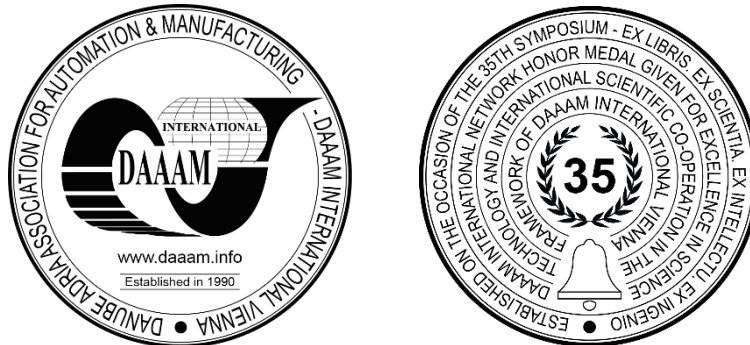


INFORMATION OVERLOAD AS A PROBLEM OF IT SPECIALISTS

Miroslav Tomšů



This Publication has to be referred as: Tomsu, M[iroslav] (2024). Information Overload as a Problem for IT Specialist, Proceedings of the 35th DAAAM International Symposium, pp.0177-0182, B. Katalinic (Ed.), Published by DAAAM International, ISBN 978-3-902734-44-0, ISSN 1726-9679, Vienna, Austria
DOI: 10.2507/35th.daaam.proceedings.023

Abstract

In today's information age, we are constantly witnessing significant technological advances that profoundly impact our daily lives. However, the constant advances and ever-increasing technologies and practices can result in too many demands and requirements on people. This paper aims to analyse how the problem of information overload manifests itself in IT specialists, how they notice it and how to prevent and, above all, eliminate information overload. The research is in the form of a questionnaire survey among IT specialists and a subsequent assessment of how severe and widespread the problem of information overload really is. Conclusion underlines that the chosen topic should be considered and that with the increasing advancement of technology in a fast-moving field like IT, these problems should be prevented.

Keywords: information overload; information technology; IT specialist; information environment; organization.

1. Introduction

Today, as we witness the rapid development of information and communication technologies, the amount of information is growing exponentially. This phenomenon, known as information overload, has become one of the significant problems for both individuals and organisations. Information overload is when an individual or group is overwhelmed by too much information, which negatively affects their ability to make decisions and process data effectively. This phenomenon was first described in the 1970s by Alvin Toffler in his book *Future Shock* [1]. Since then, this problem has dramatically intensified in the digital age.

Today, information overload is particularly evident in the work environment, where individuals face an enormous onslaught of emails, messages, work tasks and a constant influx of new data. According to surveys, up to 60% of workers feel overloaded by the information they must process daily [2]. This leads to decreased productivity, increased stress and poorer decision-making skills [3], [4]. As reported by [5], information overload can negatively affect individuals and entire teams, resulting in increased decision-making errors and reduced quality of work. The causes of information overload can be divided into several categories. The main factors include the increase in the volume of information available and the fragmentation and ambiguity of information, which is often dispersed between different sources and formats [6]. Another important aspect is the constant availability of digital devices, which brings the benefits of fast communication and increases the expectation of immediate responses and response times [7]. In response to this problem, various strategies and tools are being developed to eliminate or reduce information overload. These include automated information filtering systems, personalised search algorithms [8], efficient time management, and task prioritisation tools.

It is also essential to improve personal skills, such as managing information effectively [9], recognising essential resources, and minimising distractions [10]. However, this research has yet to focus on a specific industry, such as IT specialists. This paper aims to provide a comprehensive view of the issue of information overload among IT specialists and the working conditions that may also lead to the problem. It also aims to suggest improvements to working conditions, how to sort out unnecessary or irrelevant information, the mental health of IT specialists, and how physical health can affect information overload.

2. Information overload

The information overload on humanity continues to escalate. However, the term *information overload* was introduced to the broader public in 1970 by Alvin Toffler [11], who was an author, journalist and futurologist. This term was added to mean that when the information management required exceeded the capacity of the decision-making system, humanity creates much more information with time than humans can absorb, process, and study. Toffler was also instrumental in expanding the topic of digital revolution [12]. The sociologist Georg Simmel first became interested in the problem of information overload. Simmel was the first to notice the negative effect on the population, pointing out the information overload in modern urban lifestyles and observing the fatigue, aversion to knowledge and disinterest in responding to new situations in the population. Over the years, various psychologists have studied this topic, and it has been gradually observed that people have a limited capacity to absorb new information. During the evolution of humanity and the gradual acceleration of time due to information technology and technical developments, this topic has unfortunately become increasingly relevant, and more demands are being placed on people.

2.1. Explanation of the concept of information overload

Information overload is a massive problem in today's world, and with modernisation, this situation is occurring more often. Information overload can be defined as a condition in which a person is overwhelmed with too much information and data for a given decision but is also constantly inundated with information from many different sources. "Thousands of media and individuals spew out information today on social media, and we have reached a post-factual age where we are so overwhelmed with information that we may be on the verge of an information black hole." [13]

When a person experiences information overload, it can bring consequences in the form of decreased effectiveness, which also impacts poor decision-making in both personal life and work. When the problem of overload goes to the point where a person is unable to make decisions or shows no interest in the possibility of making decisions, so-called analysis paralysis can occur. Long-term persistent analysis paralysis is then called burnout syndrome.

Nowadays, there is so much information around us that there is no need to seek it out. On the contrary, information seeks us out [11]. At first glance, the abundance of information may seem optimistic. We have plenty of it around us, and we can choose; the more we know, the better. However, the human mind cannot be exposed to a constant intake of information. This phenomenon is called *information overload*. Simply put, it means that a person can no longer actively process this information, which can affect people's perception of the world around us. Beyond a certain point, when we are constantly exposed to new streams of information, the human mind can no longer sort through this information and assign any value, meaning, or significance to it.

Attentional fragmentation is another concept that goes hand in hand with information overload [14]. Nowadays, it is most often manifested by the fact that an individual who is focused on an activity such as work or study is easily tempted by mindlessly picking up the phone and, most often, browsing social networks. The gradual information overload in our brain causes more severe damage to human concentration, and the fragmentation of attention is still developing and will not leave a person calm.

2.2. Information overload in IT

Information technology is known for its speed of innovation and constant evolution. New technologies, programming languages, software tools and system updates appear almost daily. IT specialists must keep up with these changes and stay informed about the latest trends and practices. However, this can present challenges and lead to information overload.

One of the reasons for this is the vast amount of information available. Many online resources such as websites, blogs, articles, discussion forums, and social media offer information on new technologies. Keeping track of all these sources and filtering relevant information is challenging. IT specialists often must not only research new developments but also test and adapt them to be able to use new technologies in practice.

Another factor contributing to information overload in IT is the pressure for continuous learning. Stagnation in IT can mean obsolescence and loss of competitiveness [17]. Workers often must learn new languages, frameworks, and tools to meet the demands of the modern IT environment. This includes attending training courses and conferences and participating in regular study. In this effort to keep up-to-date, workers can feel pressure and stress that can lead to overwhelm. The rapid pace of development of IT projects must be noticed. Short deadlines and high client expectations often mean an increased workload and the need to adapt quickly to new requirements. This fast pace can lead to insufficient time to thoroughly process information and make decisions based on insufficient data. This increases the risk of errors and can negatively impact project outcomes.

There are several strategies to address information overload in IT. Staff should develop an effective system for filtering information and prioritizing tasks. This includes selecting the most important sources of information and using tools to automate and organize workflow. It is also essential to set clear goals and plan time to avoid distractions and inefficient multitasking [17]. In addition, IT specialists should seek support and collaboration with colleagues. Discussing and sharing experiences with the team can help filter and process information more efficiently. Setting aside regular time for learning and self-improvement is also essential [17]. Information overload is a real problem for IT specialists, resulting from the industry's speed of change and volume of information. However, with appropriate strategies for filtering, organizing and prioritizing information, collaborating with the team, and creating a balanced training plan, this problem can be managed, and greater productivity and efficiency at work can be achieved.

3. Methodology

3.1. Target group

This questionnaire was designed with IT specialists and individuals who work in the IT industry and deal with information related to the world of information technology in mind daily. The aim was to obtain responses from people with different specialisations and knowledge in the IT field. Professionals were approached, including programmers working with different programming languages, database specialists, software developers, theoretical computer scientists, analysts and hardware-oriented IT specialists. This ensured that the questions used encompassed different aspects of information technology and reflected the diverse experience and knowledge of people working in this field. The research was conducted in 30 organisations, with 1-2 IT specialists in each organisation being interviewed.

3.2. Questions used

This set of questions created a structured and comprehensive overview of the problem of information overload among IT specialists and was used for questionnaires, interviews or case studies. The questions were divided into several categories.

Extent and nature of information overload

- How often do you feel overwhelmed by the amount of information you work with daily?
- What types of information do you find most overwhelming (e-mails, documentation, technical specifications, messages from colleagues, etc.)?
- What volume of information do you typically process in a day?

Sources of information overload

- What are your work's main sources of information overload (internal communications, industry news, technical documentation, etc.)?
- How much influence do work tools (e.g. e-mail) have on your overload?

Impact on performance and productivity

- What impact does information overload have on your productivity and ability to concentrate?
- Do you feel that the quality of your work is decreasing due to the overload? If so, in what way?
- How does information overload affect your decision-making and problem-solving?

Managing information overload

- What strategies do you use to manage large amounts of information (time management, filtering, automation, delegation, etc.)?
- Do you use tools or techniques to streamline information handling (e.g. RSS feeds, task management applications)?
- How do you rate the effectiveness of these strategies in preventing or mitigating overload?

The role of the organisation and the working environment

- How does your organisation help you manage information overload (training, tools, policies to limit information flow)?
- Are there any practices or systems in your work environment that support information simplification?
- What role do colleagues and teamwork play in alleviating feelings of overload?

Psychological and physical impact

- What psychological or physical effects do you experience from information overload (e.g. stress, fatigue, burnout)?
- How often do you feel that information overload affects your personal life (spillover of work stress into leisure time)?
- What methods do you use to manage and prevent stress?

Future challenges and trends

- What changes do you expect about information overload in the next five years, given the evolution of technology and work practices?
- What innovations or tools could help IT specialists better manage information overload in the future?

3.3. Research results

A survey of information overload among IT specialists in 30 organisations found that most respondents (75 %) feel overloaded at least three times a week. The most overwhelming sources of information are emails and work tools. Overload significantly impacts their productivity, focus and decision-making processes, leading to more frequent errors and a slower work pace. Approximately 70 % of respondents confirmed that the amount of information decreases their work performance. IT specialists try to combat overload by using techniques such as blocking time to focus or automating routine tasks, but the success of these strategies is limited. In half of the cases, organisations offer training on managing overload, but many employees perceive that systematic procedures for managing information flow are lacking. The impact of information overload on mental health is also a significant issue. Approximately 35 % of respondents suffer from stress, with some reporting burnout syndrome. The research highlights the need for organisations to support their IT specialists better and to implement innovative tools to help reduce workload and improve the working environment.

4. Suggestions for improving conditions

If a company or organization has an IT sector in its structure, it should have a program to prevent information overload or even burnout syndrome in its employees. As mentioned in this article, the IT sector is an industry that is changing rapidly and constantly moving forward. New technologies are constantly emerging, resulting in constant employee perception and focus on these changes. The demands of other departments, supervisors, or customer requirements compound this.

4.1. Prioritisation of information

Using software tools to organise and manage tasks allows you to categorise tasks and resources according to priority and relevance. This allows employees to focus on the most important tasks and not be distracted by less relevant information.

The Scrum or Kanban methodology helps the IT team to define priorities and facilitate collaboration when distributing workloads.

4.2. Process automation

Automating repetitive tasks (e.g., by automating testing or scripting everyday operations) can save time for more important activities and reduce the cognitive load associated with manual processes. Automation eliminates the need to track every change manually, significantly reducing the amount of information that needs to be processed.

4.3. Information filtering and aggregation

Aggregation tools (for tracking news or monitoring system logs) allow you to filter and aggregate information, reducing the need to monitor multiple sources simultaneously. This allows IT specialists to get relevant data from one centralised source and minimise information overload from multiple channels.

4.4. Improving communication tools

Using centralised communication platforms such as Slack or Microsoft Teams, where conversations can be efficiently sorted by channel and topic, can reduce information chaos and distractions from the constant flow of messages and emails. Teams can take advantage of features to buffer non-urgent notifications and reduce interruptions.

4.5. Training and skills development

IT specialists should be trained in digital literacy and effective information retrieval. This includes the ability to identify trusted sources, distinguish relevant from irrelevant information, and the ability to delegate tasks or seek help within a team. Training to improve the ability to multitask and manage time properly can be helpful to minimise stress and improve concentration.

4.6. Deploy AI and analytics tools.

Artificial intelligence and machine learning can help predict what information or issues will take priority and automatically highlight relevant issues, making decision-making easier. For example, predictive analytics tools can monitor the performance of IT systems and highlight issues before they become critical.

4.7. Employer motivation

To provide valuable tools to relieve information overload and job frustration, employers (not just) can help IT specialists by focusing on their employees' intrinsic motivation and career growth. One critical approach is to invest in their professional development. In this way, organisations offer many opportunities, such as professional training, interactive workshops and access to the latest technologies. These activities allow IT specialists to expand their skills and knowledge and support their personal and professional growth. As a result, professionals gain greater confidence and competence to take on new tasks and responsibilities, which helps to reduce their information burden. One of the other essential aspects is the provision of greater responsibility.

4.8. Physical health

Maintaining good physical fitness and preventing information overload are critical factors in today's modern work environment to achieve optimal performance and maintain long-term interest in work. Strategies are needed to help keep fit and prevent burnout syndrome. One general recommendation is regular exercise, which is an integral part of a healthy lifestyle. The prolonged sitting and sedentary lifestyle typical of IT specialists can hurt physical health.

5. Discussion

Information overload is a significant issue for organisations in the digital era, especially in the rapidly changing IT industry. Several approaches can mitigate this phenomenon, each with its benefits and limitations. Process automation and information filtering are emerging as a critical strategy for reducing overload. Automating routine tasks using tools such as scripts or log management tools greatly relieves workers from repetitive tasks contributing to information chaos.

Automation also improves productivity and allows you to focus on higher value-added tasks. Research [19] shows that automation reduces information overload by eliminating redundant manual processes that lead to performance degradation. Introducing centralised communication tools like Microsoft Teams is vital in simplifying work processes. In IT environments requiring rapid communication, these tools can filter important messages and minimise information noise. However, excessive use of these tools without appropriate filtering can paradoxically lead to message overload, as confirmed by authors [19], who state that emails and chat platforms can be a source of stress if not managed properly. One of the biggest challenges of information overload is that the problem can be cognitive, and resource based.

The cognitive aspect focuses on the limited ability of individuals to process large amounts of information, which often overlaps with a lack of time or budget to process that information. For this reason, the right balance of information quantity and complexity must be struck so that these resources are used efficiently. Improving digital literacy and training on time management and multitasking can help workers better manage information overload. According to many authors [5], effective time management and identifying relevant information play a key role in how individuals manage the onslaught of data and information. Eliminating or mitigating information overload requires a multi-layered approach that includes not only technological solutions but also changes in the way of working and the development of individual skills.

Further research should consider how individual differences between IT specialists (e.g., experience, time management skills, tool usage preferences) and organisational cultures influence perceptions of information overload and its impacts. There is also a need to explore how this phenomenon can be minimised at the organisational level through education programmes, training or new approaches to project management. With the development of new tools and approaches to information management (e.g. intelligent data filtering and workflow automation), it is necessary to examine how these tools can reduce information overload. Research in this area should look at which technologies are most effective and how they can be implemented in the daily practice of IT specialists.

6. Conclusion

Information overload is a common problem affecting IT specialists in today's digital era. Data overload and a constant flow of information lead to a decline in performance, increased stress and reduced quality of decision-making processes.

This article addressed information overload in the specific environment of IT specialists. A short survey was conducted among IT specialists and found that most are affected by information overload. In the next section, the paper discussed recommendations for alleviating information overload. To effectively eliminate this phenomenon, various strategies need to be put in place, including both technological and organisational measures.

Process automation, data filtering and aggregation, and modern communication tools can help mitigate the impact of redundant information. Developing digital literacy and training in good time management also plays an important role, enabling staff to sort and process information more efficiently. Implementing these strategies leads to better use of resources, reduced cognitive load and improved work performance. The combination of these approaches can significantly improve the ability of organisations and individuals to meet the challenges of information overload and ensure optimal working conditions in a rapidly changing IT environment.

7. Acknowledgments

This article was supported by grant project IGA/FAI/2023/002, „Protection of the population, soft targets and the information environment” solved in 2023-2024.

8. References

- [1] Toffler, A. (1970). *Future shock*. New York: Random House.
- [2] Spira, B., & Goldes, M. (2007). “Information Overload: We have met the enemy and he is us”, Basex Inc., Available at: [http://freya.basex.com/web/webdownloads.nsf/e67dc0f5617d6e9c85256a99005ea0e7/ff10b594932040852570b9008022ce/\\$FILE/BasexInformationOverloadWhitePaper.pdf](http://freya.basex.com/web/webdownloads.nsf/e67dc0f5617d6e9c85256a99005ea0e7/ff10b594932040852570b9008022ce/$FILE/BasexInformationOverloadWhitePaper.pdf)
- [3] Eppler, M.J. & Mengis, J. (2004). The Concept of Information Overload: A Review of Literature from Organization Science, Accounting, Marketing, MIS, and Related Disciplines. *The Information Society*, 20 (5), pp. 325–344. DOI: <https://doi.org/10.1080/01972240490507974>.
- [4] Bawden, D. & Robinson, L. (2009). The dark side of information: overload, anxiety and other paradoxes and pathologies. *Journal of Information Science*, 35 (2), pp. 180–191. DOI: <https://doi.org/10.1177/0165551508095781>.
- [5] Jackson, T.W. & Farzaneh, P. (2012). Theory-based model of factors affecting information overload. *International Journal of Information Management*, 32 (6), pp. 523–532. DOI: <https://doi.org/10.1016/j.ijinfomgt.2012.04.006>.
- [6] Hiltz, S.R. & Turoff, M. (1985). Structuring computer-mediated communication systems to avoid information overload. *Communications of the ACM*, 28 (7), pp. 680–689. DOI: <https://doi.org/10.1145/3894.3895>.
- [7] Barley, S.R., Meyerson, D.E. & Grodal, S. (2011). E-mail as a Source and Symbol of Stress. *Organization Science*, 22 (4), pp. 887–906. DOI: <https://doi.org/10.1287/orsc.1100.0573>.
- [8] Moe, S., Drüeke, T., Cunningham, J., Goodman, W., Martin, K., Olgaard, K., Ott, S., Sprague, S., Lameire, N. & Eknoyan, G. (2006). Definition, evaluation, and classification of renal osteodystrophy: A position statement from Kidney Disease: Improving Global Outcomes (KDIGO). *Kidney International*, 69 (11), pp. 1945–1953. DOI: <https://doi.org/10.1038/sj.ki.5000414>.
- [9] Jackson, T.W. & Farzaneh, P. (2012). Theory-based model of factors affecting information overload. *International Journal of Information Management*, 32 (6), pp. 523–532. DOI: <https://doi.org/10.1016/j.ijinfomgt.2012.04.006>.
- [10] van Knippenberg, D., Dahlander, L., Haas, M.R. & George, G. (2015). Information, Attention, and Decision Making. *Academy of Management Journal*, 58 (3), pp. 649–657. DOI: <https://doi.org/10.5465/amj.2015.4003>.
- [11] Petr, M. (2022). *Kyberkultura, hackeři a digitální revoluce*. Grada Publishing a.s.
- [12] Henry, D. (2016). Alvin Toffler, author of best-selling ‘Future Shock’ and ‘The Third Wave,’ dies at 87. [online] *Washington Post*. Available at: https://www.washingtonpost.com/business/alvin-toffler-author-of-best-selling-future-shock-and-the-third-wave-dies-at-87/2016/06/29/0d63748c-3e09-11e6-80bc-d06711fd2125_story.html.
- [13] Vilém Sklenák (2001). *Data, informace, znalosti a Internet*. Nakladatelství C H Beck.
- [14] Gazzaley, A. & Rosen, L.D. (2017). *Distracted mind : Ancient brains in a high-tech world*. MIT Press.
- [15] Shenk, D. (1998). *Data smog : surviving the information glut*. San Francisco: Harperedge.
- [16] Schick, A.G., Gordon, L.A. & Haka, S. (1990). Information overload: A temporal approach. *Accounting, Organizations and Society*, 15 (3), pp. 199–220. DOI: [https://doi.org/10.1016/0361-3682\(90\)90005-f](https://doi.org/10.1016/0361-3682(90)90005-f).
- [17] Pink, D.H. (2018). *Drive: The Surprising Truth about What Motivates Us*. S.L.: Canongate Books Ltd.. ISBN 978-80-7554-104-8.
- [18] Mandel, R. (2019). *Global data shock : strategic ambiguity, deception, and surprise in an age of information overload*. Stanford, California Stanford University Press.
- [19] Tomsu, M., Valouch, J. & Vojtesek, J. (2023). Information Ecology, Information Hygiene, and Assessment of Information Vulnerabilities in Organization, *Proceedings of the 34th DAAAM International Symposium*, pp. 0388-0394, B. Katalinic (Ed.), Published by DAAAM International, ISBN 978-3-902734-41-9, ISSN 1726-9679, Vienna, Austria. DOI: 10.2507/34th.daaam.proceedings.053