AI-DRIVEN PRODUCTIVITY TOOL FOR TASK VISUALIZATION

ANALYZING THE SOCIOTECHNICAL DYNAMICS OF MICROSOFT VIVA: AN ACTOR-NETWORK THEORY PERSPECTIVE

A Thesis Prospectus
In STS 4500
Presented to
The Faculty of the
School of Engineering and Applied Science
University of Virginia
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

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November 8, 2024

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Task management is essential for achieving personal and professional goals, yet many individuals struggle to effectively break down and tackle large projects. This can lead to an issue of prioritization of tasks, which in turn causes an increase in procrastination and reduced productivity. It is shown that individuals with ADHD, in particular, struggle with managing such tasks, but breaking the task into smaller, more manageable chunks can significantly improve the likelihood that the task is completed and reduce stress in the long-run (Barkley, 2015).

Although several task management applications exist, the most popular alternatives focus more on reminders and scheduling rather than breaking down tasks into smaller, actionable steps. To address this concern, our project will utilize large language models (LLMs), which use artificial intelligence to analyze vast amounts of text data regarding how tasks are typically broken up. The LLM will serve as a key component to our productivity app and learn from given data to break down large tasks into visual, manageable components. In addition to this, we plan to investigate how Actor-network theory (ANT) serves as the STS framework for our project, which helps us analyze the interactions between human and non-human actors involved in task management (Cressman, 2009).

Task management is a sociotechnical challenge because it involves both the technical systems that facilitate task organization and the social behaviors, preferences, and interactions of users who engage with these systems. Since the challenge of effective task management for individuals is sociotechnical, it requires attending to both its technical and social aspects to accomplish. In what follows, we set out two related research proposals: a technical project proposal for developing an AI-driven productivity tool to break down tasks and an STS project proposal for examining how human and non-human actors such as users, AI systems, and organizational

protocols, form networks that influence productivity practices within Microsoft Viva. Task management exemplifies a sociotechnical challenge, as it intertwines technical tools with the social behaviors and preferences of users. By linking the technical and social dimensions of task management, this dual approach provides insights into designing adaptive tools that align with diverse user needs and contexts.

Technical Project Proposal

To address the significant challenges of task management, particularly for individuals who struggle with complex tasks, we propose an AI-driven productivity tool to help individuals visualize and carry them out. The application explores how LLMs improve task management by addressing uncertainty about where to start or proceed, which can lead to procrastination. Additionally, we would like to accommodate individuals with executive dysfunction, who may initially find the thought of doing the task overwhelming, leading to stress and incompletion.

When it comes to current approaches, our application would be unique in task management in a way that focuses less on the aspect of managing time and scheduling, and more on the steps on how to accomplish the task to promote increased completion. While most products aim for the first approach, these methods may lead to increased stress and low productivity for those who require their goals to be more specific and broken down. This is because while some people possess the skills to manage their time on a calendar, they become frozen once it comes to initializing the actual task, leading to executive function (Diamond, 2013). Although this may happen, there exists an alternative approach with a product called Goblin Tools (Goblin Tools, n.d.), where an individual identifies a task they want to complete and they choose a “spiciness” or level that they want the task to be broken down into, with a

higher spiciness correlating with a greater number of steps. While this concept serves as the basis for our application and proves effective in theory, it lacks a clear, visual component for the user to follow through. Its user interface could also be interpreted as complex and inefficient which contradicts the objective of making the breakdown of tasks accessible for the individual.

In our implementation, we would like to emphasize visualizing the steps in a task for the individual to get the specifics of each step while at the same time having an idea of the bigger picture to improve the likelihood of a task getting completed (Oettingen & Gollwitzer, 2010). To accomplish this, we are using a graph interface similar to one of the popular note-taking apps Obsidian (Obsidian, 2023), that organizes similar concepts into a structured, web format. We plan on incorporating this in React, a framework that serves as our front-end interface handling the visualization of our graph. The specific graph we will be using is the react-force-graph which includes several eye-catching features that will make our task breakdown more appealing (Vasturiano, 2024).

We would also like to differentiate ourselves from Goblin Tools through our external usage of an LLM. While our LLM will specifically be trained to handle the breakdown of tasks, we will also be utilizing an LLM called Llama3–an open-source model developed by Meta designed to understand and generate human-like responses (Dubey et al., 2024). By using Llama3, our task-breakdown application can better understand the complexities of user inputs and provide detailed, actionable task breakdowns that are tailored to individual needs. Our LLM will work in tandem with our graph to provide a resourceful and convenient way for users to envision and perform their tasks.

In addition to this, another tool called Langgraph will be used to create pipelines that connect complex sequences of prompts, allowing for more sophisticated interactions between

user inputs and AI models (LangChain Inc., 2024). Within this application, Langgraph will help break down tasks by linking multiple states of analysis, allowing for a more personalized, adaptive, and context-aware understanding of the user's needs. This will help facilitate the flow of information from one state to the next, ensuring the AI has a coherent understanding of the current task state, user feedback, and next suitable steps, achieving a flow of conversation that is needed for promoting effective interaction between the user and the AI.

To evaluate the app's effectiveness, we will gather user data through beta testing. Participants will complete surveys measuring task completion rates, stress levels, and ease of use. Quantitative metrics, such as time spent on tasks and the number of tasks completed, will be analyzed alongside qualitative feedback to assess the app's usability and impact. These findings will inform iterative improvements to the design and functionality.

Our proposed solution addresses significant gaps in current task management tools by offering a comprehensive, AI-driven approach that emphasizes visualization and personalization. By combining Llama3, a powerful LLM, with a React-based user interface and Langgraph for prompt pipelines, we aim to create an adaptive productivity tool that helps users understand, visualize, and complete complex tasks. This solution not only focuses on improving productivity for the general population and in workplaces but also caters specifically to individuals with ADHD, providing them with a structured and supportive system to reduce overwhelm and increase task completion rates.

STS Project Proposal

In 2021, Microsoft launched Viva, an AI-powered employee experience platform designed to transform digital workplace interactions (Microsoft, 2021). While promising to

revolutionize productivity and employee engagement, the platform represents a complex sociotechnical intervention that merits critical examination through the lens of Actor-Network Theory (ANT).

Current discourse around Microsoft Viva emphasizes its technological innovations, highlighting features like personalized insights, learning tools, and communication integrations (TechCrunch, 2021; Microsoft, 2021). However, existing narratives often overlook the intricate network of human and non-human actors that shape the platform's implementation and potential impact. Preliminary assessments suggest that Viva's success depends not just on its technological capabilities but on the complex interactions between organizational actors, AI systems, existing workplace infrastructures, and emerging work practices (Forrester, 2022).

The central problem this research explores is how Microsoft Viva, as an AI-driven productivity platform, negotiates and transforms workplace dynamics through its sociotechnical network. Specifically, this study argues that Viva's implementation reveals deeper tensions between technological design, organizational culture, and emerging modes of digital labor. The interaction between Viva's AI capabilities, organizational actors, and existing workplace infrastructures creates a dynamic network that simultaneously shapes and is shaped by its participants. The platform does not simply automate tasks but actively reconfigures workplace relationships, productivity expectations, and professional behaviors. The complication lies in the friction that arises when new technological systems like Viva integrate into established networks. Organizational resistance, technical challenges, and cultural misalignment can all disrupt the intended transformation. Furthermore, the consequences of these disruptions ripple outward, affecting not just productivity but also the broader workplace culture, employee well-being, and perceptions of technological trust.

Actor-Network Theory (ANT), developed by scholars like Michel Callon, Bruno Latour, and John Law, provides a critical framework for analyzing how technological systems emerge through complex networks of human and non-human actors. ANT challenges traditional perspectives that view technology as a passive tool, instead conceptualizing technological systems as active participants in network formation (Latour, 2005). Central to ANT is the idea that network builders construct heterogeneous networks of actors—human and non-human—to solve problems or achieve goals. By applying ANT to Microsoft Viva, this research explores how the platform acts as a "network builder" that assembles heterogeneous actors, including AI algorithms, employees, managers, organizational protocols, and digital interfaces. This approach moves beyond simplistic narratives of technological determinism to examine the reciprocal relationships between technological systems and their social contexts. ANT provides a lens for understanding how technological interventions succeed or fail based on the strength and alignment of their networks.

The analysis is supported by multiple data sources, including Microsoft's official documentation and product announcements, which provide insights into Viva's intended design, features, and strategic goals (Microsoft, 2021). Scholarly literature on AI and workplace technology contextualizes Viva within broader trends in organizational transformation and digital labor (Brynjolfsson & McAfee, 2014). Ethnographic observations of Viva's deployment in specific companies provide grounded insights into how the platform reconfigures workplace interactions. For instance, one illustrative case involves Viva's deployment in a global consulting firm. The firm adopted Viva Insights to promote employee well-being by monitoring work patterns and recommending actionable steps to avoid burnout. However, initial resistance emerged from employees concerned about data privacy and micromanagement. Through

iterative adjustments—including transparent communication, policy updates, and interface redesign—the firm gradually integrated Viva into its workflows, resulting in improved productivity and morale. This case highlights the challenges and strategies involved in building and stabilizing a heterogeneous network of actors (Callon, 1981; Latour, 2005).

Applying ANT to Microsoft Viva entails a thorough examination of network dynamics. Questions explored include how Viva recruits and aligns diverse actors to achieve its goals, what compromises and adaptations occur as Viva's network evolves, how organizational hierarchies and technical affordances shape the agency of actors within the network, and what factors contribute to the stabilization or collapse of Viva's sociotechnical network. Michel Callon's concept of translation, which describes the process of network formation, is particularly relevant for identifying where Viva's implementation succeeds or faces challenges (Callon, 1981). The strength of the network—determined by the alignment of interests and the seamless integration of actors—is crucial for understanding its impact on workplace dynamics.

Through an ANT-based analysis, this study provides a nuanced understanding of how AI-powered workplace technologies like Microsoft Viva negotiate, adapt, and reshape organizational dynamics. By examining the platform as an active participant in sociotechnical networks, the research contributes to a deeper appreciation of the complex interplay between technology and society in the contemporary digital workplace.

Conclusion

The project presents a dual approach to addressing task management challenges by integrating technical and social insights. Through the development of an AI-driven productivity tool that effectively breaks down complex tasks into manageable, visual components, we can see

how we can cater to individuals who struggle with executive dysfunction and completing difficult tasks. By focusing on a personalized, user-friendly interface that leverages advanced large language models and graph-based visualization, we aim to create a comprehensive tool that reduces stress and enhances task completion rates. Complementing this, the STS project applies Actor-Network Theory in analyzing Microsoft Viva to examine the sociotechnical dynamics that shape interactions between human users and AI tools. This analysis highlights how relationships between actors such as users, AI algorithms, and organizational protocols influence the success and adoption of productivity technologies. Together, these projects underscore the importance of combining technical innovation with social understanding to create adaptive systems that enhance productivity across diverse user groups to create a holistic perspective on the design and implementation of effective task management tools.

Word Count: 2071

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