the environmental impacts of social media, with some admitting limited awareness before the survey but expressing increased consciousness afterward. Interviewee 4, for example, credits the survey for enlightening them about carbon footprint, leading to a greater understanding of their social media usage's potential harm.

> *"The awareness of the environmental impact of social media is the fact that your survey came and educated or enlightened us more because I had little or no knowledge about carbon footprint. So, this study actually or this survey rather, made it easy for me to see that, what I share on the Internet and what I use social media for can actually make or destroy the environment, and that has made me very conscious of what I do and the time I spend (Interviewee 4)."*

Research Question 2: How aware are social media users of the environmental impact of their online activities, particularly in terms of carbon footprint?

Regarding the awareness of social media users about their carbon footprint, the interviewees demonstrate varying levels of consciousness. Interviewee 1 advocates for mindful social media use and eco-friendly platforms, while Interviewee 2 implemented digital well-being limitations after participating in the survey, showcasing increased awareness and proactive steps towards reducing their environmental impact.

> *"after the survey, I set digital wellbeing limitations on my smartphone to track the hours spent on each app, especially the ones which make more carbon footprint (Interviewee 2)."*

Interviewee 3 also indicates heightened awareness post-survey, leading to a reduction in online activities and a shift towards nature engagement. Interviewee 4 credits the survey for enlightening them about carbon footprint, resulting in greater consciousness about their social media usage after calculating their social media carbon footprints.

> *"Well, I have made changes in my social media consumption because as I said earlier, after I used the calculator, I saw that certain apps, I was using them so much and I saw the negative impact that was going to have on the environment. So that calculator has actually been very helpful. Because it*

helps me regulate how I use it, because I feel like that's the best way I could keep my own quota to save the environment (Interviewee 4).”

Interviewee 5 indicates that environmental impact was not initially a primary concern for reducing social media use but acknowledges its importance afterward. Interviewee 6 admits to lacking prior knowledge but emphasizes the importance of awareness for minimizing carbon footprint.

“After I got this information, I tried not to share any content easily. Before this, I used to write a story with a poem or make a post on Instagram, even to express my inner feeling. But in these few weeks I have not published anything except what I think is very necessary. These things I publish are mostly to inform about useful cultural and artistic activities (Interviewee 6).”

Research Question 3: What factors influence social media users' attitudes and behaviors towards adopting eco-conscious practices in their online interactions?

Factors influencing attitudes and behaviors that interviewees mentioned include education and awareness campaigns, personal preferences for alternative activities, and conscious efforts to limit social media usage. Interviewees expressed a desire to reduce their carbon footprint and adjust their online behaviors accordingly. Interviewee 1 mentions becoming more selective in the content they engage with, focusing on quality over quantity

“I think to reduce unnecessary scrolling and aimless browsing to minimize data use, opt for an eco-friendly platform for those who are committed to sustainability, and encourage their friends and family to join the practice the mindful social media use for environmental sake. […] Through the environmental impact on social media has influenced to the type of frequency of content I engaged with and to become more selective, focusing on meaningful and informative content rather than like mindless scrolling. I have to reduce the frequency of my interactions, opting the quality over quantity and lessen my digital footprints. (Interviewee 1).”

and interviewees 2 also mentioned changes in their social media habits to align with eco-conscious practices, such as reducing unnecessary scrolling and avoiding content contributing to carbon emissions. They emphasized the importance of fostering positive attitudes and supporting sustainable platforms.

> *"I changed some of my social media habits, like avoiding saving data on Instagram and refraining from opening reels due to unwanted content. It constantly shows contents which you didn't choose to watch. (Interviewee 2)."*

Interviewee 3 also emphasized the importance of avoiding unnecessary and unhelpful content on social networks, opting instead for informative and necessary content to reduce their environmental impact. Interviewee 5 acknowledges the complexity of balancing social media usage with environmental concerns but emphasizes the importance of education and awareness.

> *Unfortunately, education is far behind contemporary life, most of the times. But someone needs to address that in children books or in children's TV program or whatever they are going to see nowadays. Yeah, it's education, and, yeah, with education definitely is going to raise awareness. Like other things in society (Interviewee 5).".*

while Interviewee 6 emphasizes the importance of innovation in creating new needs that promote eco-friendly practices.

> *"Well, it's still not possible to limit some virtual communication in social networks. It means that we may use these social networks for at least three or two, four hours a day. But by raising awareness and changing the types of social communication, we can reduce our online time. I also think we need to be innovative and create a new need like many products that didn't exist before that we now feel the need to have that can help reduce our carbon footprint (Interviewee 6)."*

Research Question 4: What role do social media platforms play in facilitating and promoting eco-friendly practices among their users, and how can they be incentivized to prioritize environmental sustainability in their operations and features?

Interviewees suggest that social media platforms can play a significant role in promoting eco-friendly practices through features like time management apps to limit usage and sponsored ads promoting sustainable behaviors. However, concerns are raised about the conflicting interests of social media companies, which prioritize user engagement and advertising revenue. Interviewee 1 discussed the need for platforms to prioritize environmental sustainability and the necessity for social media companies to motivate users to reduce their carbon footprint by promoting mindful engagement and eco-friendly practices. Interviewee 2 suggested that companies like Meta should educate users about carbon emissions and develop apps to help limit social media usage.

> *"I believe it's essential for companies like Meta to educate users about social media's carbon footprint emissions although it seems like a dream. Some companies may develop apps to inform and help users limit their time spent on social media (Interviewee 2)."*

Interviewee 3 emphasized the need for social media platforms to provide users with tools to manage their usage and avoid unnecessary content that contributes to wasted time and environmental harm.

> *"It is better for social networks to give the user the ability to manage the use of time in these networks. Another thing is to avoid the unnecessary publication of many contents that waste the user's time and make them waste time (Interviewee 3)".*

Interviewee 4 suggests the need for social media platforms to motivate users to reduce their digital footprint,

> *"I actually wish that more phone producers or manufacturers would move with the time and introduce probably apps or app developers also not only full manufacturers that could help regulate the time we spend on the social media, something that would just give you an alert or a warning where you set time you want to spend on the day and after that you are sent the reminder to remind you that ok, you have the responsibility to save the environment and then reduce your time on social media. So an app actually would help. An app either by an app developer or by phone manufacturer.*

> *What I think social media can do to help is creating more awareness on sustainable steps that can be taken to help the environment. I think sponsored ads should be there, pop up art should be there. Just as how you go to browsers and you see advert unsolicited adverts. I think social media platforms should try to push sustainable ways in which we can help conserve the environment (Interviewee 4)".*

Interviewee 5 suggests incentivizing users to reduce their environmental footprint, although challenges related to business models and user engagement strategies are acknowledged. He suggests the development of a visualized app that serves as a reminder for social media usage and incentivizes users to be mindful of their online time allowing them to compare their social media time with that of their friends to enhance motivation.

> *In general, a new visualization works for me. There's this app called Forest, then, when you focus for 25 minutes or whatever then you grow a tree and then after 24 hours if you have, like, a lot of chunk of times which you are focused, like 25 times this standard time, you can adjust that then you have a forest, some sort of, and then you can actually compete with other people that if you have more deep work during the day, then you have like better forest. So if there would be such a thing, I think that would be helpful. For example, if you use less Instagram than you save more tree. It could be such a thing, for example if they have a health application of my Samsung Android mobile and it could be in a competition mode with other people. Maybe it's a good thing. But I'm not sure if there is any social media company who likes this idea because they generally want to hook the people to work with them or, and they also have advertisement (Interviewee 5)".*

Overall, the responses highlight a growing awareness among social media users regarding the environmental impact of their online activities and a willingness to adopt eco-conscious practices, albeit with challenges related to platform incentives and user behaviors. These insights from the interviews provide valuable perspectives on the environmental impact of social media and users' awareness and behaviors regarding eco-conscious practices online. They underscore the importance of promoting sustainability within social media platforms and empowering users to make informed choices to minimize their digital carbon footprint.

5 Discussion

5.1 Summary

This chapter summarizes the findings from the interviews conducted to address the research questions outlined in this study, along with the literature review. Through a comprehensive discussion, it offers insights into various aspects, including the environmental impacts of social media, users' awareness of their carbon footprint, factors influencing eco-conscious practices, and the role of social media platforms in promoting sustainability. The chapter concludes by describing implications for theory and practice, as well as future research directions, based on both interview responses and literature reviews.

Environmental Impacts of Social Media

The interviews conducted in this study shed light on the significant environmental implications of social media usage. Interviewees highlighted concerns about the energy consumption of data centers, carbon emissions, and digital footprints resulting from online activities. These findings are consistent with previous research emphasizing the environmental impact of digital technologies. According to CORE Econ (2019), a clear correlation exists between carbon footprint and cloud computing service use, with significant annual CO2 emissions generated by images uploaded to social media platforms such as Facebook, Instagram, and WhatsApp.

Awareness of Carbon Footprint

Interviewees demonstrated varying levels of awareness regarding their carbon footprint and the environmental impact of their online activities. While some interviewees were already mindful of their digital footprint, others gained awareness through the survey process. According to Naeem (2023), educational campaigns and initiatives play a pivotal role in promoting sustainable social media practices and raising awareness about environmental issues. Initiatives promoting sustainable social media practices aim to

create positive attitudes, develop social norms that support sustainability, and strengthen users' perceived control over their activities, therefore contributing to the formation of intentions and subsequent behavioral changes (Naeem et al., 2023).

Factors Influencing Eco-Conscious Practices

The interviews revealed factors impacting attitudes and actions toward environmentally conscious practices, such as education, personal preferences, and conscious efforts to limit social media usage. Interviewees advocated for responsible digital behaviors and fostering a culture of sustainability within the social media ecosystem, contributing to mitigating global warming and advancing environmental conservation efforts. The adoption of pro-environment behaviors can lead to a reduction in social media usage, thereby indirectly lowering the digital carbon footprint and fostering an eco-friendlier digital society (Naeem et al., 2023).

Role of Social Media Platforms

Interviewees discussed the role of social media platforms in facilitating and promoting eco-friendly practices among users. Suggestions included the development of time management apps, sponsored ads promoting sustainability, and tools to manage usage effectively. Social media platforms serve as powerful tools for promoting sustainability, enabling the rapid dissemination of information and influencing attitudes and behaviors towards environmental conservation (Hamid et al., 2017). Sustainable social media initiatives use partnerships and campaigns to raise environmental awareness and encourage behavior change, emphasizing the importance of collective action in reducing the environmental impact of digital consumption (Al Kez et al., 2022).

5.2 Recommendations

Based on the insights gathered from the interviews and literature review, several recommendations can be proposed to promote eco-conscious practices in social media usage.

1. Social media platforms should prioritize environmental sustainability by integrating features such as time management apps to limit usage and providing tools for users to manage their digital footprint.
2. Educational campaigns should be launched to raise awareness among users about the environmental impact of their online activities and encourage responsible digital consumption.
3. Collaborative efforts between social media companies, environmental organizations, and governments can further amplify the reach and effectiveness of these initiatives.
4. Incentivizing users to reduce their digital carbon footprint through rewards or recognition could foster positive behavioral changes.
5. Further research is needed to explore the efficacy of these recommendations and identify additional strategies to mitigate the environmental impact of social media usage.

5.3 Conclusion

In conclusion, the findings from this study provide valuable insights into the environmental impact of social media and users' awareness and behaviors regarding eco-conscious practices online. Sustainable social media initiatives and educational campaigns play a crucial role in promoting environmental awareness and driving behavioral change among social media users. However, challenges remain in motivating behavior change and aligning platform incentives with environmental sustainability goals. Future research should continue to explore strategies for promoting pro-environmental behaviors among social media users and addressing the environmental impact of digital consumption.

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Declaration

I acknowledge the utilization of ChatGPT and QuillBot in aiding the paraphrasing and review of my thesis' grammatical structure and sentence construction.

Appendices

Survey Link

https://forms.gle/qTzaZMKoxGkiRMSX8

Interview Questions

1. Have you ever considered the environmental impact of the data you share or consume on social media platforms?

2. Have you made any changes to your social media consumption habits after learning about the environmental impact associated with it? If so, what specific changes have you made?

3. How has your awareness of the environmental impact of social media influenced the type or frequency of content you engage with on these platforms?

4. Are there any features or applications you wish there were to help users reduce their carbon footprint? What role do social media platforms play in facilitating and promoting eco-friendly practices among their users?

5. Do you believe individuals have a responsibility to minimize their digital carbon footprint? Why or why not?

6. Are there any specific challenges you face in trying to reduce your social media carbon footprint?

7. Have you noticed any changes in your social media behavior or habits after becoming more aware of the environmental impact?

8. How do you balance the benefits of social media usage with concerns about its environmental consequences?

9. In your opinion, how can individuals influence their peers or social media networks to adopt more eco-conscious behaviors online?

10. What role do you think public awareness and education play in encouraging people to reduce their social media carbon footprint?