

Technostress and its Effects on Graphic Design Works – A Case Study of Experienced Designers in a Developing Nation



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ABSTRACT

The study aimed to examine the effects of technostress on graphic design projects. This research employed a constructivist methodology and adopted a qualitative approach. Purposive sampling ensured a deliberate and targeted selection of experienced graphic designers in Kumasi, Ghana. Structured interviews were conducted with the skilled designers at Asafo, a busy hub for graphic design works in Kumasi. Twenty designers were interviewed, and their responses were analysed thematically. The interview transcripts were categorised and coded in Microsoft Excel to identify recurring patterns related to technostress in graphic design projects, focusing on its effects on designers' work from the perspectives of confidence, workflow, and creativity. It was identified that hardware and software compatibility issues, inability to update regularly due to pirated design software, obsolete skills resulting from modifications to the design software's environment, and client rigidity were the primary causes of technostress. These affected the work being created and, therefore, designers should promote open communication and foster supportive work environments to mitigate their effects, thereby improving project quality and motivation. The study concludes by emphasising the importance of continuous improvement, learning, and understanding technostress in graphic design projects to support and motivate designers in their work. The study contributes to digital transformation in graphic design practices and throws light on the technologically induced stress in a developing nation in Africa.

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INTRODUCTION

Technology is now a part of every aspect of our lives. To remain up-to-date with the ever-changing landscape of Information and Communication Technology (ICT), professionals must continuously refresh their skills and knowledge and recognise that technology is an essential component of our daily routines.¹ Keeping up with the latest advancements in technology is crucial for maximising ICT potential in education, healthcare, business, or any other field. Therefore, a proactive approach towards learning and

¹ M. Bosamia, "Positive and Negative Impacts of Information and Communication Technology in Our Everyday Life Positive and Negative Impacts of ICT in Our Everyday Life Positive and Negative Impacts of Information and Communication Technology in Our Everyday Life Mansi P," *Information and Communication Technology in Our Everyday Life*, 2013, 1–9.

staying informed is necessary to thrive in today's technologically-driven world.² Technology has been designed to simplify our lives, but it seems like this objective has been lost along the way due to how complex some of the technologies are. Today, users are not satisfied with just the basic functionalities of technology; instead, they have developed a compulsion to use the same computer-based tools as professionals,³ based on the unfriendly nature of some of the design software. This trend has led to a considerable increase in the complexity of our lives. We are now surrounded by many devices and software programs that require constant updates and maintenance, which can be time-consuming and stressful. This phenomenon has become so widespread that it can be considered a disease, as it is affecting productivity.⁴ Some people hesitate to use technology when required, despite increased usage and comfort with it by many.⁵ Individuals may face challenges when adjusting to new circumstances, resulting in various reactions. Among these responses is technostress, a form of stress that arises from utilising information and communication technology (ICT). The rapid pace at which technology advances is the primary cause of this strain.⁶

Technostress refers to the adverse psychological effects of using technology.⁷ Technostress is a growing concern in today's digital world, where technology has become an essential part of work and communication. Van Fleet and Wallace conducted a study on the impact of computer-based library cataloguing, retrieval, and database systems, such as LexisNexis, on the stress levels of librarians.⁸ The study found that the rapid introduction of such systems significantly impacted the stress levels of librarians. The researchers concluded that implementing these systems without proper training and support can cause stress and burnout among librarians.⁹ A different study focused on the impact of stress induced by ICT, known as "technostress," on both role stress and individual productivity. The researchers initially outlined various ways ICTs can cause user stress and identified the factors contributing to technostress.¹⁰ Additionally, Alvarez-Risco et al. conducted a cross-sectional, analytical study on medical students at a university to evaluate how technostress acts as a mediator for social media overload, communication overload, and mental exhaustion and its negative consequences on the academic performance of university students.¹¹ While their study provided insightful information regarding technostress among university medical students, it is essential to recognise that the prevalence and severity of technostress may vary across different professions and groups of individuals.¹²

While various aspects of technostress have been explored, the existing approaches primarily concentrate on job performance and student productivity. Researchers have made significant contributions in this area. However, there is a distinct lack of attention given to other professional fields, particularly graphic design.¹³ Ayyagari et al. also add that further development of theoretical frameworks in

² P S Aithal, Santhosh Prabhu, and Shubhrajyotsna Aithal, "Future of Higher Education through Technology Prediction and Forecasting," *Poornaprajna International Journal of Management, Education, and Social Science (PIJMESS)* 1, no. 1 (2024): 1–50.

³ Janna Anderson and Lee Rainie, "Millennials Will Benefit and Suffer Due to Their Hyperconnected Lives," *Washington DC, Pew Research Center* 18 (2012).

⁴ H.M. Komala and P. T. Meena, "Techno Stress-A New Bane to the Students," *International Journal of Informative & Futuristic Research* 4, no. 5 (2017): 6125–29.

⁵ Marisa Salanova, Susana Llorens, and Eva Cifre, "The Dark Side of Technologies: Technostress among Users of Information and Communication Technologies," *International Journal of Psychology* 48, no. 3 (June 25, 2013): 422–36, <https://doi.org/10.1080/00207594.2012.680460>.

⁶ Yudit Y. Choque-Cabrera, Mayra J. Malaga-Villalba, and Fabiola M. Talavera-Mendoza, "Technostress in The Frequency of Use of ICT," in *2021 3rd International Conference on Modern Educational Technology* (New York, NY, USA: ACM, 2021), 93–99, <https://doi.org/10.1145/3468978.3468994>.

⁷ Katharina Pflügner et al., "Personality Profiles That Put Users at Risk of Perceiving Technostress," *Business & Information Systems Engineering* 63, no. 4 (2021): 389–402.

⁸ Connie Van Fleet and Danny P Wallace, "Virtual Libraries—Real Stress: Change at the Reference Desk," 2001.

⁹ Monideepa Tarafdar, Ellen Bolman. Pullins, and T. S. Ragu-Nathan, "Technostress: Negative Effect on Performance and Possible Mitigations," *Information Systems Journal* 25, no. 2 (March 24, 2015): 103–32, <https://doi.org/10.1111/isj.12042>.

¹⁰ Monideepa Tarafdar et al., "The Impact of Technostress on Role Stress and Productivity," *Journal of Management Information Systems* 24, no. 1 (July 8, 2007): 301–28, <https://doi.org/10.2753/MIS0742-1222240109>.

¹¹ Aldo Alvarez-Risco et al., "Influence of Technostress on Academic Performance of University Medicine Students in Peru during the COVID-19 Pandemic," *Sustainability* 13, no. 16 (2021): 8949.

¹² Alvarez-Risco et al., "Influence of Technostress on Academic Performance of University Medicine Students in Peru during the COVID-19 Pandemic."

¹³ Christian Korunka, *Flexible Working Practices and Approaches*, ed. Christian Korunka (Cham: Springer International Publishing, 2021), <https://doi.org/10.1007/978-3-030-74128-0>; Tarafdar, Pullins, and Ragu-Nathan, "Technostress: Negative Effect on Performance and

technostress should focus on uncovering valuable insights within specific contexts.¹⁴ These contexts may include the utilisation of particular technologies or applications, as well as the examination of specific outcomes influenced by technostress.¹⁵ This contextualization offers a significant chance for theoretical advancement in understanding this increasingly acknowledged statement for the need for further research into other areas, which is absent in the existing technostress literature.¹⁶ The literature gap necessitates the need for exploring technostress among graphic designers, who are particularly susceptible to technostress due to the nature of their work involving constant use of digital tools and the need to keep up with the latest technological advancements.¹⁷ It is, therefore, necessary to conduct further research and evaluations of the technostress effect in the context of graphic design.¹⁸

LITERATURE REVIEW

Craig defines technostress as “a modern disease of adaptation induced by a challenge to deal with new computer technologies intelligently.”¹⁹ Technostress is also defined as “stress created by ICT use,” explaining that it is “one of the ramifications of a person's attempts and challenges to deal with rapidly evolving ICTs and the changing psychological and behavioural requirements related to their use.”²⁰ Technostress is “Any adverse impact on attitudes, beliefs, behaviours, or physiological psychology generated directly or indirectly by technology.”²¹ According to Champion, techno-stress is a major health problem accompanied by panic, anxiety, resistance to innovations and leaders’ commands, mental tiredness, bodily diseases, and technophobia.²² Although there are significant differences between the two notions, technophobia (also known as computer anxiety, computer phobia, cyberphobia, and so on) is sometimes mistaken for technostress.²³ While technophobia relates to people's emotional reactions to ICT use, technostress is a broad term that describes the direct and indirect effects of using and engaging with ICT.²⁴

Research has shown that technostress can have both beneficial and detrimental effects on individuals and organisations. Researchers and practitioners have referred to technostress as a double-edged sword because it can lead to positive outcomes, such as increased motivation and productivity, but it can also have negative consequences, such as anxiety and burnout.²⁵ To understand technostress deeply, Tarafdar et al. proposed a new framework that considers techno-eustress, techno-distress, and information systems (IS) design to provide a more comprehensive understanding of technostress.²⁶ This framework recognises that the positive effects of technostress can be beneficial, but also emphasises the crucial role of effective IS design in mitigating the negative consequences. For example, an employee may feel a sense

Possible Mitigations”; Alvarez-Risco et al., “Influence of Technostress on Academic Performance of University Medicine Students in Peru during the COVID-19 Pandemic.”

¹⁴ Ramakrishna Ayyagari, Varun Grover, and Russell Purvis, “Technostress: Technological Antecedents and Implications1,” *MIS Quarterly* 35, no. 4 (December 1, 2011): 831-A10, <https://doi.org/10.2307/41409963>.

¹⁵ Ayyagari, Grover, and Purvis, “Technostress: Technological Antecedents and Implications1.”

¹⁶ Tarafdar, Pullins, and Ragu-Nathan, “Technostress: Negative Effect on Performance and Possible Mitigations.”

¹⁷ Christian Korunka and Peter Hoonakker, *The Impact of ICT on Quality of Working Life*, ed. Christian Korunka and Peter Hoonakker (Dordrecht: Springer Netherlands, 2014), <https://doi.org/10.1007/978-94-017-8854-0>.

¹⁸ Alvarez-Risco et al., “Influence of Technostress on Academic Performance of University Medicine Students in Peru during the COVID-19 Pandemic”; Megan A. Moreno, “Media Use and Sleep,” *JAMA Pediatrics* 170, no. 12 (December 1, 2016): 1236, <https://doi.org/10.1001/jamapediatrics.2015.2575>; Anna-Sophie Ulfert-Blank and Isabelle Schmidt, “Assessing Digital Self-Efficacy: Review and Scale Development,” *Computers & Education* 191 (December 2022): 104626, <https://doi.org/10.1016/j.compedu.2022.104626>.

¹⁹ Craig Brod, *Technostress: The Human Cost of the Computer Revolution* (Reading, MA: Addison-Wesley, 1984).

²⁰ Tarafdar et al., “The Impact of Technostress on Role Stress and Productivity.”

²¹ Michelle M Weil and Larry D Rosen, “A Study of Technological Sophistication and Technophobia in University Students from 23 Countries,” *Computers in Human Behavior* 11, no. 1 (1995): 95–133.

²² Sandra Champion, “Technostress: Technology’s Toll,” *School Library Journal* 35, no. 3 (1988): 48–51.

²³ Qin Shu, Qiang Tu, and Kanliang Wang, “The Impact of Computer Self-Efficacy and Technology Dependence on Computer-Related Technostress: A Social Cognitive Theory Perspective,” *International Journal of Human-Computer Interaction* 27, no. 10 (2011): 923–39.

²⁴ Shu, Tu, and Wang, “The Impact of Computer Self-Efficacy and Technology Dependence on Computer-Related Technostress: A Social Cognitive Theory Perspective.”

²⁵ Cong Qi, “A Double-Edged Sword? Exploring the Impact of Students’ Academic Usage of Mobile Devices on Technostress and Academic Performance,” *Behaviour & Information Technology* 38, no. 12 (December 2, 2019): 1337–54, <https://doi.org/10.1080/0144929X.2019.1585476>.

²⁶ Tarafdar, Pullins, and Ragu-Nathan, “Technostress: Negative Effect on Performance and Possible Mitigations.”

of accomplishment after completing a challenging project using new technology.²⁷ Techno-distress, on the other hand, occurs when individuals perceive IS as a threat, leading to stress and undesirable outcomes. For instance, an employee may experience anxiety and frustration due to their inadequate skills in new software, resulting in decreased productivity and job dissatisfaction.²⁸ By considering both technoeustress and techno-distress in the context of IS that mitigates negative outcomes, organisations can harness the positive effects of technostress and take control of its negative consequences.²⁹

Categories of Techno-stress and the Concept of Techno-stress in Graphic Design

There are several known producers of technological stress. The top three causes of techno-stress, according to Clute's systematic review, are lack of training, performance anxiety, and inexperience with computer usage.³⁰ Techno-stressors are stimuli, events, or stresses triggered by technology,³¹ and are categorised into five, which are techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty.³²

Graphic design is a complex and multi-faceted process involving planning and executing visual communication messages for different purposes, requiring a deep understanding of human psychology, aesthetics, and visual language.³³ Graphic designers use various tools and techniques to create visually appealing designs that convey a message or idea to the target audience.³⁴ The process begins with extensive research on the target audience's informational needs and preferences from the socio-cultural context.³⁵ The message is designed using the research conducted in various forms for different media, such as print, electronic and digital platforms.³⁶ Graphic design is dynamic and demands designers to remain current with the most recent design trends and technologies to produce groundbreaking designs that push conventional approaches in marketing and communication.³⁷ When using technology as a tool, a wide range of hardware and software is utilised, including word processors, graphic design applications, digital cameras, presentation software, databases, and spreadsheets. These tools were created to help people increase their capacity for employment beyond just educational purposes.³⁸ For students with a strong interest in technology, graphic design is a highly specialised field of study that involves computer specialisation. While technology can make tasks more mobile and remotely accessible, it also adds pressure for more effective performance, increases information to the point of information overload, causes anxiety due to the constantly changing technology, demands frequent updates of technical skills following technological changes, and reduces social support as usage of technology typically results in isolation.³⁹

Despite the undeniable advantages of ICT, experts warn that techno-stress negatively affects employee well-being, job motivation, and performance. Techno-stress is a type of stress caused by technology that can lead to health issues. The ICT sector is changing through ecosystem-wide convergence

²⁷ Lígia Nascimento, Manuela Faia Correia, and Christopher B. Califf, "Towards a Bright Side of Technostress in Higher Education Teachers: Identifying Several Antecedents and Outcomes of Techno-Eustress," *Technology in Society* 76 (March 2024): 102428, <https://doi.org/10.1016/j.techsoc.2023.102428>.

²⁸ Anna Mette Fuglseth and Øystein Sørø, "The Effects of Technostress within the Context of Employee Use of ICT," *Computers in Human Behavior* 40 (2014): 161–70.

²⁹ Tarafdar, Pullins, and Ragu-Nathan, "Technostress: Negative Effect on Performance and Possible Mitigations."

³⁰ Kathryn Clute, *Computer Anxiety: Systematic Review of Causes and Effects* (Westport, CT: Greenwood Press, 1998).

³¹ Ayyagari, Grover, and Purvis, "Technostress: Technological Antecedents and Implications1"; T. S. Ragu-Nathan et al., "The Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation," *Information Systems Research* 19, no. 4 (December 2008): 417–33, <https://doi.org/10.1287/isre.1070.0165>.

³² Tarafdar, Pullins, and Ragu-Nathan, "Technostress: Negative Effect on Performance and Possible Mitigations."

³³ Kok Cheow Yeoh, *A Study on the Influences of Computer Usage on Idea Formation in Graphic Design Students* (Texas Tech University, 2002).

³⁴ Yeoh, *A Study on the Influences of Computer Usage on Idea Formation in Graphic Design Students*.

³⁵ Jan-Henning Raff, "Theoretical Frameworks for the Conceptualization of Graphic Design in Use," *Iridescent* 2, no. 2 (April 21, 2012): 10–21, <https://doi.org/10.1080/19235003.2012.11428507>.

³⁶ Carol M. Barnum, *Managing Public Relations: A Practical Approach*, 11th ed. (New York: Routledge, 2015).

³⁷ Ginn Bonsu Assibey, "Design Interventions for Re-Conceptualising Sustainable Graphic Design Practices in Ghana" (Cape Peninsula University of Technology, 2019).

³⁸ Drew Tiene and Pamela Luft, "What Hardware and Software Are Most Critical for Learning Effectively with Technology?," *Journal of Educational Technology* 42 (July 1, 2002): 32–38.

³⁹ Qiong Wang and Ni Yao, "Understanding the Impact of Technology Usage at Work on Academics' Psychological Well-Being: A Perspective of Technostress," *BMC Psychology* 13, no. 1 (2025): 130.

and competition. To speed up innovation, several ICT organisations are achieving both hardware and software capabilities.⁴⁰ Information and communications technology (ICT) is rapidly changing its environment, and software competency now determines a company's destiny as the ICT paradigm evolves toward a human-centric system. ICT sectors are becoming more interdependent and co-evolving through symbiotic contact.⁴¹ As mentioned earlier in the previous paragraph, graphic design is subject to techno-stress because it is highly dependent on design applications such as Adobe Photoshop, Adobe Illustrator, CorelDraw, as well as website content management open source applications like WordPress, Joomla, Drupal, PHP, CSS, among others.⁴² As a result, graphic designers are likely to face high techno-stress due to the influx of design applications and the rigid expectations of clients. However, little is known about the techno-stress experiences of graphic designers, especially in a developing nation context, and how these experiences negatively affect their designed works. Therefore, this research is conducted to explore the types of technostress that graphic designers in a developing country experience and how the experience affects the quality of designs created to help develop strategies to mitigate the challenge.

Activity Theory: A framework to examine the effects of technostress on graphic designers and their design practice

The concept of activity theory was developed in the early 1900s in the Soviet Union by Vygotsky and his students as a type of psychology based on dialectical materialism. As a psychological theory, its primary objective was to comprehend the cognitive abilities of an individual human being based on an activity one engages in.⁴³ Activity theory challenges the notion of an individual human being as a sufficient unit of study, emphasising the importance of cultural and technical influences on human activity. The unit of analysis encompasses technological artefacts as well as the cultural organisation that humans are influenced by and actively construct.⁴⁴ Activity theory explores the interplay between human activity and contextual awareness by examining the activities individuals participate in, as well as the individuals interact with different elements in an activity and the effect of the interaction. This analysis involves considering their objectives, the regulations and standards governing the activity, and the resulting outcomes.⁴⁵ The theory was employed in this study because graphic design is a multidisciplinary field that involves creating visual and textual content to communicate messages to a target audience. It encompasses various activities such as research, ideation, prototyping, and testing.⁴⁶ Activity Theory, a framework used to analyse and evaluate complex systems, can help one better understand graphic design and its activities. From a Graphic design perspective, the subject is the designer, the object is the design product produced, the tools are the graphic design tools used, the community is the design community and stakeholders, the rules are the design principles and guidelines, and the division of labour is the collaborative nature of design work, the outcome is the experience gained by the designers as well as the usefulness of the designed products to clients or users and the transformation refers to the interaction with the units that generates experiences.⁴⁷

⁴⁰ J. A. Lee and D. J. T. Chen, "Design Communities: A Theoretical Foundation," *Design Studies* 29, no. 5 (2008): 413–32.

⁴¹ Martin Fransman, *The New ICT Ecosystem: Implications for Policy and Strategy* (Cambridge: Cambridge University Press, 2010).

⁴² Nicholas Opoku, Edward Appiah, and Patrique deGraft-Yankson, "Competencies of the Present-Day Graphic Designer: A Document Analysis of Online Job Ads in Ghana," *Journal of Graphic Engineering and Design* 11, no. 2 (December 2020): 37–45, <https://doi.org/10.24867/JGED-2020-2-037>.

⁴³ David Bakhurst, "Reflections on Activity Theory," *Educational Review* 61, no. 2 (May 2009): 197–210, <https://doi.org/10.1080/00131910902846916>.

⁴⁴ Olav W Bertelsen and Susanne Bødker, "11 Activity Theory," *HCI Models, Theories, and Frameworks: Toward a Multidisciplinary Science*, no. 12 (2003).

⁴⁵ David H. Jonassen and Lucia Rohrer-Murphy, "Activity Theory as a Framework for Designing Constructivist Learning Environments," *Educational Technology Research and Development* 47, no. 1 (March 1999): 61–79, <https://doi.org/10.1007/BF02299477>.

⁴⁶ Tim Brown, *Change by Design: How Design Thinking Creates New Alternatives for Business and Society* (New York: Harper Business, 2009).

⁴⁷ Yrjö Engeström, "Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization," *Journal of Education and Work* 14, no. 1 (February 2001): 133–56, <https://doi.org/10.1080/13639080020028747>.

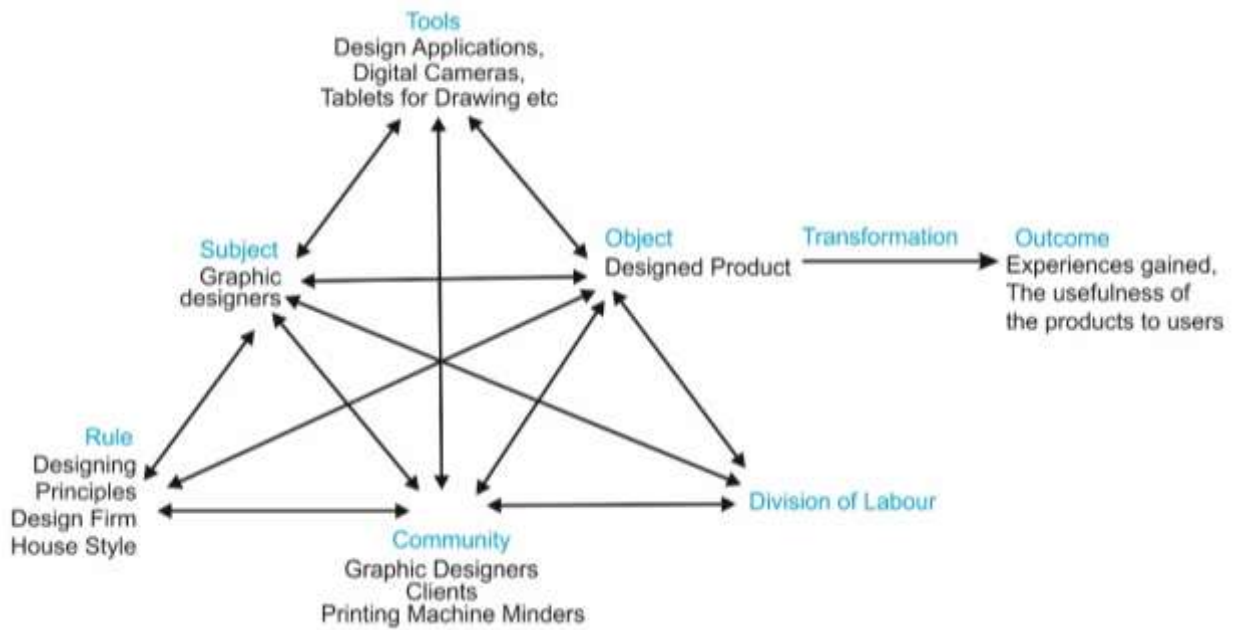


Figure 1: Adopted from the Second-generation activity model.⁴⁸

METHODOLOGY

A qualitative methodology was employed for this study. Qualitative research involves an inductive method of thoroughly describing, explaining, and interpreting the gathered data.⁴⁹ A qualitative approach was chosen because the research aimed to investigate graphic design practices deeply in the context of techno-stress. The goal was to comprehend, from an Activity Theory perspective, how techno-stress manifests in the graphic designers' choice of materials and tools, and their interactions with clients, to unveil the techno-stressors in their design activities. The qualitative data were gathered through observation and interviews. An interview helped the researcher to comprehend the ideas, beliefs, views, opinions, and behaviours of the research participants, and therefore, it was ideal for inquiring into the techno-stress experienced by the graphic designers.

The population for the study was the graphic designers at Asafo, a suburb of Kumasi, a bustling hub for design work in Ghana.⁵⁰ The research delved into the various aspects of technostress that affect graphic designers, including the impact on their productivity, job satisfaction, and overall well-being. The study examined the designers' strategies used to mitigate technostress for maximum efficiency.

Sampling Strategies

In this study, participants were chosen purposively. Purposive sampling is a sampling technique that involves the intentional selection of research participants based on their distinctive characteristics, qualities, or experiences rather than using a random selection process. The objective of this sampling method was to collect a comprehensive and diverse range of data from a variety of experienced graphic designers. By meticulously selecting participants based on their traits, researchers can gain a more profound insight into the phenomenon of techno-stress under study. The sample size for this research was 20 graphic designers, who were chosen based on their experience, expertise, and willingness to participate.

Data Analysis

According to Nieuwenhuis, qualitative data analysis is typically based on an interpretive philosophy, aiming to explore the significant content of the qualitative empirical data by determining the meaning attributed to the phenomena.⁵¹ To achieve this, the researchers analysed participants' perceptions,

⁴⁸ Engeström, "Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization."

⁴⁹ Michael Williams, *Research Methods: A Guide for Students*, 2nd ed. (London: Routledge, 2011).

⁵⁰ Assibey, "Design Interventions for Re-Conceptualising Sustainable Graphic Design Practices in Ghana."

⁵¹ Jan Nieuwenhuis, "Introducing Qualitative Research," *First Steps in Research* 5 (2007): 224–54.

attitudes, understanding, values, and emotions. In this study, data analysis was conducted through an iterative process, with constant reference to the researcher's field notes and attention to the research questions. The qualitative data were analysed thematically using Clarke & Braun's approach.⁵² The initial step in the data analysis process involved familiarisation with the data, where each digital recording was electronically filed and labelled appropriately to facilitate easy retrieval. Copies of the recordings were also archived for potential retrieval if lost or stolen. Subsequently, each interview was transcribed verbatim by the researchers, with copies of the transcribed interviews being archived together with the digital recordings. In Microsoft Excel, the first column was labelled G1, G2, in that order, representing graphic designer respondents; the second column was also labelled Q1, Q2 in that order, presenting the questions; the third column was labelled interview response, and the last column was labelled themes. The transcribed interview responses were loaded into Microsoft Excel under the column labelled Interview response. The responses were then read and given themes based on the type of technostress. The themes were studied for patterns and grouped based on the technostress types while using Activity as a guide.

Ethical Considerations

In researching technostress among graphic designers, ethical considerations were applied to ensure the protection, respect, and well-being of all participants. Researchers obtained informed consent by clearly explaining the study's purpose, procedures, and potential risks, ensuring voluntary participation and the right to withdraw at any time. Privacy and confidentiality were maintained through secure data handling and anonymity in reporting. Since technostress involves emotional and psychological dimensions, researchers took care to avoid causing distress and provided appropriate support when necessary. Integrity and honesty were upheld by reporting data accurately, without bias or manipulation. Technology was used ethically throughout the research process, ensuring that digital tools did not increase participants' stress levels and that the study contributed positively to understanding and reducing technostress in the graphic design field.

PRESENTATION OF FINDINGS

The results were obtained from 20 established graphic designers who have been working at Asafo for the past 5 years. The total population of the graphic designers who were available and were contacted at Asafo was 50. The selection of the 20 was based on availability and willingness to participate in the interview. Using the Activity Theory as the guide for the results presentation, the tensions from a techno-stress perspective manifested between the graphic designers and the tools, as well as the clients, as captured in Figure 2.

⁵² Victoria Clarke and Virginia Braun, "Teaching Thematic Analysis: Overcoming Challenges and Developing Strategies for Effective Learning," *The Psychologist* 26, no. 2 (2013).

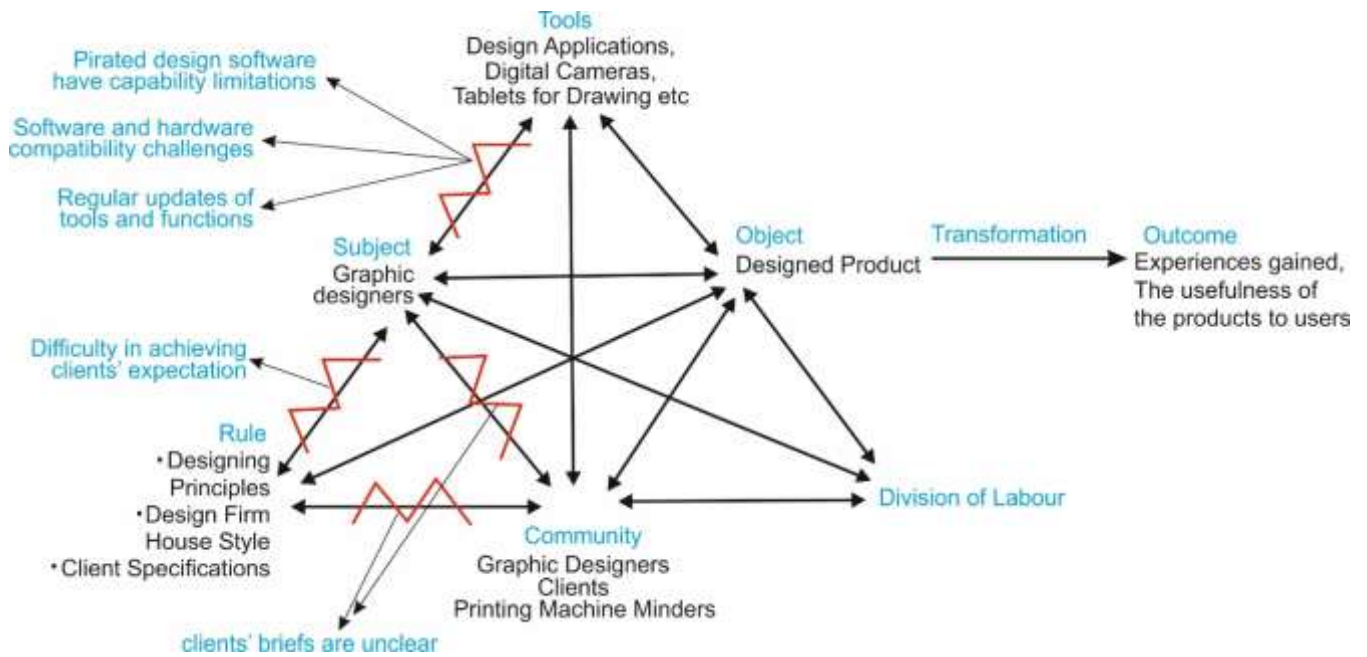


Figure 2: Techno-stressors encountered by graphic designers (Authors' construct)

Techno-stress caused by design tools

The tensions around the usage of the tools, according to several graphic designers interviewed, is the constant evolution of hardware and design application software, which presented several challenges. One of such challenges was that the design applications used were pirated and had limitations. The need for graphic designers to continually update their knowledge and skills is critical, given current design practice challenges in the context of techno-stress. The following comments throw more light on the challenges encountered by graphic designers:

- i. "It is hard to keep up with the fast changes in the design software. It can make me feel anxious and like I am not good enough" (Graphic Designer 15).
- ii. "When it comes to the use of design software applications, I think I am not all that good, and at least we are all trying our best to bring the best out of us, because the software comprises many things. I do not even know someone who can say he or she knows everything about design software. We are all trying our best because day in, day out, you find out new things about the software" (Graphic Designer 1).

From Figure 2, the techno-stressors are pirated software with limitations, software and hardware compatibility challenges, as well as regular update issues, which make the graphic designers unable to deliver as required by clients and the creative directors. These challenges generated psychological stress for the graphic designers, which are categorised into three:

- i. Software tools are plagued by the inability to utilise them proficiently.
- ii. Software updates and compatibility, which prevent design software from functioning well and delay the execution of designs.
- iii. Software complexity, which requires regular studies of video tutorials on social media platforms for retooling of the designers.

Though most graphic designers encountered these techno-stressors, some of the graphic designers were highly proficient in using the design applications, while others were still learning on the job. Those learning on the job due to new versions of design software encountered difficulties in using the tools to achieve the desired design effects or outcomes in CorelDRAW 2024 and Adobe Photoshop 2024. The challenges they faced with Adobe Photoshop 2024 included the frequent updates, which led to changes in the interface and some tools, making navigation difficult at times. Additionally, many designers found it challenging to use 3D applications. In summary, the findings indicated that most designers struggled with

one or more software tools. Additionally, due to piracy of some of the design tools, when they connect to the internet, the software eventually freezes and stops working. The following are some of the responses provided, offering insight into the challenges related to the CorelDRAW and Adobe Photoshop usage:

- i. *“I find it difficult whenever I try to change the colour of a certain object to a different colour” (Graphic Designer 1).*
- ii. *“Coral Draw, when you come into Photoshop, the pen tool is very easy when using it, but when it comes to Coral Draw, I find it difficult, like cropping the background” (Graphic Designer 2)*
- iii. *“Photoshop pen tool. It makes cropping or cutting easier, but because I do not know how to use it properly, I delay when using it” (Graphic Designer 4)*
- iv. *“Photoshop has a lot of image editing tools, but since I use Coral Draw, I find it difficult to find the right tool to work with when using images” (Graphic Designer 9).*

Based on findings from the interviews, designers had many frustrations with software updates and compatibility. Staying up to date with software updates and ensuring compatibility is crucial for a seamless workflow and high-quality results. In this fast-paced digital age, the software we use is constantly evolving, and understanding how to work with it effectively is essential for success in the field. Here are some key responses from the graphic designers:

- i. *“When I update things too often, they can break other things that were already working. This can mess up my work and make it harder to be creative, and can even make my projects take longer to finish” (Graphic Designer 15).*
- ii. *“I often encounter compatibility issues while working with different platforms and software versions. These issues can cause unexpected bugs and inconsistencies, leading to delays and requiring troubleshooting. To avoid such issues, I always make sure that all software and platforms are compatible before beginning any work” (Graphic Designer 18).*
- iii. *“I find it difficult to keep up with the fast pace of software updates and new releases, which makes it challenging to stay up-to-date on evolving features and functionalities” (Graphic Designer 16).*

Graphic Designer 3 shared a personal experience with a client. He had this to say:

- iv. *“Sometimes when he or she brings the design, the software that we use is different from the other person’s software that he used to design. You can use Photoshop to design it, but some of the Photoshop cloud, some of them are different types, some are 2018, some are 2019 software. The person who first made the design use let me say 2019, but you are using 2016, so you end up finding it difficult. So it affects the outcome.”*

Techno-stress caused by the client's rigidity and unclear specifications

In the context of the findings relating to techno-stress caused by clients, the results show that the chief stressors were unclear client specifications, tight client deadlines and client rigidity to preferences and reference materials. One graphic designer shared that he always overworks himself due to unclear client briefs. He shared that he executed a work with a client, the colours were selected by the client and to his surprise, the client came later and requested that every colour must be changed, including some images, which were all selected by the client. This attitude of some of the clients makes working for them very tedious and stressful. One other lady designer shared that a client supplied a design sample as a guide for the client’s project, but the colour was a Pantone, which was difficult to obtain in Cyan Magenta, Yellow and Black (CMYK) Profile. This was a detailed comment shared:

“I spent a considerable amount of time testing different CMYK builds to see how closely I could match the Pantone reference. Even with my expertise, I found that certain Pantone tones simply could not be replicated with complete accuracy in CMYK. This caused tension, because the client expected a perfect match and didn’t understand why the colour looked different when printed. I had to sit the client down and explain why Pantone and CMYK work differently, and why some colours cannot be reproduced exactly without using spot-colour printing” (Graphic designer 17).

Reflecting on the experience, such situations were quite common among the interviewees. Many clients rely on visual samples without realising the complexity behind colour systems. Such rigidity was a key stressor for many designers, which has caused many job losses and designer-client conflict. One designer added that the client's rigidity affects the work produced to the extent that, at times, colour combinations do not make the text visible, which affects the printed outcome.

The findings show that the techno-stressors that were common among the graphic designers were techno-overload (rigidity of clients, tight deadlines, and unclear briefs made the designers overwork) and techno-invasion, which was a result of the graphic designers' quest to remain relevant by engaging regularly with online tutorials. Techno-complexity and uncertainty were also encountered by the designers due to the complex software interface and tools, which were modified in the design applications when updates were made, making designers struggle to work with the tools and other elements in the working space. Techno-insecurity was the last techno-stress encountered by the graphic designers, as a result of the loss of a job due to weakness in the design software applications usage or inability to use the design software to achieve design demands from a client.

DISCUSSION

The interviews revealed that graphic designers' primary technostress creators were the fast changes, complexity of design software and clients' rigidity (Techno overload and techno complexity). These constant updates and complexities can lead to feelings of anxiety, self-doubt, and incompetence. The lack of technological competence and the pressure to continually learn and adapt to new technologies (techno insecurity) can also contribute to technostress. The frequent upgrades and modifications in design software add to a feeling of technological overload, overwhelm designers and affect their productivity and job satisfaction. The designers also conveyed their dissatisfaction with the utilisation of outdated technologies and the inability to utilise specific design tools. These constraints result in annoyance, ineffectiveness, and technological stress. The intricacy of designing software interfaces, the challenge of comprehending and utilising the tools inside the software, and the substantial time and effort needed to become proficient in the software are all major factors that contribute to technostress among the graphic designers.

Unattainable customer specifications and ambiguous client briefs result in technostress, which is classified as "Techno overload and techno uncertainty," resulting in role ambiguity and undue pressure to fulfil unrealistic client demands. Technostress also arises from software compatibility concerns, disparities in program versions, and variable degrees of knowledge across design teams. The task of interpreting ambiguous feedback from clients also generates stress and strain among the team, resulting in hasty work and reduced design excellence. Technostress generally stems from techno overload, which refers to an excessive amount of technology use, as well as a lack of understanding in utilising design software and managing technological improvements. Techno overload was the most dominant source of stress across the five activity theory units. The presence of technostress substantially affects graphic designers' work, resulting in delays in projects, loss of projects, and reduced productivity.

The impact of technostress on the work of designers is significant and diverse. Limitations imposed by hardware and software on graphic designers lead to project delays, loss of work, and failure to meet client expectations, ultimately causing stress and decreased productivity. The constraints mentioned above elicit emotions of irritation, inefficiency, and insecurity among employees.⁵³ Moreover, graphic designers encounter difficulties with the use of specific software tools. These challenges include difficulties in mastering different software tools, steep learning curves, and compatibility issues. These challenges can result in technostress and a decline in efficiency.⁵⁴ Additionally, unclear requests from clients and unrealistic client requirements result in uncertainty, opposite expectations, and excessive pressure on graphic designers to meet impracticable demands within strict time constraints, ultimately affecting the calibre and ingenuity of their work.⁵⁵ Unclear or ambiguous demands can result in role overload, job

⁵³ Tarafdar, Pullins, and Ragu-Nathan, "Technostress: Negative Effect on Performance and Possible Mitigations."

⁵⁴ Ragu-Nathan et al., "The Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation."

⁵⁵ Prakash Chandra Shukla, Phuong Bui, and Paul C Parsons, "Coping with Uncertainty in UX Design Practice: Practitioner Strategies and Judgment," in *Proceedings of the 2025 Conference on Creativity and Cognition*, 2025, 626–36.

stress, and reduced job satisfaction among graphic designers.⁵⁶ These variables, such as job ambiguity and overload, lead to uncertainty regarding the designer's obligations and impose excessive demands and pressure.⁵⁷

Based on the findings, there are several concrete measures that graphic designers can take to reduce technostress in their work. Designers need to prioritise and manage their tasks effectively to lessen the impact of technostress.⁵⁸ Using methods of mindfulness and relaxation, like meditation and deep breathing exercises, can also help alleviate the stress related to technology usage.⁵⁹ Establishing ergonomic workstations and taking regular breaks to minimise physical strain from prolonged computer use is essential.⁶⁰ Moreover, promoting a supportive and collaborative work culture where team members can openly discuss technostress-related issues can be beneficial.⁶¹ Providing training and support for new technologies can empower designers to feel more confident and competent in using design software, ultimately reducing technostress (Tarafdar et al., 2019). Employers and managers should also encourage open communication about technostress and create a supportive work environment where designers feel comfortable discussing their challenges.⁶² These findings are expanded and summarised in Figure 3.

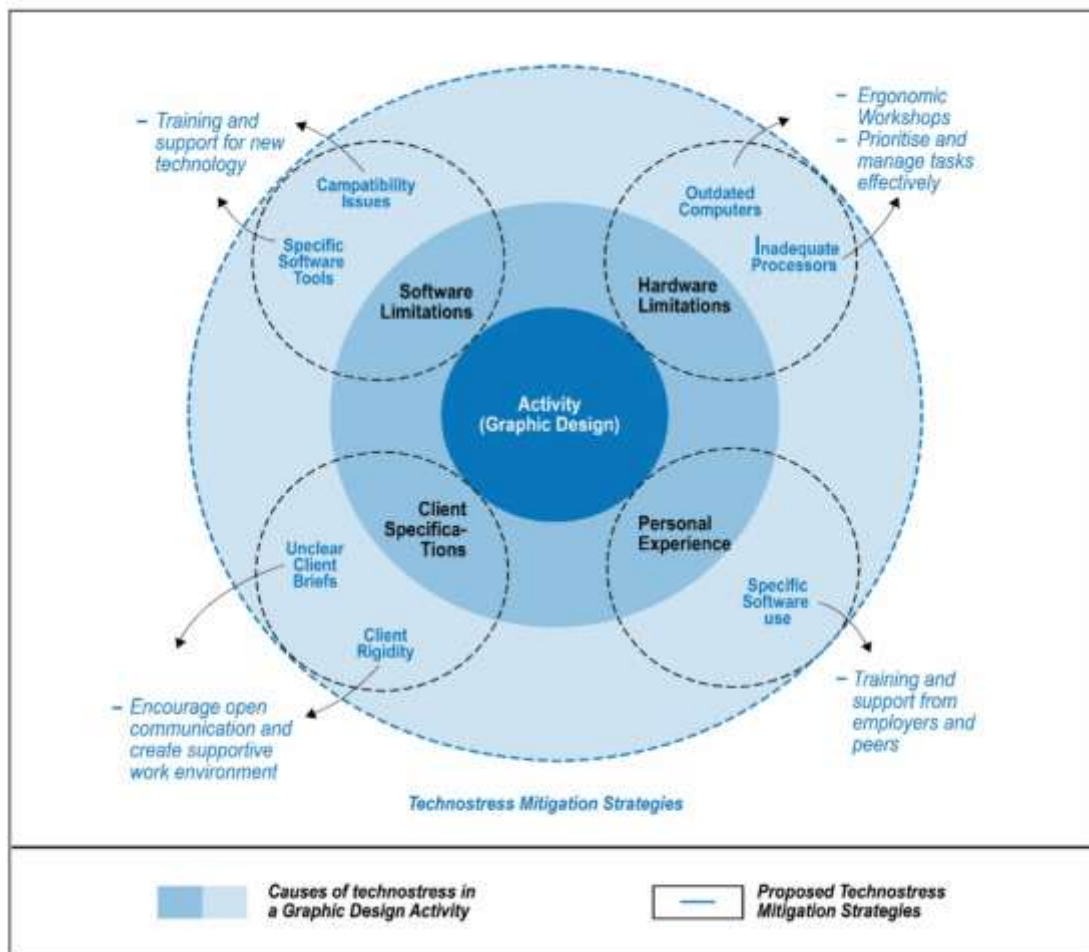


Figure 3: Proposed mitigating strategies for technostress for graphic designers
 Source: Authors' construct, 2024

⁵⁶ Tarafdar, Pullins, and Ragu-Nathan, "Technostress: Negative Effect on Performance and Possible Mitigations."
⁵⁷ Tarafdar, Pullins, and Ragu-Nathan, "Technostress: Negative Effect on Performance and Possible Mitigations."
⁵⁸ Tarafdar, Pullins, and Ragu-Nathan, "Technostress: Negative Effect on Performance and Possible Mitigations."
⁵⁹ Ute R. Hülshager et al., "Stop the Spin: The Role of Mindfulness Practices in Reducing Affect Spin.," *Journal of Occupational Health Psychology* 27, no. 6 (December 2022): 529–43, <https://doi.org/10.1037/ocp0000332>.
⁶⁰ Xenia Gorny et al., "Deficiency of the Immunoproteasome Subunit B5i/LMP7 Supports the Anxiogenic Effects of Mild Stress and Facilitates Cued Fear Memory in Mice," *Brain, Behavior, and Immunity* 80 (August 2019): 35–43, <https://doi.org/10.1016/j.bbi.2019.02.018>.
⁶¹ Chenè E Ward and Martha Harunavamwe, "The Role of Perceived Organisational Support on Technostress and Work–Family Conflict," *SA Journal of Industrial Psychology* 51 (2025): 2218.
⁶² Ward and Harunavamwe, "The Role of Perceived Organisational Support on Technostress and Work–Family Conflict."

RECOMMENDATIONS

To minimise techno-stress among designers, these recommendations are advanced within the context of policy-makers, graphic design educators and researchers, and graphic design professionals based on the research results. This could involve investigating the implementation of support systems for updating hardware and software, as well as the establishment of guidelines for promoting work environments that minimise technostress. Understanding the impact of policy interventions on mitigating technostress among graphic designers would be valuable for informing governmental and organisational strategies.

Researchers should concentrate on developing effective training programs and educational curricula that specifically target the technological challenges faced by graphic designers by identifying specific techno-stressors and implementing strategies to address them within educational settings. Graphic design practitioners should focus on exploring coping mechanisms and interventions to manage technostress in the workplace. Training initiatives, support systems, and technological interventions aimed at reducing technostress and improving technological competence among graphic designers could provide actionable insights for practitioners seeking to enhance their work environment and productivity.

CONCLUSION

This research sheds light on the impact of technostress on graphic design works, outlining how rapid changes and the complexity of design software create challenges that affect designers' confidence, workflow, and creativity. It gives an understanding of particular causes of technostress in graphic design projects, like the rapid changes and intricacies of design software, and problems related to hardware and software. Understanding these stressors is crucial for the industry as it allows for the development of strategies to mitigate their impact on graphic designers. The research emphasises that technostress can have negative effects on graphic design work, affecting the quality and timely completion of work, as well as designers' motivation and welfare. It concludes by highlighting the importance of continuous improvement, learning, and understanding the significance of technostress in graphic design projects to support and motivate designers in their endeavours.

Limitations

These were the limitations in the study:

1. The research was carried out in Kumasi (Asafo), where a selection of graphic designers was purposely made. Ghana has 16 regions, and conducting the study in only Kumasi, a town in the Ashanti region in Ghana, may not be representative of graphic design practitioners nationwide due to its size relative to the entire country. Therefore, similar studies should be conducted in additional regions of Ghana to gain a more comprehensive understanding of techno-stress across the country.
2. Given that the data is derived from interviews and self-reported responses from graphic designers, there is a potential for self-reporting bias. Participants might provide responses that are socially desirable or may not entirely reflect their experiences. It would be beneficial to include diverse data sources, such as observations or surveys, to address this bias and gain more comprehensive insights into technostress in graphic design.

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