

THE VITAL INFLUENCE OF THE EXPRESSION OF INFORMATION AND COMMUNICATION IN THE INFORMATION SOCIETY: A STUDY WITH GRADUATE STUDENTS IN DOCUMENTATION AND INFORMATION SCIENCES AND TECHNOLOGIES

Carla Rocha

Escola Superior de Tecnologia e Gestão, Instituto Politécnico de Viana do Castelo, Portugal

Olga Ferreira

Centro de Cultura, Instituto Politécnico do Porto, Portugal; Instituto Superior de Contabilidade e Administração do Porto, Instituto Politécnico do Porto, Portugal

Milena Carvalho

CITCEM/FLUP – Centro de Investigação, CULTURA, ESPAÇO e MEMÓRIA ; CEOS.PP / ISCAP / P.PORTO, Rua Jaime Lopes Amorim s/n, 4465-004, Matosinhos, Portugal

Susana Martins

CEOS.PP / ISCAP / P.PORTO, Rua Jaime Lopes Amorim s/n, 4465-004, Matosinhos, Portugal ; CITCEM/FLUP – Centro de Investigação, CULTURA, ESPAÇO e MEMÓRIA

Abstract. The expression of information and communication plays a central role in the information society, deeply and comprehensively shaping the way people interact, share knowledge and influence the world around them. This article explores the influence of these elements on various aspects, from access to information to the concerns of the use of it, with a specific focus on graduates of the degree in Documentation and Information Sciences and Technologies from Instituto Superior de Contabilidade e Administração – Instituto Politécnico do Porto. Furthermore, the technological and social impacts of information expression and communication are discussed, along with associated challenges such as the spread of misinformation and privacy issues. By fully recognizing and understanding this influence, we can make the most of the benefits of the information society while responsibly addressing the challenges and ethical dilemmas it presents.

The methodological approach uses a questionnaire survey in order to explore how these professionals perceive and experience the interaction between the expression of information, communication and their professional practice. The results reveal valuable insights into how training in this area influences the understanding and application of information society principles, as well as the challenges and opportunities they face in the current context. This study pretends to contribute to a deeper understanding of the mechanisms through which the expression of information and communication shapes professional practice and society at large.

Keywords: Expression of Information and Communication; Information Society; Documentation and Information Sciences and Technologies; Information Technologies

Introduction

In the modern era, the expression of information and communication has become a powerful force that shapes not only the way we interact, but also the way we perceive the world around us. In the information society, where access to information is abundant and communication is instantaneous, the influence of these elements is undeniable and profound. This article explores the breadth and importance of the influence of the expression of information and communication in contemporary society.

In the digital era in which we live, the expression of information and communication plays a fundamental role in the construction and evolution of the information society. This article addresses the current state of this ever-changing research topic.

The rapid evolution of information and communication technology (ICT) has profoundly changed the way people interact, access information and participate in society. The explosion of the internet, social networks, artificial intelligence and other digital technologies has generated an environment where the expression of information and communication is more accessible, instantaneous and ubiquitous than ever before. In this context, understanding the influence of these phenomena on the information society is crucial to adapt policies, practices and strategies that promote development and social well-being.

The object of this research is to explore how the expression of information and communication impacts various aspects of the information society, from the dissemination of knowledge to the formation of identities and opinions. The main focus will be on the effects of this expression on the professional practice of undergraduate students in Documentation and Information Sciences and Technologies.

The purpose of this research is to provide an in-depth analysis of the mechanisms through which the expression of information and communication influences the information society, with an emphasis on the experiences and perceptions of professionals trained in the area of Documentation and Information Sciences and Technologies. The aim is to identify patterns, trends and challenges related to the expression of information and communication in this specific context, providing valuable insights for the improvement of professional practice and the advancement of the information society as a whole.

The objectives of this investigation are the following:

- Analyze the role of information expression and communication in the dissemination of knowledge in the information society.
- Investigate how the expression of information and communication influences the formation of identities and opinions in digital networks.
- Assess the impact of the expression of information and communication on the professional practice of students in Documentation and Information Sciences and Technologies.
- Identify challenges and opportunities related to the expression of information and communication in the information society, with a focus on training the professionals in question.

The expression of information and communication plays a central role in the information society, shaping fundamental aspects of social, cultural, economic and political life. By exploring the effects of this expression on the professional practice of students in Documentation and Information Sciences and Technologies, this investigation will contribute to a more comprehensive understanding of the challenges and opportunities faced in this constantly evolving context. It is hoped that the results of this study will provide valuable insights for the development of policies, practices and strategies that promote responsible and effective use of information expression and communication in the contemporary information society.

Literature review

The information society is characterized by the centrality of information and communication in all aspects of social, economic, and cultural life. This literature review analyzes diverse theoretical and empirical perspectives on how the expression of information and communication shapes and transforms contemporary society.

Castells (2010) explores the structural transformation of society with the advent of information technology. Castells argues that the network society fundamentally alters power relations, the economy and culture. The author identifies the "information age" as a new stage in social development, driven by digital technology and communication networks. Bell (1973) anticipated many of the changes Castells describes and introduces the concept of post-industrial society, where the economy is dominated by services and the production of knowledge surpasses the production of material goods.

McLuhan (1994) offers a seminal perspective on how the media affect human perception and social organization. McLuhan is known for his expression "the medium is the message", indicating that the medium of communication itself influences society more than the content transmitted.

Mark Warschauer (2003) addresses digital exclusion, arguing that the simple availability of technology does not solve social inequalities and suggests that digital inclusion policies should focus on infrastructure but also on training.

Benkler (2006) discusses social production and network collaboration, highlighting how the internet and digital networks enable new forms of economic and social organization. Benkler argues that these networks promote freedom and innovation by challenging traditional power and market structures. Also in 2006, Lawrence Lessig discusses the legal and ethical implications of internet regulation and argues that the digital code (software) is a form of law that can reinforce or undermine privacy and freedom.

Two years later, Shirky (2008) explores how the internet and social media enable collective organization without the need for formal structures and emphasizes the potential of digital platforms for social and political mobilization. In the same year, Hargittai (2008) analyzes a different perspective, the disparities in internet access and use. The author highlights that digital literacy is crucial to fully taking advantage of the opportunities offered by the information society, but not everyone has equal access to these skills.

Tim Wu (2010) traces the history of communication monopolies and argues for the need for policies that promote diversity and freedom on the internet and in 2011, Turkle (2011) investigates the paradoxes of digital life. Turkle argues that while technology connects people, it can also isolate them, creating a false sense of intimacy and understanding.

More recently Viktor Mayer-Schönberger and Kenneth Cukier (2013) discuss the impact of big data on society. They explore how information governance can balance innovation with personal data protection.

Bruce Schneier (2015) warns about the risks of massive data collection. Schneier stresses the threats to privacy and individual security, as well as the implications for freedom and democracy.

From the structural changes in power relations and economics described by Castells to the privacy and security challenges discussed by Schneier, it is clear that digital communication is a complex and dynamic field, fraught with opportunities and risks. Digital literacy and inclusion are essential to ensure the benefits of this transformation are widely shared.

Access to information

One of the main consequences of the digital revolution is democratic access to information. Previously confined to libraries and traditional media, information is now at our fingertips, thanks to the internet and mobile devices. This has democratized knowledge, allowing people around the world

to explore a wealth of information on a wide range of topics, regardless of their geographic location or socioeconomic status.

The speed and reach of communication in contemporary society are truly impressive. Messages can be sent and received in a matter of seconds, regardless of the distance between sender and recipient. Social media platforms connect billions of people around the world, enabling the rapid dissemination of information, ideas, and opinions. This ability for instant communication has the power to mobilize masses, influence trends and even promote social and political changes.

The expression of information and communication plays a crucial role in the formation of individual and collective identities. Exposure to a variety of perspectives, cultures and values through media and the internet profoundly influences how people see themselves and relate to others. Furthermore, individuals' opinions and beliefs are often shaped by the information they consume and the interactions they have online. This can lead to a diversity of opinions and thoughts, but it can also result in polarization and the spread of extreme ideologies.

The expression of information and communication not only shapes social and cultural interactions, but also has a significant impact on the economy and technology. Entire industries, such as information technology, digital media and e-commerce, depend on information exchange and effective communication to thrive. Furthermore, the emergence of new communication technologies, such as artificial intelligence and virtual reality, is transforming the way we communicate and interact with the world around us.

New Technologies as Facilitators of Change

New technologies are the building blocks of a smart society. From artificial intelligence to the Internet of Things, these innovations offer unprecedented opportunities to improve efficiency, sustainability, and quality of life. For example, artificial intelligence can optimize industrial processes, improve medical diagnostic accuracy, and personalize the customer experience. Likewise, the Internet of Things can create smarter cities by connecting critical infrastructure and facilitating real-time data collection.

However, it is important to recognize that adopting new technologies also brings challenges and ethical issues. From privacy and security concerns to the impact on employment and inequality, it is essential to address these issues proactively and responsibly. Companies play a crucial role in this process, developing policies and practices that ensure new technologies are implemented in an ethical and inclusive way.

New technologies play a central role in shaping the information society. They not only enable companies to innovate and adapt to market demands, but they also have a profound impact on every aspect of everyday life, from education and work to entertainment and healthcare.

Artificial intelligence, for example, is transforming the way we interact with technology, enabling intelligent virtual assistants, personalized recommendation systems, and advanced data analytics. The internet of things connects devices and sensors into a global network, creating opportunities for intelligent automation and real-time data collection. Blockchain offers a secure and transparent record of transactions, with the potential to revolutionize industries such as finance, supply chain and healthcare.

However, these new technologies also present significant challenges, such as data privacy and security concerns, digital inequality, and impacts on employment and the economy. It is crucial that

society develops appropriate policies and regulations to ensure that these technologies are used ethically and responsibly, benefiting all members of the community.

Building a Smart Society

An intelligent society is one that intelligently and strategically uses new technologies to face the challenges of the modern world. This means not only adopting cutting-edge technologies, but also developing policies and infrastructure that promote digital inclusion, technological education and civic participation.

Companies play a central role in building a smart society, both as drivers of technological innovation and as corporate managers. By investing in research and development, promoting diversity and inclusion, and adopting sustainable business practices, companies can significantly contribute to creating a fairer, more prosperous, and connected future for all.

In the contemporary scenario, companies and new technologies play fundamental roles in the formation of an intelligent society. This interconnection between these elements is essential to drive progress and innovation towards a more sustainable and inclusive future.

A smart society is characterized by connectivity and collaboration, where citizens have easy and equitable access to public services, quality education and employment opportunities. It also values innovation and entrepreneurship, encouraging the creation of new companies and creative solutions to the challenges faced by the community.

However, a smart society also recognizes the risks and challenges associated with technology and information and works to mitigate these impacts through robust privacy policies, digital education and digital inclusion programs.

In short, companies, new technologies and an intelligent society are intrinsically linked in the information society. As we move forward in this new paradigm, it is essential that we address these issues holistically and collaboratively, ensuring that technology and information are used to promote the well-being and progress of all members of society.

Companies as Engines of Transformation

Companies are not just commercial entities, but agents of change and innovation in society. They have the potential to catalyze the development of new technologies and practices that shape the world around us. By investing in research and development, collaborating with startups, and adopting an innovation mindset, companies can lead the vanguard of technological transformation.

Furthermore, companies play a crucial role in the dissemination and adoption of new technologies. Whether through the production and commercialization of technological products or the implementation of innovative solutions in their internal processes, companies are the catalysts that take new technologies from the laboratory to the market and, finally, to society in general.

In the information society, companies face unique challenges and opportunities. On the one hand, rapid technological evolution, and the increasing digitalization of all aspects of life require companies to be agile and adaptable. On the other hand, near-universal access to information and instant communication means that companies are constantly under public scrutiny, requiring transparency and accountability in their operations.

To thrive in the information society, companies must embrace innovation and digital transformation. This may involve adopting new technologies, such as artificial intelligence, big data, the internet of things and blockchain, to optimize processes, improve efficiency and create more personalized and customer-centric products and services. Furthermore, companies must also be aware of the ethical and social issues related to the use of these technologies, ensuring that they are implemented in a responsible and sustainable way.

In short, the interconnection between companies, new technologies and a smart society is essential to face the challenges of the 21st century and create a more promising future for everyone. By working together to harness the power of innovation and technology, we can build a smarter, fairer and more sustainable world for future generations.

Methodology

A structured questionnaire survey was used as a data collection instrument. This questionnaire survey aims to evaluate the understanding and opinions of undergraduate students in Documentation and Information Sciences and Technologies, from the Instituto Superior de Contabilidade e Administração do Porto - Instituto Politécnico do Porto, on the influence of the expression of information and communication in the information society.

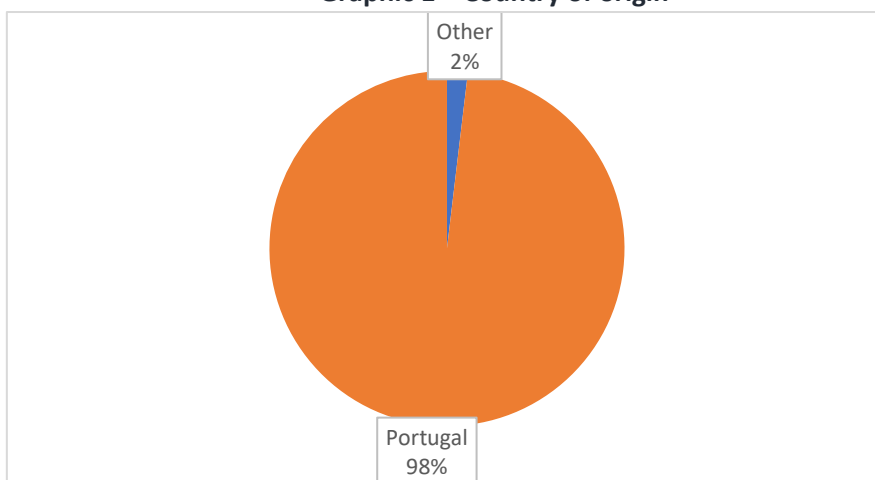
The questionnaire includes questions about participant identification, the importance of effective communication in the information society, especially in the context of information sciences and technologies, how they influence the way they communicate and what are the main challenges related to information security in the Digital Era and the impact of information technologies on academic life. They are also asked about information overload and the role of social networks and ends with the role of social networks and addresses ethics in the use of information technologies.

The questionnaire was distributed via email to undergraduate students in Documentation and Information Sciences and Technologies and was answered by 53 students.

Results

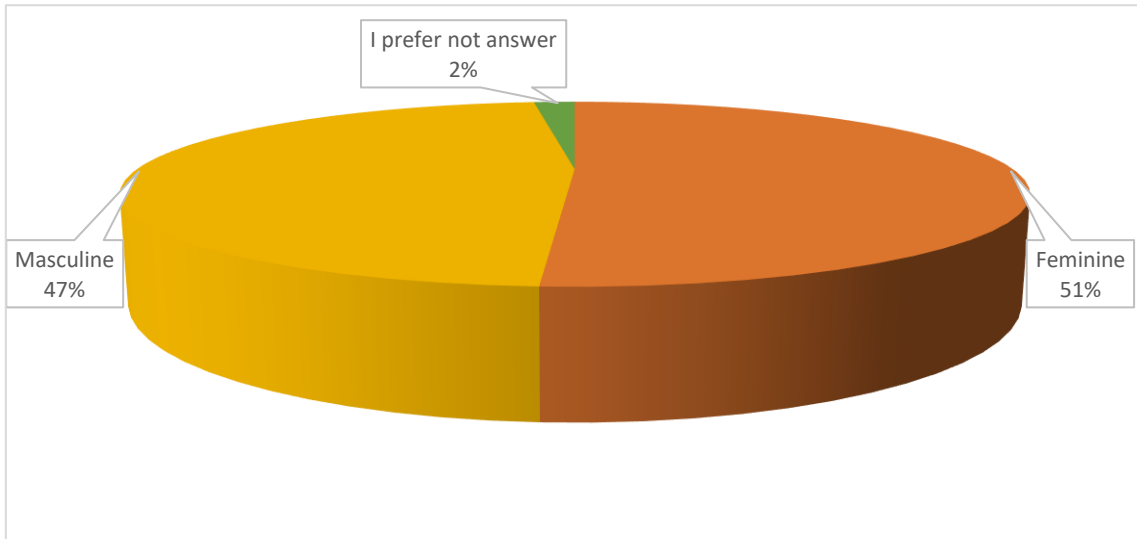
The first data analyzed was personal characterization where they were asked about nationality, gender, and age. The most common nationality is Portuguese (98%), with most respondents being female (51%), with ages ranging from 19-24 years old prevailing, as can be seen in the graphs below:

Graphic 1 – Country of origin



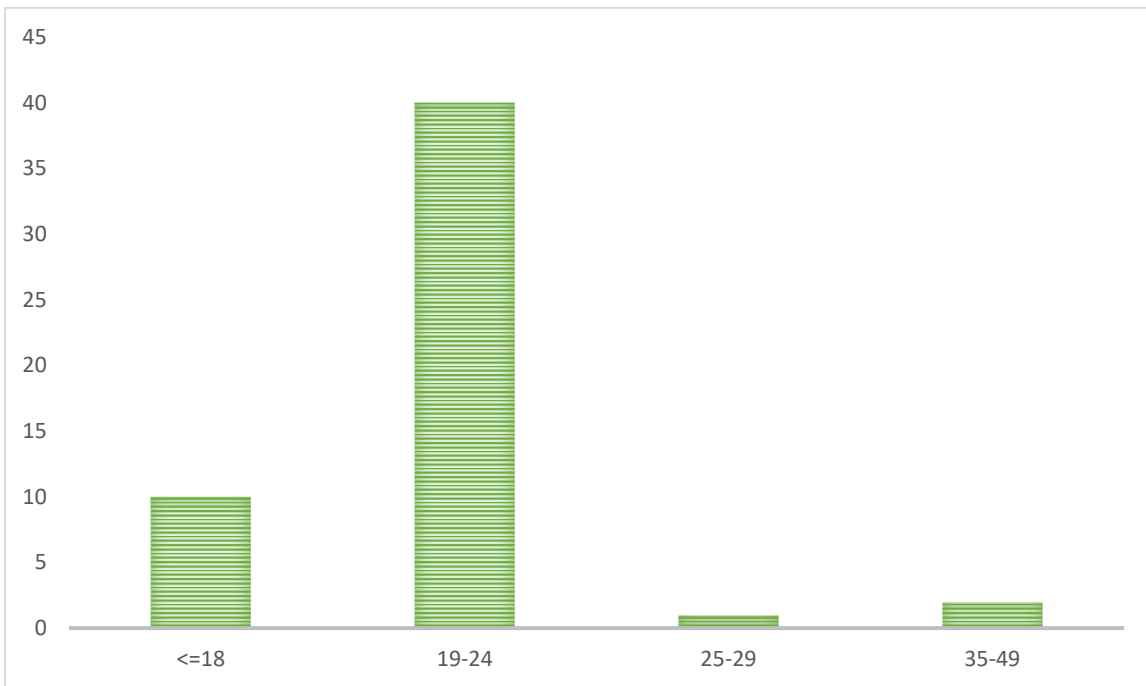
Source: The authors - Excel Capture (2024)

Graphic 2 – Gender



Source: The authors - Excel Capture (2024)

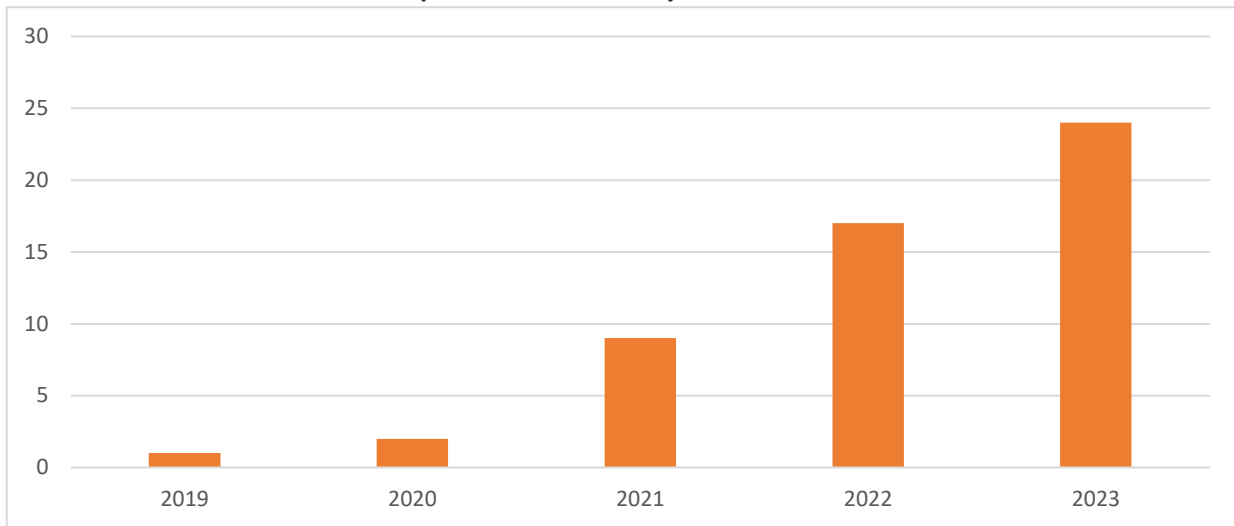
Graphic 3 – Age



Source: The authors - Excel Capture (2024)

The graph below shows that the majority of respondents entered the degree between 2022 and 2023:

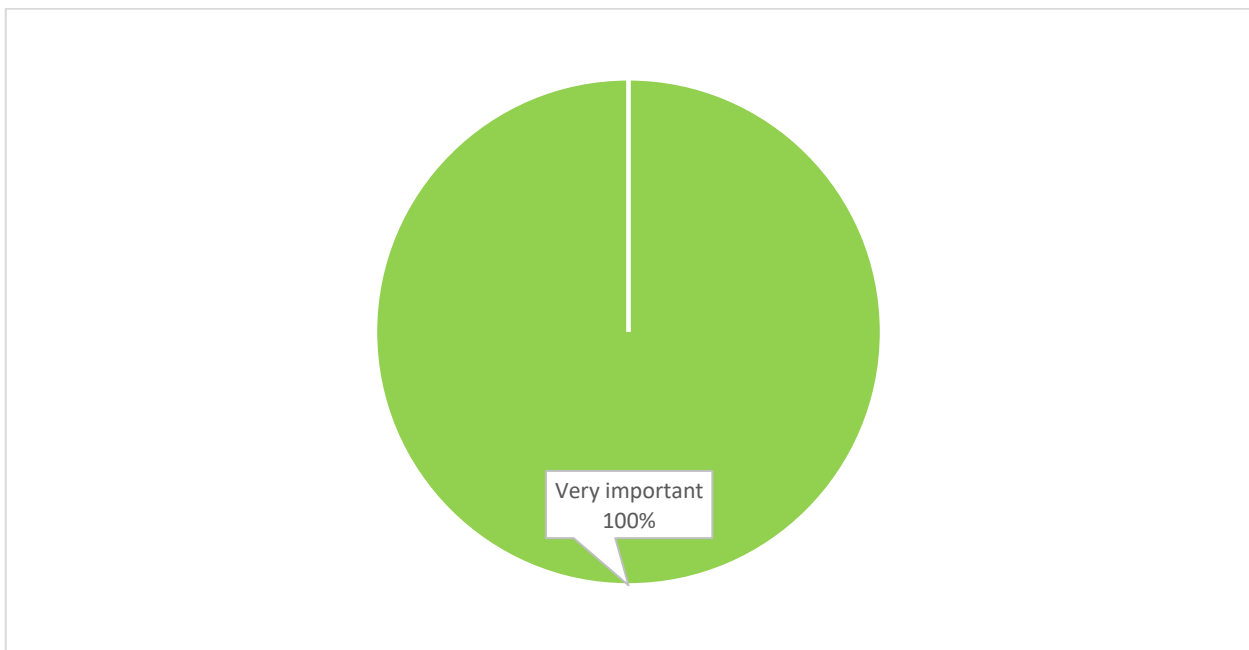
Graphic 4 – Year of entry into the course



Source: The authors - Excel Capture (2024)

When asked about the importance of effective communication in the information society, especially in the context of information sciences and technologies, on a scale where they could answer, little importance, moderate importance, very important or I don't know/I'm not sure. 100% Of respondents answered that effective communication in the information society is very important nowadays, as can be seen in the graph below:

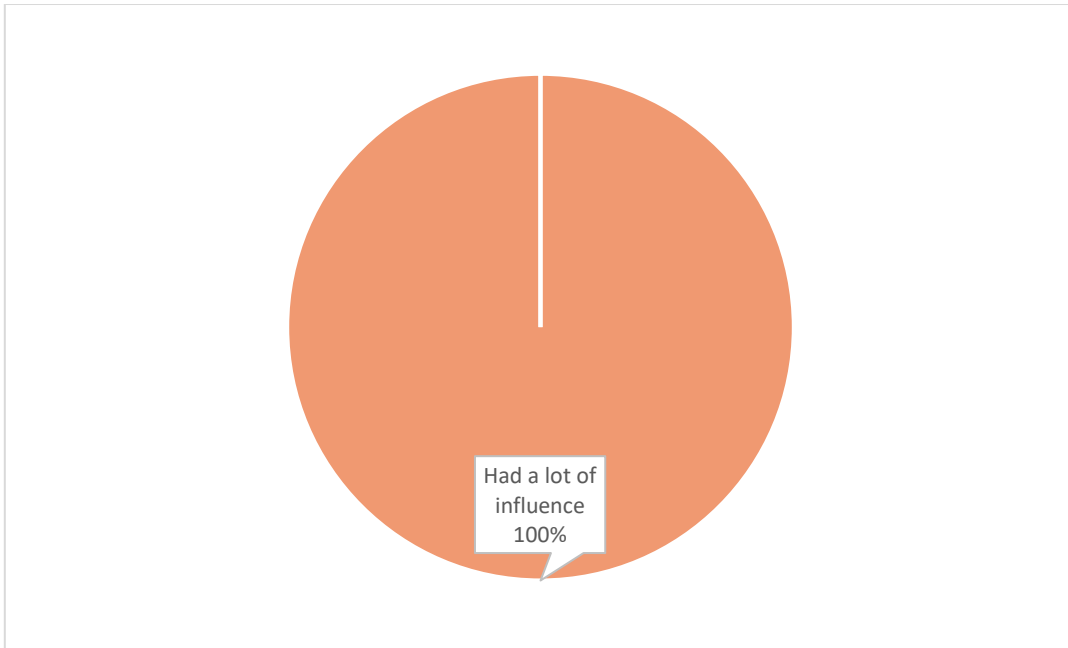
Graphic 5 – Importance of effective communication in the information society



Source: The authors - Excel Capture (2024)

In the following question, respondents were led to think about how information technologies have influenced the way they communicate and share information in today's society, and it was verified by the responses that they consider that technologies have a great influence, as shown in the following Graphic 6:

Graphic 6 – Influence of information technologies on communication

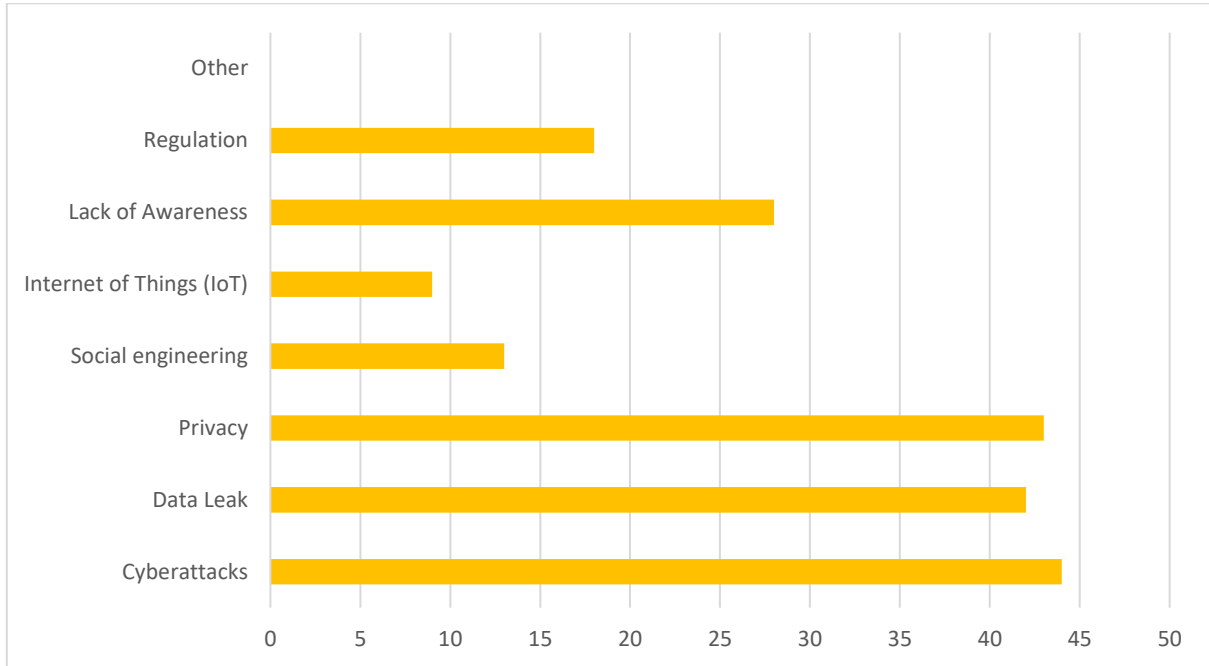


Source: The authors - Excel Capture (2024)

The next question concerned the main challenges related to information security in the digital age. Respondents had several options to choose from, including: cyberattacks: increased sophistication and frequency of cyberattacks, such as malware, phishing and ransomware; data leakage: possibility of confidential information being exposed due to security breaches or data breaches; privacy: challenges in protecting the privacy of users' personal data against misuse; social engineering: techniques used to manipulate people and obtain confidential information, often through online interactions; internet of things (IoT): increased interconnection of IoT devices can create vulnerabilities that can be exploited by cybercriminals; lack of awareness: many users are not sufficiently informed about online security practices, making them more susceptible to attacks; Regulation: Complying with data protection laws and regulations can be a challenge for organizations, especially with the diversity of existing standards.

The following graph shows that, for respondents, cyberattacks, data leaks and privacy are the main challenges related to information security in the digital age.

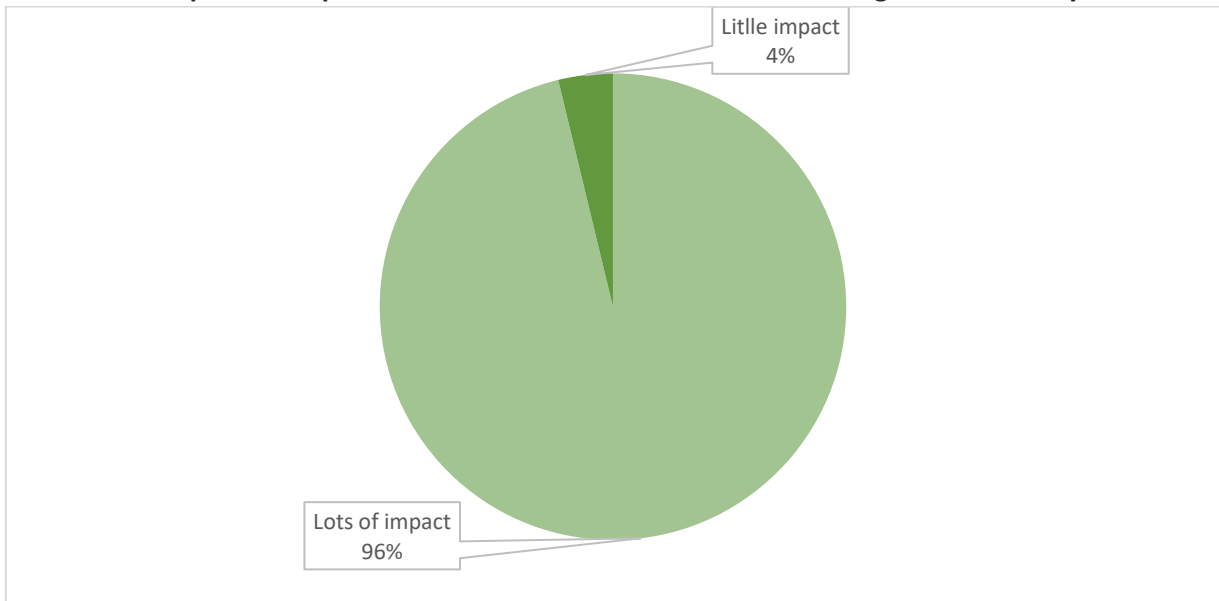
Graphic 7 – Main challenges related to information security in the digital age



Source: The authors - Excel Capture (2024)

The graph below illustrates how the evolution of information technologies has impacted the way in which respondents’ study/organize their academic life and 96% of respondents reveal that it has a lot of impact as opposed to 4% of respondents who indicate that it has little impact.

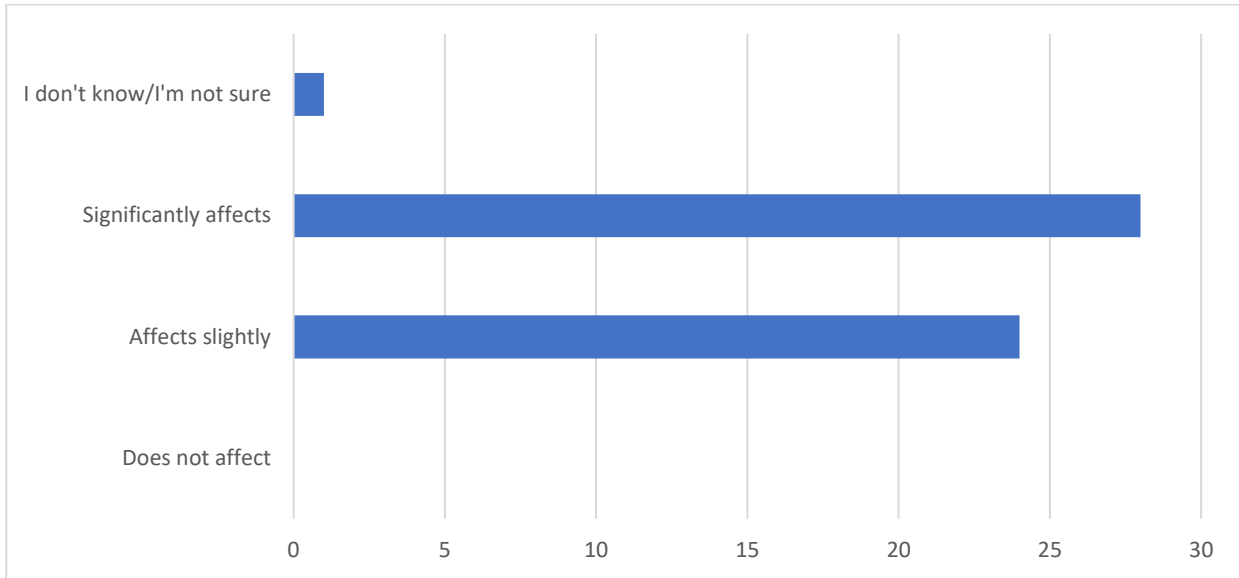
Graphic 8 – Impact of the evolution of information technologies on the study



Source: The authors - Excel Capture (2024)

The next question was about how information overload affects the ability to process and understand the information available in today's society. 53% Of respondents responded that it affects it significantly, while 45% say it affects it slightly and 2% indicate that they do not know/are not sure, as can be seen in the graph below.

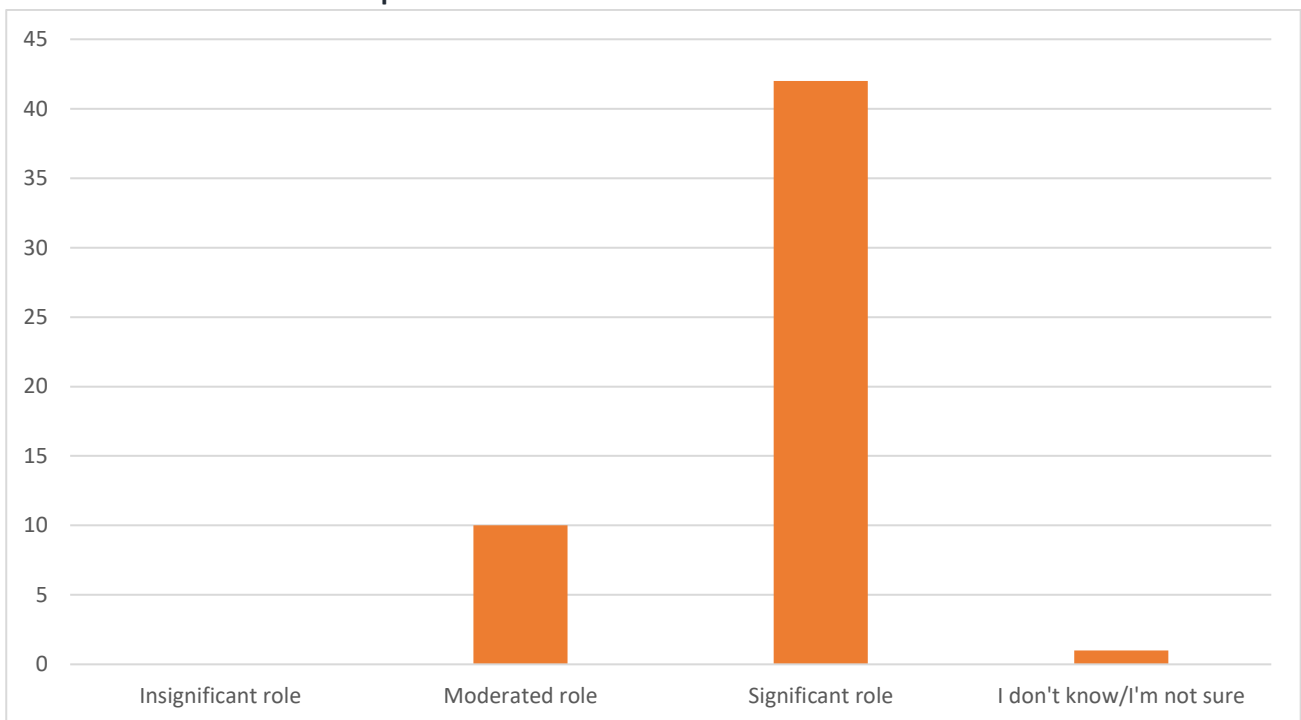
Graphic 9 – Impact of the evolution of information technologies on the study



Source: The authors - Excel Capture (2024)

When asked what role social networks play in disseminating information and forming opinions in the information society, the majority of respondents reveal that they play a significant role. It should be noted that no participant indicates that they have an insignificant role, as we can see in the graph below:

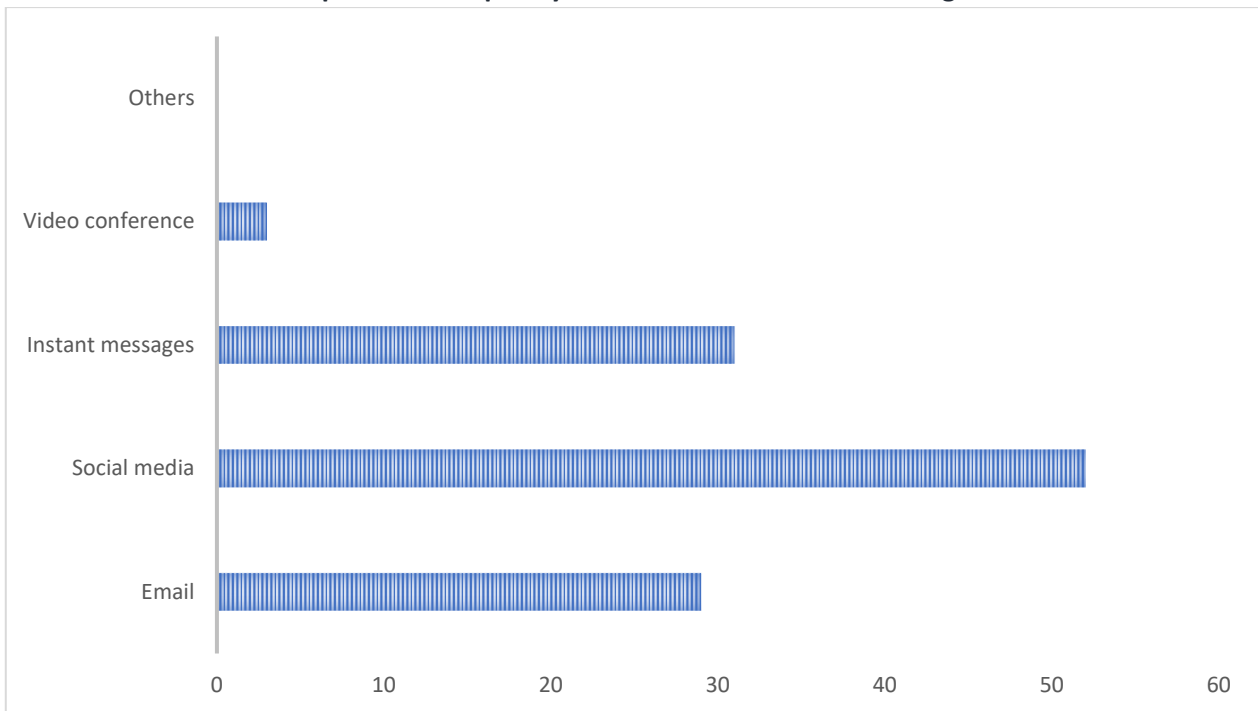
Graphic 10 – Role of social networks in information



Source: The authors - Excel Capture (2024)

The following graph illustrates which information technologies respondents use most frequently. We found that social networks are the most used with 45% of responses, followed by instant messaging with 27% of responses and e-mail comes in third place with 25% of respondents' responses.

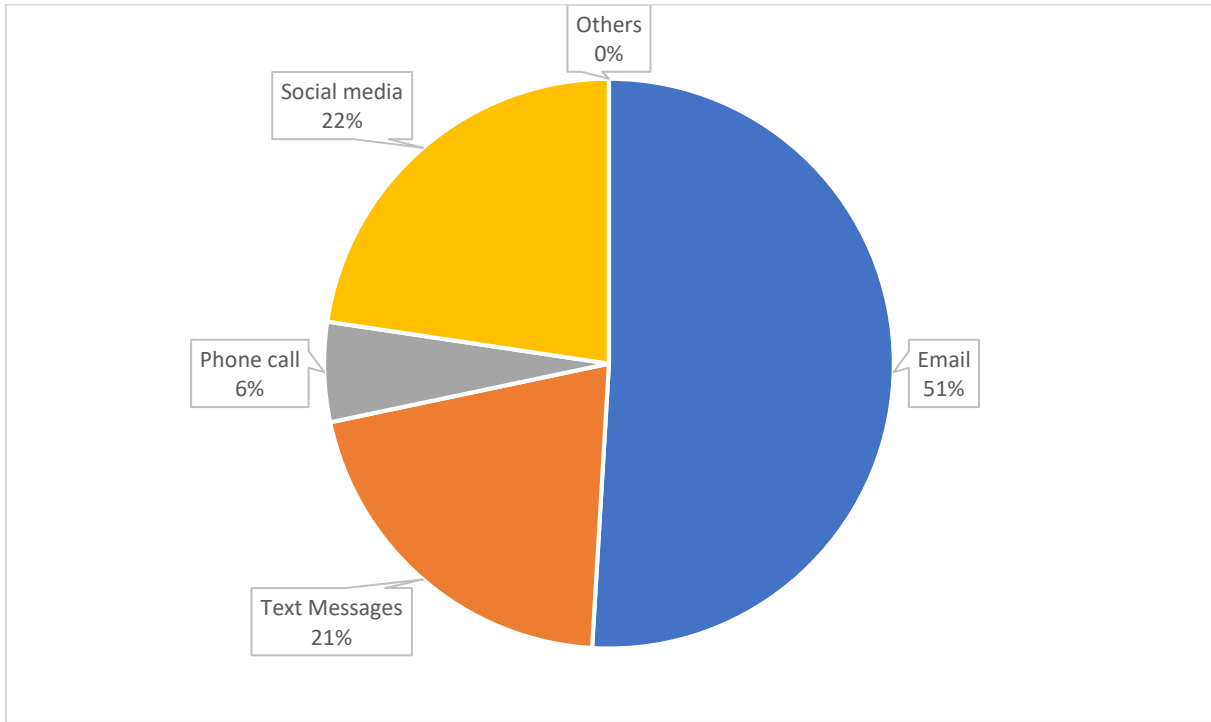
Graphic 11 – Frequency of use of information technologies



Source: The authors - Excel Capture (2024)

Respondents were also asked which communication channel they preferred to receive important information, and as shown in the graph below, 51% of respondents referred to email, 22% to social networks, 21% to text messages and 6% to telephone calls.

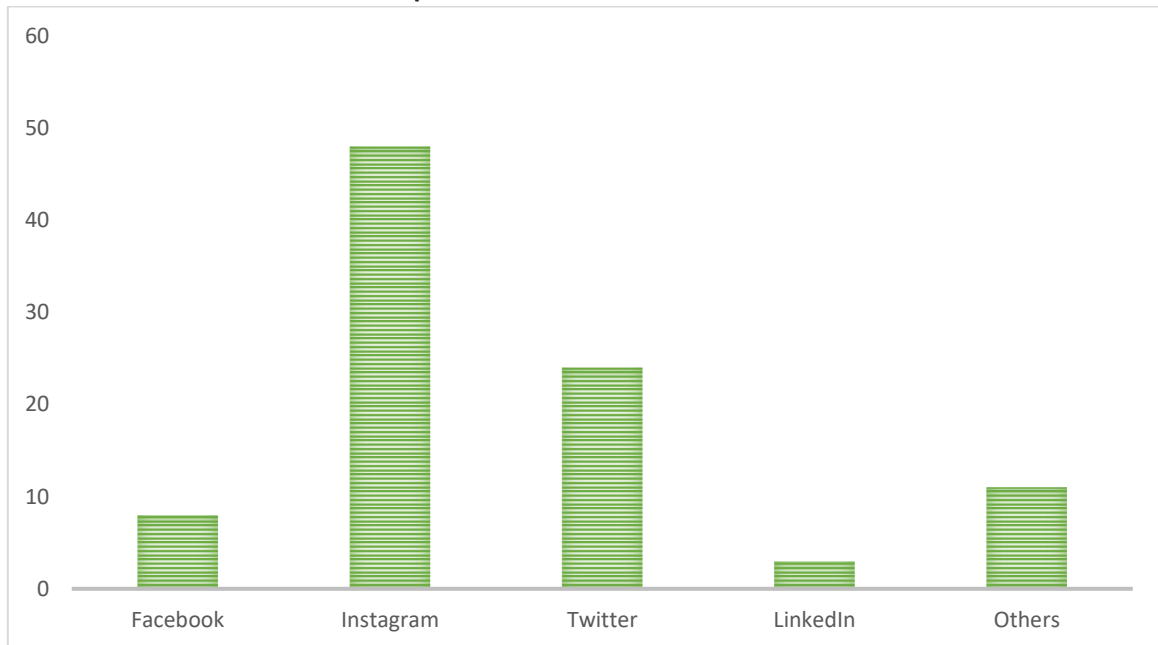
Graphic 12 – Communication channel preference



Source: The authors - Excel Capture (2024)

Regarding the regular use of social networks, we found that 51% of respondents reported using Instagram, 26% used Twitter, 9% used Facebook and 3% used LinkedIn, as shown in the following graph:

Graphic 13 – Use of social networks



Source: The authors - Excel Capture (2024)

It should be noted that 9% of respondents responded Others in the previous graph reveal that they use WeChat, Tiktok, Reddit and WhatsApp as shown in the figure below:

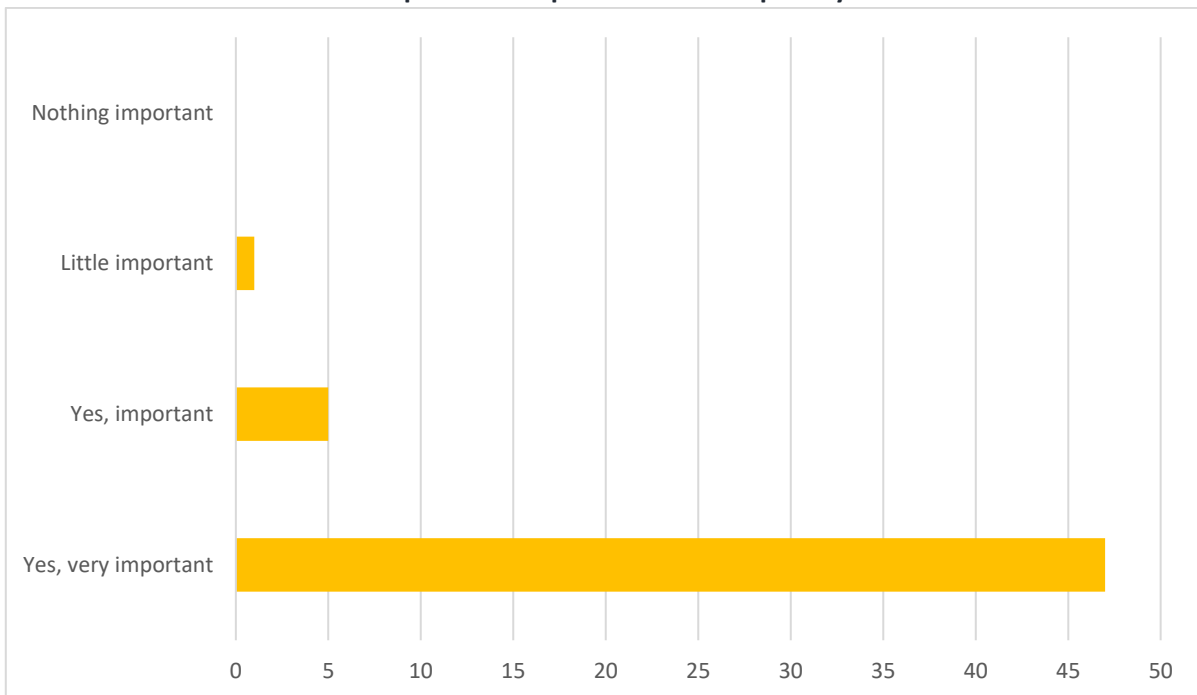
Figure 1 – Other use of social networks



Source: The authors - Microsoft Forms Capture (2024)

When asked about the importance of the privacy of their personal data online, 89% say yes, it is very important, 9% say it is important and 2% say it is not very important. It should be noted that no one said that it was not important at all, as the graph below reveals:

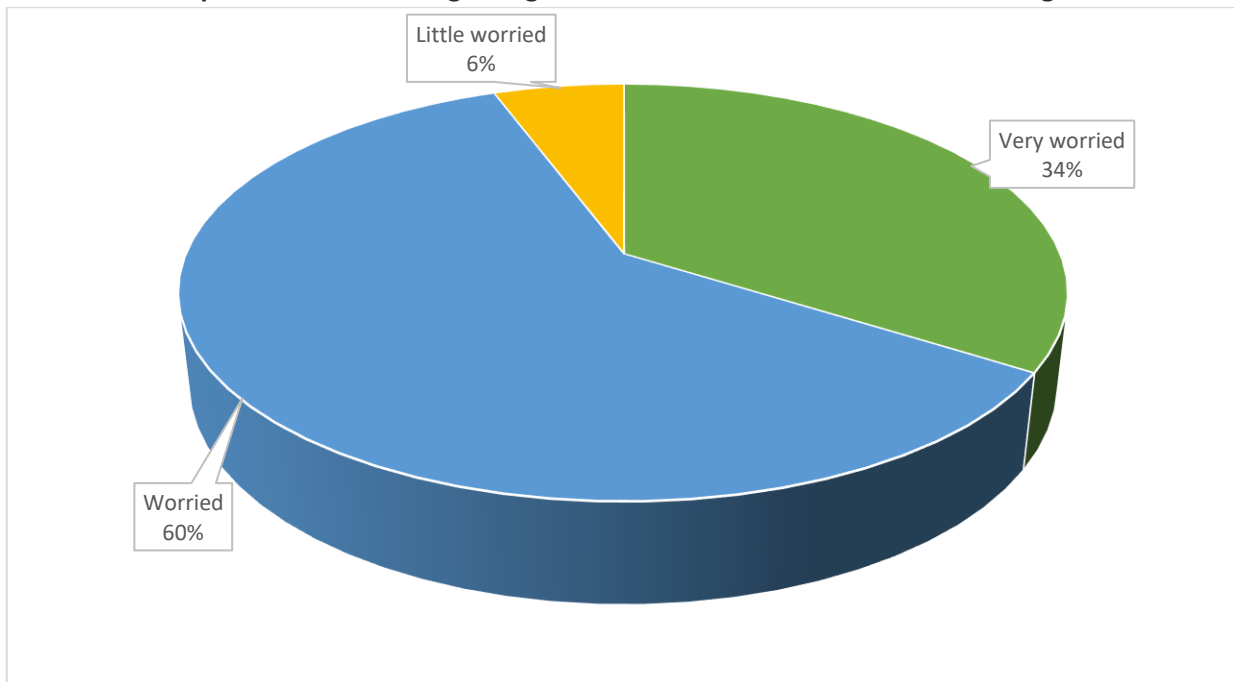
Graphic 14 – Importance of data privacy



Source: The authors - Excel Capture (2024)

The last question asked them to describe their concerns regarding ethics in the use of information technologies. The graph below reveals that 60% of respondents are worried, 34% are very worried and 6% are somewhat worried. It should be noted that no respondent revealed that they were not worried.

Graphic 15 – Concern regarding ethics in the use of information technologies



Source: The authors - Excel Capture (2024)

Conclusions

The unanimity among respondents highlights the importance of effective communication in the information society, especially in the context of information sciences and technologies. All respondents agree that information technologies have a significant impact on the way they communicate and share information in today's society, with 100% of them recognizing this influence.

Despite the benefits of information expression and communication, there are also several challenges and concerns. The spread of misinformation and fake news can undermine trust in information, while a lack of privacy and cybersecurity can put individuals and communities at risk.

Therefore, this study shows that for the respondents there are a variety of concerns regarding information security challenges in the digital environment, with an emphasis on data leaks, cyberattacks, privacy issues and lack of awareness.

The expression of information and communication plays a fundamental role in the information society, significantly shaping the way we interact, share knowledge, and influence the world around us. After a detailed analysis of the different aspects of this influence, we can reach some important conclusions, more specifically that digital communication platforms have a significant impact in their lives and that all of respondents are concerned about the way information is use. None of the respondents believe that the evolution of information technologies does not affect them, with the majority feeling a significant impact, especially on the role of social networks in disseminating information and forming opinions.

Tools such as email, social networks and messaging are widely used, with a notable preference for Instagram, Twitter, WhatsApp and TikTok. Furthermore, all respondents recognize the importance of data privacy, expressing concerns about the ethical use of information technologies.

Ultimately, the influence of information expression and communication in the information society is vast and multifaceted. From democratizing access to information to shaping identities and opinions, from driving technological innovation to presenting ethical challenges, its importance cannot be

underestimated. As we navigate this new digital world, it is essential that we recognize and fully understand the impact of this influence and work to ensure it is used to advance the common good and human progress.

In the information society, professionals from different areas, including those trained in Documentation and Information Sciences and Technologies, face new challenges and opportunities arising from the expression of information and communication and have an increased responsibility to the communities they serve to help combat the challenges and difficulties identified

References

Allen, Lee. (2015). The influence of information and communication technologies on societies and their cultures: A historical perspective. 10.4018/978-1-4666-8433-1.ch016.

Antunes, M.; Rodrigues, B. (2018) Introdução à cibersegurança: a internet, os aspetos legais e a análise digital forense. Lisboa, cop. 2018. XI, 244 p. ISBN 978-972-722-861-4

Bell, D. (1973). The Coming of Post-Industrial Society. Basic Books.

Benkler, Y. (2006). The Wealth of Networks: How Social Production Transforms Markets and Freedom. Yale University Press.

Carvalho, M.; Martins, S.; Ferreira, O.; Rocha, C.; Pocevicicene, R. (2023). Comparative analysis of the perception of information management skills: a case study of two higher education institutions, ICERI2023 Proceedings, pp. 1070-1078. doi: 10.21125/iceri.2023.0354

Castells, M. (2010). The Rise of the Network Society: The Information Age: Economy, Society, and Culture. Wiley-Blackwell.

Coelho, J. D.; Sampaio, J. (2007). Sociedade da informação: o percurso português: dez anos de sociedade da informação análise e perspectivas. Lisboa: Sílabo, 2007. 708 p. ISBN 978-972-618-462-1

Figueiredo, F. (2015). Redes sociais: um suporte para a prática do self-cyberbullying. Educação Sociedade & Culturas. Porto. - ISSN 0872-7643-41. N.º 44 (1 2015), p. 107-130

Hargittai, E. (2008). Digital Inequality: Differences in Young Adults' Use of the Internet. Communication Research, 35(5), 602-621.

ISCAP (2024). Licenciatura em Ciências e Tecnologias da Documentação e Informação. <https://www.iscap.ipp.pt/cursos/licenciatura/808>

Lessig, L. (2006). Code: Version 2.0. Basic Books.

McLuhan, M. (1994). Understanding Media: The Extensions of Man. MIT Press.

Portugal. Ministério da Ciência, Tecnologia e Ensino Superior. UMIC - Agência para a Sociedade do Conhecimento, ed. lit. (2011). A sociedade da informação em Portugal: 2010. Porto Salvo: UMIC, 2011. ISBN 978-989-97517-5-0

Schneier, B. (2015). Data and Goliath: The Hidden Battles to Collect Your Data and Control Your World. W.W. Norton & Company.

Shirky, C. (2008). *Here Comes Everybody: The Power of Organizing Without Organizations*. Penguin Press.

Turkle, S. (2011). *Alone Together: Why We Expect More from Technology and Less from Each Other*. Basic Books.

Warschauer, M. (2003). *Technology and Social Inclusion: Rethinking the Digital Divide*. MIT Press.

Wu, T. (2010). *The Master Switch: The Rise and Fall of Information Empires*. Knopf.

Mayer-Schönberger, V., & Cukier, K. (2013). *Big Data: A Revolution That Will Transform How We Live, Work, and Think*. Houghton Mifflin Harcourt.