AFRICA DESIGN REVIEW JOURNAL (AFRIDEJ)
AFRIDEJ VOL 2 ISSUE 1 OCTOBER 2025

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

SEMIOTIC OPTIMIZATION OF VISUAL COMMUNICATION IN TELECOMMUTING PRESENTATIONS DESIGN

AKELLO ODUNDO

FRANCISCA ODUNDO

Corresponding Author: Akello Odundo. odundo.akello@gmail.com

Received: 12th July, 2025

Received after editor preview: 15th July, 2025

ABSTRACT

Background: Telecommuting relies heavily on digital presentations, but poor engagement reduces productivity. In Kenya's BETA Agenda, one of the five thematic areas of focus is "Digital Superhighway and Creative Economy". In this sector, BETA aims to expand digital infrastructure, promote e-commerce and harness the creative potential of Kenyan youth. Telecommuting plays a key role in the achievement of these goals. ***Problem:*** Telecommuting and working from home have become common among Kenyan professionals. Digital presentations are key drivers of this remote work. Poor engagement during digital presentations reduces the efficacy of telecommuting, resulting in wasted time and a drop in productivity. ***Objective:*** This study tests whether semiotics (pragmatic signs/symbols) improve engagement in telecommuting presentations. ***Design:*** Descriptive methods were used in this cross-sectional qualitative study, where the researchers adopted a relativism philosophy. The secondary research encompassed thematic literature reviews of the fields of study, which are telecommuting and semiotics. ***Setting:*** The study was carried out among graduate professionals telecommuting in Nairobi, Kenya. ***Subjects:*** The subjects of this study were adult males and females. ***Results:*** The research objective was to determine whether semiotics improved engagement of participants during digital presentations. 49.9% of key informants interviewed reported that introducing semiotics to digital

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

presentations had an effect their engagement. A further 42.9% reported that the semiotics stood out the most as a feature in the digital presentation. ***Conclusion:*** Africa continues to integrate into the digital global economy, telecommuting presents a future of promise where work is accessible, inclusive and without borders. With the continent endeavouring to navigate the complexities of a digital world, purposeful telecommuting remains a key driver of change. It offers a glimpse into a future where Africa's workforce is empowered, connected and thriving in the global digital arena.

Keywords: ***telecommuting, visual communication, semiotics, design***

INTRODUCTION

KEY DEFINITIONS

Telecommuting, also known as remote work or e-work, refers to the practice of working from an off-site location that is not the office environment (Bailey & Kurland, 2002). Because most modern telecommuting is carried out from workers' homes, it is also referred to as working from home (WFH). This mode of work is enhanced by technological advancements, specifically information & communication technology (ICT) and the internet (Hill, Miller, Weiner, & Colihan, 1998). Employees are able to perform their tasks, collaborate and communicate with their supervisors remotely.

Visual communication is the transmission of information using visual elements (Fahim, 2022). Digital presentation is a visual communication tool which is an integral part of telecommuting, especially for meeting administrators. Digital presentation consists of using a series of sequenced slides to provide information or explain a concept to the audience (Kamaluddin, Azizah, Allan, & Robert, 2023). Whether conducting online teaching or a virtual meeting, logically organized content is essential for conveying information.

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

Semiotics encompasses the study of signs and symbols. It is a pillar of visual communication design (Chandler, 2007). Semiotics is a useful tool that helps designers create effective and impactful visual designs by understanding the structure, meaning and interpretation of signs. Through application of semiotic principles in emerging technology for digital presentations, telecommuters can visually communicate in a way that keeps their audience engaged. This involves an understanding of cultural nuances and thoughtful selection of signs.

Design as a process comprises the application of given principles to create functionality. Elements are arranged in a way that optimizes a particular outcome (Ralph & Wand, 2013). In the case of this study, two designers from different fields collaborated to design semiotics for telecommuting in Kenya, in order to contribute to the thematic area of "Digital Superhighway & Creative Industry" in Kenya's Bottom-up Economic Transformation Agenda.

CONTEXT OF THE STUDY

i. **Geographic context:** The study was carried out in Nairobi, Kenya. Fifteen key informants in the city were interviewed from 11 - 24 April 2024.

ii. **Demographic context:** The study was carried out among telecommuting professionals in Nairobi. These professionals had to have started undergraduate level training, but completion of studies was not a prerequisite. The study was cross-generational, and ages of participants were recorded (unless otherwise specified).

Relevance of the Study

Telecommuting represents a paradigm shift in the African the workplace. By improving telecommuting practices through introduction of semiotics, Kenya can adapt to increase participation in global commerce. This

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

forward-thinking approach could allow the country to address its economic challenges and grow as stipulated in the **Bottom-up Economic Transformation Agenda** (BETA).

Problem Statement

Telecommuting and working from home have become common among Kenyan professionals (Sitawa, 2023). Digital presentations are key drivers of this remote work. Poor engagement during digital presentations reduces the efficacy of telecommuting, resulting in wasted time and a drop in productivity.

Thesis Statement

The thesis statement of this research is that the introduction of relevant semiotics to digital presentations creates engagement, thereby improving telecommuting as a practice among Kenyan professionals. The research objective was to determine whether semiotics improved engagement of participants during digital presentations.

Research Questions

i. What is the demographic distribution of telecommuting professionals in Nairobi?
ii. Does use of semiotics improve understanding of digital presentations?
iii. Which features of digital presentations provide the most engagement?

Primary Objective:

To evaluate whether the strategic application of pragmatic semiotics (culturally tailored signs/symbols) in digital presentations significantly improves audience engagement among Kenyan telecommuting professionals.

Specific Objectives:

To analyze the demographic characteristics of telecommuting professionals in Nairobi and their correlation with engagement preferences.

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

To assess how semiotics influence comprehension and retention of presentation content in remote work settings.

To identify which visual design features (e.g., icons, color schemes, typography) are most effective for sustaining engagement during telecommuting presentations.

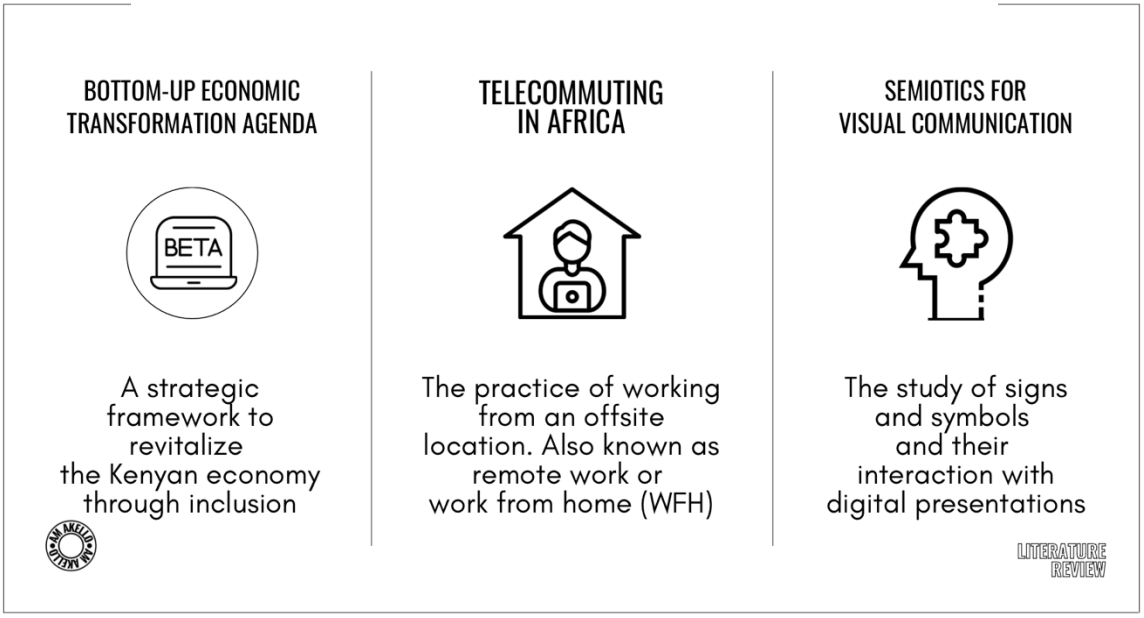
Methodological Objective:

To conduct an exploratory study that acknowledges limitations (sample size, sampling bias) while laying groundwork for future large-scale validation of semiotics in telecommuting contexts.

BACKGROUND INFORMATION

In line with BETA's "Digital Superhighway & Creative Industry" thematic area, telecommuting is becoming more widespread across the Kenyan economy. It is therefore, hypothetically, of interest to improve digital presentation for telecommuters. This thematic literature review aimed to peruse existing narratives to prove (or disprove) the aforementioned hypothesis.

Figure 1.1: Literature Review Thematic Areas



Thematic literature review was used as a tool to explore the thematic areas so as to provide relevant background information. The background of this study was laid out as three sub-topics. First, the alignment with current national agendas is discussed.

THEORY

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

The second sub topic gives details about continental telecommuting trends. And lastly, the unlikely alliance with semiotics is addressed.

Figure 1.1: serves as a roadmap to guide the thematic literature review. It does so by summarizing the areas of focus using semiotics. The images facilitated quick reference throughout the literature review process.

BOTTOM-UP ECONOMIC TRANSFORMATION AGENDA (BETA)

The **Bottom-up Economic Transformation Agenda** (BETA) is a strategic framework aimed at revitalizing Kenya's economy. According to the Treasury Cabinet Secretary, Njuguna Ndung'u, the medium-term budget preparation for the 2024/2025 financial year was focused on implementation of the Bottom-up Economic Transformation Agenda. BETA's policy is focused on inclusive growth and economic turnaround (Njoka, 2023). In a 2023 operationalizing report created by the Parliamentary Budget Office, BETA's five thematic areas were outlined as follows:

1. **Agricultural Transformation:** Agriculture has been recognized as the backbone of the Kenyan economy and a large contributor to the GDP. BETA aims to enhance agricultural productivity. Investments in irrigation, mechanization and value addition are key components (Muhati, 2023).
2. **Micro, Small, and Medium Enterprise (MSME) Economy:** BETA addresses the vital role played by MSMEs in job creation and economic growth (Omondi, 2022). The agenda seeks to provide targeted support to these enterprises through access to finance, capacity building and market linkages.
3. **Healthcare:** A healthy population promotes economic productivity. BETA advocates for improved healthcare infrastructure, quality services

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

and disease prevention. Investments in medical facilities and personnel have been initiated (Muhati, 2023).

4. **Housing and Settlement:** Addressing the housing deficit is crucial for inclusive development. BETA highlights affordable housing solutions, urban planning and infrastructure development to enhance living conditions as well as to create employment opportunities.
5. **Digital Superhighway and Creative Economy:** Emphasis on the transformative power of technology is outlined. BETA aims to expand digital infrastructure, promote e-commerce and harness the creative potential of Kenyan youth (County Government of Nyeri, 2023). This includes investments in broadband connectivity, digital skills training and promotion of creative industries.

Telecommuting is an adaptive response to global challenges for sustainable socio-economic development in line with the BETA thematic area of "Digital Superhighway and Creative Economy". It enables Kenyan professionals to remotely participate in the global job market.

TELECOMMUTING IN AFRICA

Digital skills have played a role in promoting the economic advancement of the African continent, which houses eight of the world's fastest growing economies (Kandri, 2019). Telecommuting is a digital skill that has enables modified work arrangements (Makori & Mauti, 2023) and promotes workplace inclusivity (Hunt, 2021).

History of telecommuting in Africa

Historically, Africa's communication infrastructure was shaped by colonial powers who focused on telegraphy and telephony for administrative control (Srinivasan & Diepeveen, 2019). Post-

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

independence, initiatives like the Pan African Telecommunication network (PANAFTEL) sought to enhance interconnectivity, laying the groundwork for today's digital landscape (CIDA, 2013) and facilitating telecommuting.

A Digital Leap Forward

In recent years, telecommuting has gained significant traction across Africa, due to its potential to reduce traffic congestion, decrease carbon emissions and promote inclusivity in the workforce (Mokhtarian, Salomon, & Choo, 2005). The COVID-19 pandemic accelerated this trend by forcing businesses and governments to adapt to remote work setups. This shift has not been without its challenges. Inconsistent power supply, limited internet access and a digital skills gap are notable hurdles. In stark contrast, the resilience and ingenuity of African workers have turned these obstacles into opportunities for innovation.

Telecommuting offers several benefits including increased flexibility, reduced commute time and potential for improved work-life balance (Gajendran & Harrison, 2007). On the flip side, it also presents challenges such as isolation, blurring of work-life boundaries and potential impacts on career progression (Golden, Veiga, & Dino, 2008).

The concept of telecommuting, or remote work, has been a transformative force in the global workplace, and Africa is no exception. With a burgeoning 79% youth population and rapid technological advancements (UNICEF, 2024), the continent is poised to leapfrog traditional work models and embrace the digital age of employment. As such, understanding the dynamics of telecommuting is crucial for both organizations and employees in the modern Kenyan workplace.

Current State and Opportunities

In 2024, telecommuting is more than a mere convenience; it is a necessity for

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

many African professionals. The rise of co-working spaces, digital hubs, and online freelancing platforms has facilitated a new era of work culture. Countries like Nigeria, Kenya and South Africa are leading the charge (Oluwole, 2023), with a significant portion of their professional workforce now operating remotely at least once a week.

The benefits of telecommuting in Africa are manifold. It offers a solution to the urban-rural divide, allowing talent from less developed areas to participate in the global economy (Hunt, 2021). It reduces the need for costly and time-consuming commutes, contributing to a better work-life balance and environmental sustainability.

The Role of Semiotics in Telecommuting

Distributed teams are a natural outcome of telecommuting. These teams largely rely on digital presentations to communicate effectively. However, remote attendees have a high likelihood of being distracted during digital presentations. A Canva study revealed that while attending digital presentations, 26% of respondents cooked and 42% of respondents answered texts/emails. Other distractions included scrolling through social media, online shopping and lavatory use (Insider Studios, 2021). The hypothesis of this research is that the introduction of semiotics to digital presentations creates engagement, thereby improving telecommuting as a practice.

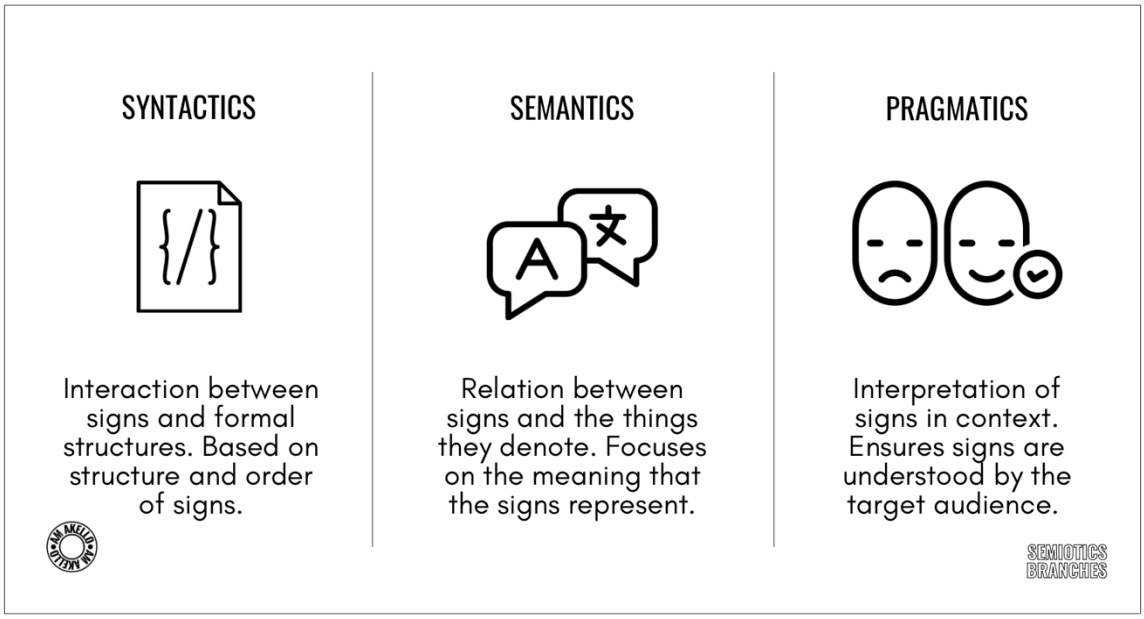
SEMIOTICS FOR VISUAL COMMUNICATION

Semiotics is the study of signs and symbols. It is a crucial element in the effective communication and collaboration that is needed for telecommuting. The three main types of semiotics are syntactics, semantics, and pragmatics (Morris, 1938).

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

Syntactics focuses on the interaction between signs and formal structures. Syntactics is crucial in design as it helps in understanding the structure and order of signs. For instance, in a logo design, the arrangement of elements can impact the message conveyed (Crow, 2010).



Semantics deals with the relation between signs and the things to which they refer. Semantics is about the meaning that the signs represent. In visual communication, semantics helps in creating designs that effectively communicate the intended message. A red color in a stop sign, for example, represents danger or caution (Frascara, 2004).

Pragmatics is about the interpretation of the signs in context. Pragmatics centres on the relation of signs to their effects on those who use them. It is essential in design as it ensures that the design is understood as intended by its audience. For example, cultural differences can lead to different interpretations of the same sign (Barnard, 2005).

For this study, the selected branch was pragmatics. Digital presentations are

Figure 1.2: Branches of Semiotics. Source Authors

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

targeted in nature. Since audience demographics exist, their interpretation of the signs can be predicted.

METHODOLOGY

Our study aimed to bridge the gap between the design of digital presentations and their actual use in professional and academic contexts. It adopted a descriptive approach to explore the interaction between slide composition and presentation engagement.

RESEARCH DESIGN

A descriptive, cross-sectional qualitative study was conducted using Key Informant Interviews (KIIs). While the small sample size (N=15) and snowball sampling method limit generalizability, this approach provided depth of insights from a niche population of graduate telecommuters in Nairobi. Future replication studies would benefit from stratified random sampling.

Research Questions

Our study addressed the following research questions:

i. What is the demographic distribution of telecommuting professionals in Kenya?
ii. Does use of semiotics improve understanding of digital presentations?
iii. Which features of digital presentations provide the most engagement?

Research Approach

A research approach defines the methods chosen by the researcher(s) to collect, analyze and interpret data. To enable experiential understanding of how semiotics influenced visual communication during telecommuting, qualitative methods were selected.

Descriptive research was used as a method to identify patterns in telecommuting professionals, so as to establish whether semiotics improved their engagement during digital

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

presentations. The researcher(s) adopted an interpretivism philosophy, choosing to recognize verified data from key informants. The study was cross-sectional in nature.

Primary research was carried out as Key Informant Interviews in the days spanning 11 April 2024 and 24 April 2024. The secondary research encompassed thematic literature reviews of the fields of study, which are telecommuting and semiotics. The secondary research not only informed the design of the digital interview, but also determined the selection of participants.

DATA COLLECTION

We employed Key Informant Interviews (KIIs) as our primary data collection method. The key informants were graduate professionals in Nairobi who regularly used digital presentations in their telecommuting work or academic settings.

Participants viewed a 5-slide presentation incorporating pragmatic semiotics (e.g., culturally tailored icons, color symbolism). The absence of a control group viewing a non-semiotic version prevents isolation of semiotics' effects, but participant feedback on specific semiotic elements offers preliminary evidence.

Key Informant Interviews

Key Informant Interviews (KIIs) were used to collect data from the participants because the participants of the study were graduate professionals telecommuting in Kenya. This represented a niché population with detailed insights. Key Informant Interviews provide higher quality data for qualitative research by insights from individuals with in-depth knowledge on a particular subject matter (Kibuacha, 2024).

A five-slide digital presentation was created collaboratively by the researchers. The subject matter was "Thematic Areas of BETA". Pragmatic semiotics were included in the digital presentation. For ease of dissemination,

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

the presentation was formatted into a YouTube video. A first draft questionnaire was prepared by the researcher(s) on Google Forms to accompany the video. It was then digitally dispatched to two Design Thinking certified advisors for user-testing. The two advisors identified functionality gaps in the draft. The researcher(s) amended the questionnaire accordingly to create the final draft. The feedback from advisors was:

i. Include "Prefer not to say" option for "age" question. Participants may be hesitant to disclose year of birth.
ii. Administer survey in person as Key Informant Interviews.
iii. Include "I don't know" option for "thematic areas" question. Some participants may be unwilling to guess an answer if the answer is unknown.

Once these changes were made as specified, 20 minute KIIs were then administered to 15 key informants using the final draft of the questionnaire. This was done in the days spanning 11 April 2024 and 24 April 2024. Four primary interviews were guided by the researcher(s) during face-to-face interviews. The remaining were administered digitally following an in-person interaction introducing the study by one of the four primary participants.

Sampling

Having identified the target population as "graduate professionals telecommuting in Nairobi", convenience sampling was used to find four primary informants. The researcher(s) purposefully selected four key informants from diverse professional backgrounds including software engineering, architecture, psychology and film production. These four key informants then snowballed the interview within their networks. The request was three additional

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

participants per key informant, but it was difficult to track respondents because the questionnaire was anonymous. Based on key informant testimony, the respondents were business professionals, educators, researchers and students. Our goal was to capture a wide range of perspectives on digital presentations.

Interview Protocol

The researcher(s) interviewed four key informants in face to face interviews. The key informants watched a 22 seconds long digital presentation in the form of a YouTube video. The researcher(s) then administered the guided interview as a closed-ended digital survey. Our semi-structured interview protocol included closed-ended questions on Google Forms related to the following topics:

- Information for demographic purposes
- Frequency of telecommuting
- Memory tests for the video
- Effectiveness of semiotics in the video
- The features of the video that stood out most

The four primary key informants then administered the interviews to additional participants from the specified population using snowballing techniques. Their responses were recorded anonymously on Google Forms.

Ethical Considerations

The researcher(s) obtained informed consent from all participants. No names are used in the research paper to protect participants' identities. Whether from a primary participant or their snowball network, all collected data was analyzed together. There was no distinction between data sources to ensure confidentiality and collecting of data anonymously.

Limitations:

1. The sample size is insufficient for statistical generalization but

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

adequate for exploratory qualitative research.

2. Snowball sampling may introduce homophily bias, though primary informants were selected from diverse professions to mitigate this.
3. Without a control group, we cannot definitively attribute engagement changes to semiotics alone.

RESULTS

The researcher(s) used thematic coding to identify recurring patterns and themes. These themes were then used to select the options for the interview questions. All questions were closed-ended except the last which was semi closed-ended. The interview responses were transcribed using a standardized Google Form. Fifteen Key Informant Interviews were conducted. These were the questions and results:

What age demographic do you identify with?

Greatest Generation (1901-1927)	**0**
Silent Generation (1928-1945)	0
Baby Boomers (1946-1964)	1
Generation X (1965-1980)	1
Millennials (1981-1996)	10
Gen Z (1997-2012)	1
Gen Alpha (2013-present)	0
Prefer not to say	2

Do you have an undergraduate level of training?

I have an undergraduate degree	**14**
I have started but not completed my undergraduate training	1
I have not received an undergraduate level of training	0
Prefer not to say	0

How did the illustrations affect your understanding of BETA and its thematic areas?

One	**2**
Two	2

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

Three	1
Four	2
Five	3
Six	1
Seven	3

*This question was a filtering question. Fourteen key informants that picked the first two options were able to proceed with the interview.

Telecommuting refers to the practice of working from an offsite location. Most commonly, this location is home. How often do you telecommute?

Quite often (5-7 days a week)	**6**
Often (2-4 days a week)	3
Occasionally (1-7 days a month)	1
Rarely (2-11 days a year	2
Never	2

How many thematic areas does BETA have?

Six	**1**
Five	9
Four	1
Three	1
I don't know	2

Which of these is NOT included in BETA's thematic areas?

Housing & Settlement	**1**
Healthcare	1
Climate Change & Environmental Protection	6
Digital Superhighway & Creative Industry	7
I don't know	2

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

Which feature stood out the most for you?

The Audio	**8**
The Color Scheme	0
The Illustrations	6
Other	0

DATA ANALYSIS

As the Key Informant Interviews were being conducted, responses to the closed-ended interview were recorded digitally by participants. These responses were then grouped by topic and represented as either pie charts or bar graphs.

DATA ABOUT PARTICIPANTS

The demographic data collected from key informants was education level and age range. Both data set distributions were represented as pie charts in the figure below.

Additionally, data on telecommuting frequency was analyzed.

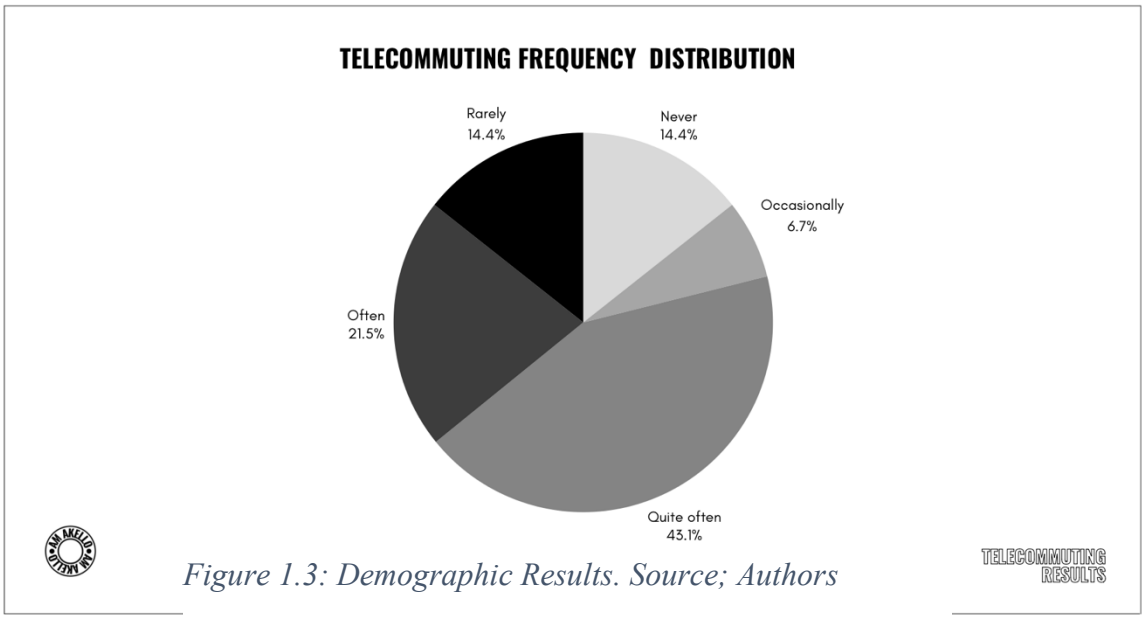


Figure 1.3: Demographic Results. Source; Authors

DATA ABOUT ENGAGEMENT

Engagement with the video presentation was measured using two test questions.

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

One was simple and one was detailed. The distribution of participants' answers is represented below.

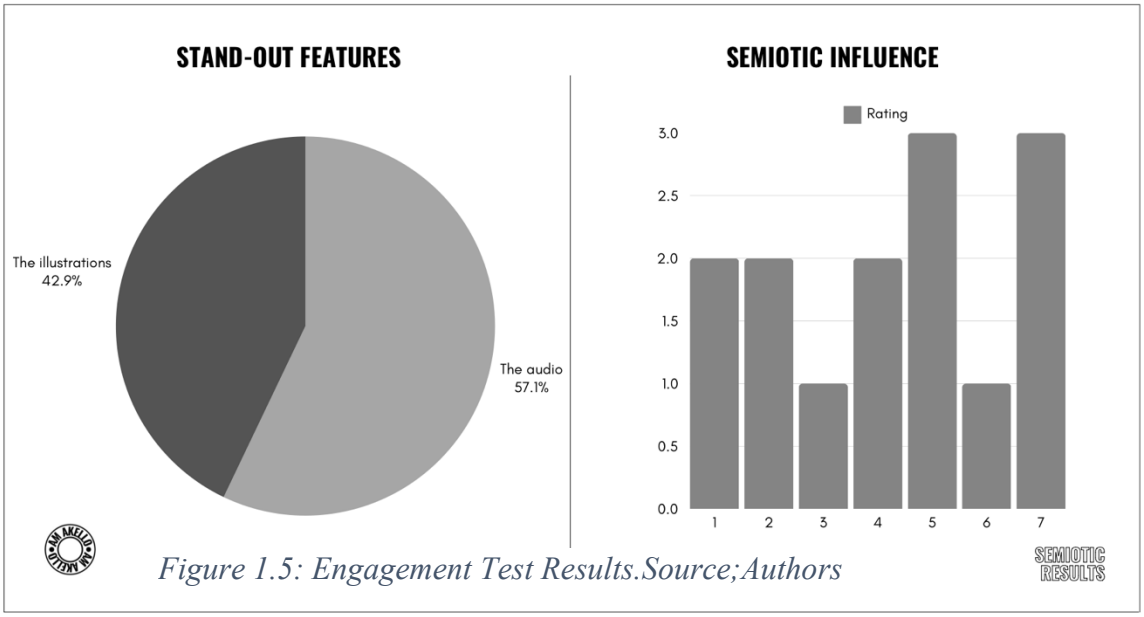
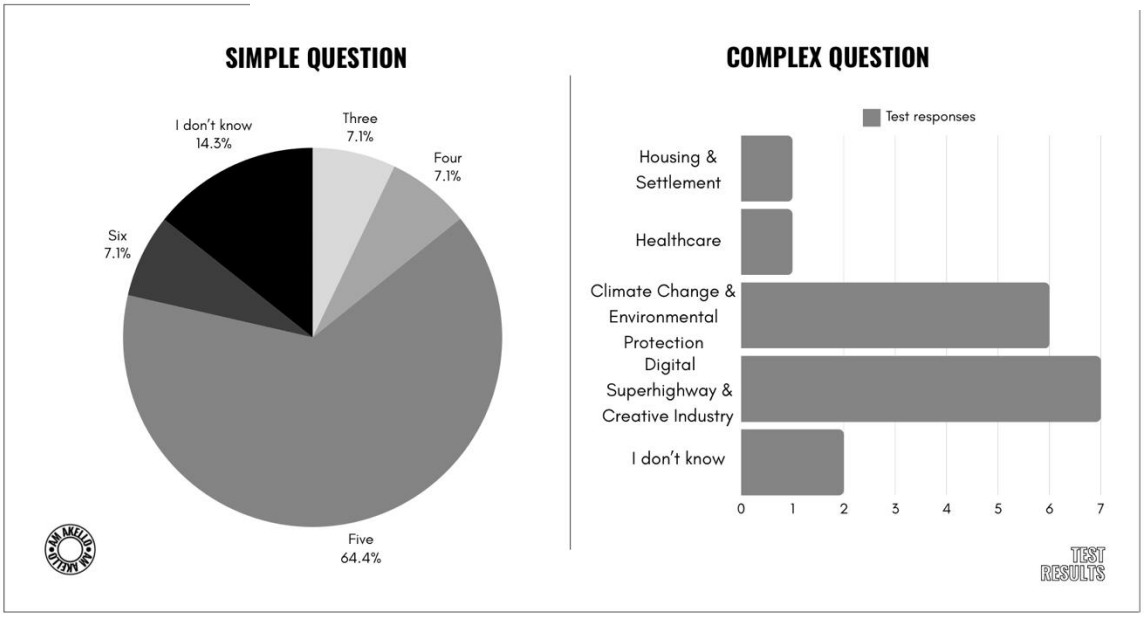


Figure 1.5: Engagement Test Results.Source;Authors

Participants were interviewed on which features stood out the most to them in the digital presentation.

DATA ABOUT SEMIOTICS

Figure 1.6: Semiotic Results



The key informants also rated how semiotics had affected their engagement. The distribution of

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

semiotic responses is represented in the figure below.

DISCUSSION

TELECOMMUTING AND THE WAY FORWARD

There exists a pressing need for digital literacy and skills development. By 2030, it is estimated that 230 million jobs in Sub-Saharan Africa will require digital competencies (Kandri, 2019). Despite the progress, the digital divide remains a critical issue affecting local telecommuting, with internet penetration varying widely across the country (Abiero & Kipkoech, 2023), as well as across gender lines (Maichuhie, 2023). Investment in infrastructure, particularly in rural areas, is currently being implemented across Kenya (Muhati, 2023) which could promote equitable access to telecommuting opportunities.

THE ROLE OF SEMIOTICS

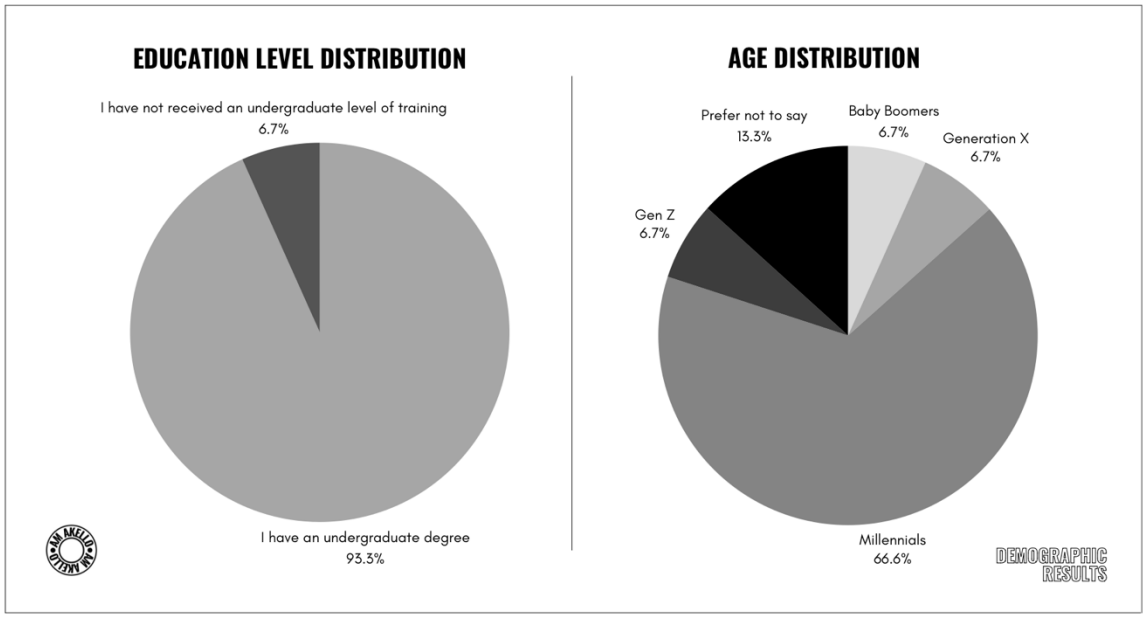


Figure 1.4: Telecommuting Results. Source: Authors

Virtual workspaces have been embraced by Kenyan employers, whether on a part-time (hybrid) or full-time basis (Sitawa, 2023). Semiotics plays a role in making these telecommuting spaces engaging thereby creating promoting inclusivity. This outcome is in line with the

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

objectives of the **Bottom-up Economic Transformation Agenda** (BETA).

CONCLUSION

The research objective was to determine whether semiotics improved engagement of participants during digital presentations. 49.9% of key informants interviewed reported that introducing semiotics to digital presentations had an effect their engagement. A further 42.9% reported that the semiotics stood out the most as a feature in the digital presentation.

The research contributes to a holistic understanding of the interplay between semiotic practices and digital presentation delivery. By adopting the use of pragmatic semiotics, telecommuting professionals in Nairobi experienced improved engagement. The researcher(s) aim to inform design culture and enhance the effectiveness of digital presentations for improved telecommuting in Kenya.

As Africa continues to integrate into the digital global economy, telecommuting stands as a beacon of progress, promising a future where work is accessible, inclusive and without borders (Hunt, 2021). With the continent endeavouring to navigate the complexities of a digital world, purposeful telecommuting remains a key driver of change. It offers a glimpse into a future where Africa's workforce is empowered, connected and thriving in the global digital arena.

While findings suggest semiotics can enhance engagement in telecommuting presentations, the study's methodological constraints necessitate cautious interpretation. The results provide a foundation for future, more robust studies on visual communication optimization in remote work contexts

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

BIBLIOGRAPHY

Abiero, D. & Kipkoech, D. A. (2023). Kenya's Digital Deserts. *Strathmore University: Centre For Intellectual Property And Information Technology Law*. https://cipit.strathmore.edu/kenyas-digital-deserts/

Bailey, D. E. & Kurland, N. B. (2002). A Review of Telework Research: Findings, New Directions, And Lessons For The Study of Modern Work. *Journal of Organizational Behavior,* 23(4), 383-400. https://www.jstor.org/stable/4093813

Barnard, M. (2005). Graphic Design as Communication. London: *Routledge*.

Canada International Development Agency (CIDA). (2013). Evaluation Study of The PANAFTEL Project. *Government of Canada Publications*. https://publications.gc.ca/collections/collection_2017/amc-gac/CD4-117-2001-eng.pdf

Chandler, D. (2007). Semiotics: The Basics.p (2nd Edition). *London: Routledge*. ISBN: 978-0415363754

Crow, D. (2010). Visible Signs: An Introduction to Semiotics in the Visual Arts. *Lausanne: AVA Publishing*. ISBN: 978-2-940411-42-9 https://www.scribd.com/document/127181708/Crow-Visible-Signs-Semiotics-in-the-Visual-Arts

Fahim, T. (2022). Visual Communication And Digital Media: Exploring The Science Behind Visual Communication in Digital Age. *Arcada University of Applied Sciences*.

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

https://www.theseus.fi/bitstream/handle/10024/788597/Fahim_Tatiana.pdf?sequence=2&isAllowed=y

Frascara, J. (2004). Communication Design: Principles, Methods, and Practice. *New York: Allworth Press*. https://scholar.google.com/citations?view_op=view_citation&hl=en&user=rwVYjC4AAAAJ&citation_for_view=rwVYjC4AAAAJ:5nxA0vEk-isC

Gajendran, R. S., & Harrison, D. A. (2007). The Good, The Bad, And The Unknown About Telecommuting: Meta-analysis of Psychological Mediators And Individual Consequences. *Journal of Applied Psychology*, 92(6), 1524-41. https://www.researchgate.net/publication/5825885_The_Good_the_Bad_and_the_Unknown_About_Telecommuting_Meta-Analysis_of_Psychological_Mediators_and_Individual_Consequences

Golden, T. D., Veiga, J. F. & Dino, R. N. (2008). The Impact of Professional Isolation on Teleworker Job Performance And Turnover Intentions: Does Time Spent Teleworking, Interacting Face-to-face, or Having Access to Communication-enhancing Technology Matter? *Journal of Applied Psychology*, 93(6), 1412-21. https://www.researchgate.net/publication/23489230_The_Impact_of_Professional_Isolation_on_Teleworker_Job_Performance_and_Turnover_Intentions_Does_Time_Spent_Teleworking_Interacting_Face-to-Face_or_Having_Access_to_Communication-Enhancing_Technology_M

Hill, E. J., Miller, B. C., Weiner, S. P. & Colihan, J. (1998). Influences of The Virtual Office on Aspects of Work And Work/life Balance. *Personnel Psychology*, 51(3), 667-683. https://www.researchgate.net/publication/227639884_Influences_of_the_Virtual_Office_on_Aspects_of_Work_and_WorkLife_Balance

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

Kamaluddin, K., Azizah, W., Allan, M. & Robert, Y. (2023). Digital-Based Online Presentation Media in Improving Students' Language Skills. *Journal International of Lingua and Technology* 1(3): 172-187 DOI:10.55849/jiltech.v1i3.142

Liu, K. & Tan, C. (2015). Semiotics in Digital Visualisation. *Lecture Notes in Business Information Processing*, Vol. 227. https://DOI.org/10.1007/978-3-319-22348-3_1

Makori, E. O. & Mauti, N. O. (2023). Telecommuting Practices and Trends in the Digital Transformation. *International Journal of Interactive Communication Systems and Technologies*, 12(1):1-14 https://www.researchgate.net/publication/369462787_Telecommuting_Practices_and_Trends_in_the_Digital_Transformation

Mokhtarian, P. L., Salomon, I. & Choo, S. (2005). Measuring The Measurable: Why Can't We Agree on The Number of Telecommuters in The US? *Quality & Quantity*, 39(4), 423-452. https://www.researchgate.net/publication/226816015_Measuring_the_Measurable_Why_Can't_We_Agree_on_the_Number_of_Telecommuters_in_the_US

Morris, C. (1938). Foundations of the Theory of Signs. *Chicago: University of Chicago Press*.

Ralph, P. & Wand, Y. (2013). A Proposal for a Formal Definition of the Design Concept. *Annual Review of Policy Design*. https://core.ac.uk/download/pdf/229585288.pdf

Srinivasan, S. & Diepeveen, S. (2019). Communication Technology and African Politics. *Oxford Research Encyclopedias, Politics.* https://doi.org/10.1093/acrefore/9780190228637.013.1381

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

Zhao, S., Djonov, E. & van Leeuwen, T. (2014). Semiotic technology and practice: A multimodal social semiotic approach to PowerPoint. *Text & Talk*, *34*(3), 349-375. https://doi.org/10.1515/text-2014-0005

INTERNET SOURCES

Muhati, J. (2023, August 18). KEY HIGHLIGHTS OF THE FOURTH MEDIUM TERM PLAN (MTP IV) 2023 – 2027. Retrieved from https://www.treasury.go.ke/wp-content/uploads/2023/08/KEY-HIGHLIGHTS-OF-MTP-IV-PRESENTATION-for-PS-2024-25-MTEF-Budget-Launch-REV-17-08-2023-2023hrs.pdf.

Njoka, L. (2023, August 21). Focus on Bottom-up Agenda As New Budgeting Process Begins. *People Daily*. Retrieved from https://www.pd.co.ke/business/focus-on-bottom-up-agenda-as-new-budgeting-process-begins-197168/.

Omondi, I. (2022, June 30). The Six Pillars of DP Ruto's Bottom-up Economic Model And Why He Believes It Is The Solution. *Citizen Digital*. Retrieved from https://citizen.digital/news/the-six-pillars-of-dp-rutos-bottom-up-economic-model-and-why-he-believes-it-is-the-solution-n301225.

County Government of Nyeri (2023). Nyeri County Fiscal Strategy Paper, 2023: The Bottom-up Economic Transformation Agenda For Inclusive Growth. Retrieved from https://repository.kippra.or.ke/bitstream/handle/123456789/4123/Nyeri%20Approved-CFSP-2023.pdf?sequence=1

Hunt, S. T. (2021, May 12). How Hybrid Remote Work Improves Diversity And Inclusion. *Forbes*. Retrieved from https://www.forbes.com/sites/sap/2021/05/12/how-hybrid-remote-work-improves-diversity-and-inclusion/?sh=51b2921b321f

Insider Studios with Canva (2021). 3 Reasons Your Work Presentation Is Boring, According To 1,000 Remote Workers. *Business Insider*. Retrieved from

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

https://www.businessinsider.com/sc/how-to-improve-remote-work-presentations-2021-7?r=US&IR=T

Kandri, S-E. (2019, October 23). Africa's Future Is Bright And Digital. *World Bank Blogs: Digital Development*. Retrieved from https://blogs.worldbank.org/en/digital-development/africas-future-bright-and-digital

Kibuacha, F. (2024). Key Informant Interviews: An In-Depth Guide For Researchers. *GeoPoll*. Retrieved from https://www.geopoll.com/blog/key-informant-interviews/#The_Importance_of_Key_Informant_Interviews_in_Research

Maichuhie, K. (2023, March 8). Great Divide: How Digital Gender Gap is Widening Inequalities. *Nation Media Group*. Retrieved from https://nation.africa/kenya/news/gender/great-divide-how-digital-gender-gap-is-widening-inequalities-4150468

Operationalizing the Bottom-up Economic Transformation Agenda (2023). http://www.parliament.go.ke/sites/default/files/2023-09/Budget%20Watch%202023_0.pdf.

Oluwole, V. (2023, June 6). Top 10 Most Popular Remote Working Destinations in Africa. *Business Insider Africa*. Retrieved from https://africa.businessinsider.com/local/lifestyle/top-10-most-popular-remote-working-destinations-in-africa/m7s5d6d

Sitawa, M. (2023, November 12). More Kenyans To Work Remotely, Says Forecast. *Business Daily*. Retrieved from https://www.businessdailyafrica.com/bd/economy/more-kenyans-to-work-remotely-says-forecast--4431506

Copyright © The Author, All rights reserved

ONLINE ISSN-2664-5866 PRINT ISSN-2664-5874

UNICEF (February, 2024). Empowering African Youth For A Future In Technology. *United Nations Children's Fund Blog Post*. Retrieved from https://www.unicef.org/ghana/blog/empowering-african-youth-future-technology

This paper was presented at the Machakos University 6th Annual Conference held at Machakos University.

Copyright © The Author, All rights reserved