

AI DOWNTIME AS DIGITAL DISRUPTION: A NETNOGRAPHY OF USER RESPONSES TO THE 2024 CHATGPT OUTAGE

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Preprint / Working Paper | Version 1.0
Posted on April 2, 2026
DOI: 10.5281/zenodo.19380595

This manuscript is a preprint and has not undergone journal peer review.
It may be revised before formal publication.

This study was self-funded by the author.

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Abstract: *The December 2024 global ChatGPT outage provided a rare natural experiment for examining human reliance on artificial intelligence. This study employs a netnographic case analysis of Reddit discussions to explore dimensions of user reactions when a widely adopted AI tool suddenly became unavailable. Drawing on Attachment Theory, the Technology Acceptance Model, and Cognitive Load Theory, the analysis reveals that user dependency is not only multidimensional, emerging from overlapping emotional bonds, functional routines, and cognitive adaptations, but also cyclical, as these dimensions reinforce one another during disruption. Emotional attachment fuels reliance, reliance amplifies vulnerability to cognitive strain, and cognitive adaptation deepens attachment once AI access is restored. These dynamics were vividly expressed through frustration, humor, anxiety, and coping strategies as users navigated the outage. By situating AI downtime as both a technical disruption and a socio-psychological event, the study introduces a conceptual framework that advances theoretical understanding and highlights implications for digital resilience, ethical system design, and policies that prepare societies for inevitable technological disruptions.*

Keywords: *AI dependency, AI downtime; netnography; human–technology interaction; digital resilience; natural experiment*

INTRODUCTION

The rapid development of artificial intelligence (AI), particularly generative models such as *ChatGPT*, has transformed the nature of human–technology interaction. Once considered experimental tools, these systems now play central roles in education, work, and social life. Millions of people worldwide use generative AI daily to draft essays, prepare lesson plans, create software code, analyze data, and even provide companionship (Brown et al., 2020; OpenAI, 2023). Their accessibility and versatility have expanded both productivity and creativity, offering individuals new ways to perform tasks that were once labor-intensive or required specialized expertise.

The integration of AI into everyday routines has encouraged scholars to rethink how technology is conceptualized within social and cultural contexts. Early research on human–computer interaction emphasized usability and efficiency, but recent studies highlight more complex psychological and relational dynamics. Users often anthropomorphize AI systems, attributing to them human-like qualities of responsiveness and empathy (Kim et al., 2022). Such attributions may foster trust and satisfaction but also introduce risks of emotional attachment and dependency. Scholars have documented cases in which AI companions are described as therapeutic partners, suggesting that the boundaries between tools and relationships are increasingly blurred (Li et al., 2025).

At the same time, concerns have been raised regarding the potential cognitive consequences of extensive AI use. Education researchers caution that overreliance on AI-based tools for academic assignments may reduce independent problem-solving, originality, and critical thinking (Susnjak & McIntosh, 2024). Organizational scholars similarly warn that dependence on automated text generation may weaken professional skills, particularly in communication-intensive roles. Cognitive scientists go further, suggesting that frequent AI use might foster what is described as “cognitive debt” — a condition in which reliance on external systems reduces memory retention and intellectual resilience (MIT Media Lab, 2025; Time, 2025).

These concerns highlight an important paradox. On the one hand, AI offers powerful scaffolding that can extend human capabilities. On the other, the very efficiency of AI tools may encourage dependency that undermines autonomy, resilience, and adaptability. This paradox becomes most visible during moments of disruption — when technologies that are taken for granted suddenly fail.

The global outage of *ChatGPT* in December 2024 provided precisely such a moment. For several hours, one of the world’s most widely used AI systems became inaccessible, prompting confusion, frustration, and humor across social media. The outage functioned as a “stress test” for digital culture, exposing not only technical vulnerabilities but also psychological, functional, and cognitive dependencies that had become embedded in daily life. Unlike survey-based or experimental studies that investigate hypothetical disruptions, this event offered a naturalistic opportunity to observe user responses as they unfolded in real time.

This study positions the December 2024 outage as a case study for examining human responses to AI downtime. Specifically, it adopts a *netnographic* approach to analyze Reddit discussions during the disruption, focusing on the ways in which users articulated their experiences of loss, frustration, adaptation, and resilience. By interpreting these responses through three complementary theoretical frameworks — Attachment Theory (Bowlby, 1969), the Technology Acceptance Model (TAM) (Davis, 1989), and Cognitive Load Theory (Sweller,

1988) — the study aims to demonstrate how AI dependency can be understood as multidimensional.

Attachment Theory provides a lens for analyzing the emotional dimension of dependency. If technologies are perceived as relational partners, then their sudden absence may trigger emotions akin to anxiety, loneliness, or even grief. The Technology Acceptance Model contextualizes the functional dimension of dependency, highlighting how usefulness and ease of use translate into practical reliance that may leave individuals vulnerable when access is withdrawn. Cognitive Load Theory frames the cognitive dimension, suggesting that sudden increases in task demands during outages may overwhelm working memory, leading to stress or humor as adaptive coping mechanisms.

By synthesizing these perspectives, the study contributes to the growing body of literature on human–AI interaction in three important ways. First, it extends scholarship on AI adoption by shifting focus from uptake and integration to disruption and absence. Second, it offers empirical evidence of multidimensional dependency that goes beyond convenience, illustrating how AI shapes emotions, productivity, and cognition. Third, it highlights implications for digital resilience, suggesting that both individuals and institutions must prepare for the vulnerabilities that accompany widespread reliance on generative AI.

The importance of this inquiry extends beyond the specific case of *ChatGPT*. As societies increasingly integrate AI into critical domains such as education, healthcare, governance, and communication, the risks of overdependence become more consequential. Outages, system failures, or even deliberate restrictions may disrupt not only individual workflows but also collective functioning. Understanding how people respond to these disruptions provides insights into the cultural embedding of AI and offers guidance for ethical design, responsible adoption, and policy development.

This article proceeds as follows. The next section outlines the theoretical frameworks that guide the analysis: Attachment Theory, the Technology Acceptance Model, and Cognitive Load Theory. This is followed by a description of the *netnographic* research design and methodology, including data collection and thematic analysis procedures. The findings are then presented in three thematic clusters — emotional attachment, functional reliance, and cognitive adaptation — each supported by exemplar quotations. The discussion interprets these findings in light of existing research, highlighting the implications for digital resilience and human–technology relations. The article concludes with recommendations for users, educators, creators, and policymakers, as well as a reflection on the broader significance of AI downtime as a form of digital disruption.

THEORETICAL FRAMEWORK

This study applies three complementary theoretical perspectives — *Attachment Theory*, the *Technology Acceptance Model (TAM)*, and *Cognitive Load Theory* — to interpret user responses during the December 2024 *ChatGPT* outage. Each framework highlights a distinct dimension of AI dependency: emotional, functional, and cognitive. Together, they provide a multidimensional lens for understanding how humans react when suddenly deprived of a widely integrated digital technology.

Attachment Theory

Attachment Theory, first developed by Bowlby (1969) to describe emotional bonds between infants and caregivers, has been extended to analyze human connections with objects, brands, and technologies. Scholars argue that people increasingly perceive digital systems not merely as tools but as quasi-social partners, attributing to them human-like qualities of responsiveness, reliability, and even companionship (Kim et al., 2022).

Research on human–AI interaction demonstrates that conversational agents and generative models can elicit affective responses similar to those found in interpersonal relationships. For example, studies of voice assistants reveal that users often describe them as helpful friends or companions, and prolonged use may lead to feelings of attachment (Li et al., 2025). When such systems fail or become unavailable, users may experience emotions comparable to separation anxiety, frustration, or loneliness.

Applying this framework to the December 2024 outage reveals that user expressions of despair, humor, or even loss reflect more than irritation with a malfunctioning service. Instead, they illustrate how generative AI systems occupy emotional niches in users’ lives. Posts lamenting the absence of *ChatGPT* as though it were a ghosting friend demonstrate the affective weight of such attachments. Interpreting these reactions through Attachment Theory highlights how AI reliance has emotional as well as instrumental consequences.

Technology Acceptance Model (TAM)

While Attachment Theory addresses the emotional dimension, the Technology Acceptance Model (Davis, 1989) offers a lens for analyzing functional reliance. TAM argues that two primary factors — perceived usefulness and perceived ease of use — drive adoption and continued use of technology. When users perceive a system as both effective and user-friendly, they are more likely to integrate it into daily practices.

ChatGPT exemplifies these characteristics. Its capacity to generate coherent, context-sensitive responses across diverse domains has made it indispensable to students, educators, professionals, and creatives alike. Studies show that individuals frequently incorporate AI into workflows because it reduces effort, saves time, and increases productivity (Susnjak & McIntosh, 2024). In doing so, they create routines in which the AI becomes not just helpful but necessary.

The December 2024 outage made these functional dependencies visible. Students unable to prepare for exams, employees unable to complete assignments, and users struggling with basic writing tasks all expressed frustration at the disruption of daily routines. Such responses illustrate how perceived usefulness can evolve into structural reliance, creating vulnerabilities when the technology is unavailable. From a TAM perspective, the outage underscores that functional dependence is a natural extension of perceived usefulness — but one that carries risks if alternative skills or backup systems are not maintained.

Cognitive Load Theory

The third perspective, Cognitive Load Theory (Sweller, 1988), addresses the cognitive consequences of AI downtime. This theory posits that human working memory has limited capacity, and that excessive task demands can overwhelm mental resources, impairing learning

and performance. Instructional designers often use the theory to minimize unnecessary mental effort and optimize knowledge acquisition.

In the context of generative AI, Cognitive Load Theory helps explain both the benefits and risks of reliance. By offloading certain tasks — brainstorming, drafting, or information retrieval — AI reduces cognitive load, allowing users to focus on higher-order thinking. However, prolonged reliance on AI can also create dependency, such that users experience difficulty when forced to perform tasks unaided. This aligns with recent findings on “cognitive debt,” in which outsourcing intellectual work to AI may diminish originality, critical thinking, and memory retention over time (MIT Media Lab, 2025; Time, 2025).

The December 2024 outage provided an opportunity to observe this phenomenon in practice. Posts describing difficulty concentrating, humorous exaggerations of incompetence, or efforts to substitute alternative systems illustrate the strain imposed by increased task demands. The cognitive fatigue expressed by users — sometimes masked through humor — reflects how deeply AI had been integrated into cognitive routines. Cognitive Load Theory thus frames the outage as a case of sudden cognitive overload, in which individuals were forced to recalibrate workflows without their usual support structures.

Integration of Frameworks

Individually, these three frameworks shed light on distinct facets of AI dependency. Taken together, they provide a comprehensive model for interpreting user responses to disruption. Attachment Theory explains why outages trigger affective reactions that resemble relational distress. TAM situates these reactions within functional routines that depend on perceived usefulness and ease of use. Cognitive Load Theory highlights the mental strain of sudden adaptation when tasks must be performed without AI assistance.

The integration of these perspectives supports the conceptual model presented later in this article (Figure 1). The model maps the intersection of emotional attachment, functional reliance, and cognitive adaptation, illustrating how AI dependency is multidimensional and interdependent. Emotional bonds may amplify functional reliance, while functional dependence increases the cognitive strain experienced during disruption. Understanding these intersections provides a richer framework for analyzing not only AI outages but also broader dynamics of digital reliance.

METHODOLOGY

This study adopts a qualitative case study design, employing *netnography* to examine user responses during the December 2024 global outage of *ChatGPT*. *Netnography*, an adaptation of ethnographic methods for online environments, is particularly suited for studying social interactions, cultural practices, and meaning-making in digital spaces (Kozinets, 2010). The outage was treated as a bounded case, providing a unique opportunity to observe emotional, functional, and cognitive dimensions of AI dependency as they emerged in real time.

Research Design

Case study methodology allows researchers to investigate complex social phenomena within their real-life contexts (Yin, 2014). The December 2024 outage represents a naturally occurring disruption — a “digital event” — that revealed hidden aspects of human–AI relations.

Netnography was chosen as the primary method because it facilitates the analysis of online discourse while maintaining sensitivity to context and cultural meaning.

Unlike experimental or survey methods that simulate scenarios, *netnography* captures naturally occurring expressions of users grappling with disruption. This design is thus appropriate for the study’s aim of uncovering the emotional, functional, and cognitive dynamics of AI downtime.

Data Collection

Selection of Platform and Thread.

Data were collected from Reddit, a widely used social media platform that fosters community-driven discussions. During the outage, a thread titled “*Is ChatGPT down for all?*” became highly active, generating over 1,200 comments within a few hours. This thread was selected for its direct relevance, immediacy, and diversity of user participation.

Data Extraction

Only textual comments were included. Usernames, metadata, and identifiable details were excluded to protect anonymity. Emoticons, slang, and colloquial language were retained in their original form but contextualized during analysis to preserve meaning.

Inclusion and Exclusion Criteria

Posts were included if they explicitly referenced the outage, described emotional or functional experiences, or mentioned adaptation strategies. Comments unrelated to the outage, such as spam or off-topic discussions, were excluded.

Dataset Size

Approximately 700 unique comments met the inclusion criteria and were analyzed. This sample was sufficient to achieve thematic saturation while maintaining analytical depth.

Data Analysis

Data analysis followed *Braun and Clarke’s (2006)* thematic analysis framework, which is widely applied in qualitative research. The process was iterative and interpretive, involving the following steps:

1. **Familiarization.** All comments were read multiple times to gain an overall sense of tone, context, and emerging patterns.
2. **Initial Coding.** Comments were coded line by line, focusing on emotional expressions.

3. **Theme Development.** Codes were clustered into broader categories.
4. **Theme Refinement.** Themes were reviewed against the dataset to ensure accuracy and representativeness. Overlapping codes were reorganized, and distinct subthemes were identified.
5. **Interpretation.** Themes were interpreted in light of the theoretical framework, supported by exemplar quotations that illustrate user voices.

Coding was done manually to maintain close engagement with the data. This approach allowed for nuanced interpretation of emoticons, humor, and colloquial expressions that automated tools might overlook.

Ethical Considerations

This study adhered to established ethical guidelines for *netnographic* research (Kozinets, 2010). All data were drawn from publicly accessible online discussions. No attempts were made to contact users or access private information. To preserve anonymity, usernames and other identifiers were excluded.

Quotations are reported verbatim, with contextual clarifications added in brackets where necessary. For example, emoticons are described to convey tone (e.g., [crying emoji expressing despair]). Profanities are retained to preserve authenticity but are contextualized.

Because the data were already public and no interventions were conducted, risks to participants were minimal. Nevertheless, care was taken to avoid decontextualization or sensationalism. Findings are presented as collective expressions rather than individualized accounts, ensuring respect for participants' online voices.

Trustworthiness and Rigor

Qualitative rigor was maintained through multiple strategies:

- **Credibility.** Prolonged engagement with the dataset and repeated coding ensured that findings were grounded in user expressions.
- **Dependability.** An audit trail of coding decisions and theme development was maintained, allowing transparency in the analytical process.
- **Confirmability.** Reflexive journaling was used to monitor potential researcher bias, ensuring that interpretations were guided by data rather than assumptions.
- **Transferability.** Thick description of context, platform, and cultural dynamics allows readers to assess the applicability of findings to other digital settings.

Limitations

Several limitations should be acknowledged. First, the dataset was limited to one Reddit thread, which, while rich, may not capture the full diversity of user experiences. Other platforms such as Twitter (X), Discord, or TikTok may have produced different discourses. Second, because the data are self-reported and informal, they may reflect exaggeration, humor, or performative expression rather than literal accounts. Third, the study captures a single event and cannot speak to long-term patterns of dependency. Approximately 700 unique comments were analyzed until no new patterns emerged, indicating that thematic saturation had been achieved and ensuring that

the findings reflect a comprehensive view of user responses within the thread. Despite these limitations, the methodology provides valuable insights into the immediate cultural and psychological dynamics of AI downtime.

FINDINGS

The thematic analysis of Reddit comments during the December 2024 ChatGPT outage revealed three interrelated dimensions of AI dependency: *emotional attachment*, *functional reliance*, and *cognitive adaptation*. These categories align with Attachment Theory, the Technology Acceptance Model (TAM), and Cognitive Load Theory, offering a structured lens to interpret the outage as a case study of AI dependency.

Emotional Attachment

Consistent with Attachment Theory, many users expressed *intense emotional reactions* to the outage. These ranged from frustration and anxiety to loneliness and humor.

- **Anxiety and Frustration.** Users expressed distress when unable to complete urgent tasks: “*Have a project due at midnight, I’m cooked 🤔 [crying emoji expressing despair and stress].*” The emotive symbols highlighted the urgency and vulnerability of users who felt incapacitated without AI support.
- **Loneliness and Loss.** Several comments suggested that ChatGPT functioned as more than a tool, with users framing its absence as relational: “*I actually feel so alone without ChatGPT 😞🙏 [sad face emoji expressing loneliness; folded hands emoji signaling plea or comfort].*” Such expressions illustrate how anthropomorphism of AI can foster companionship-like bonds.
- **Humor as Coping.** Humor emerged as a strategy to manage disruption: “*I thought my AI ghosted me. Like FUCKKK [profanity, intensifier expressing frustration], I have more questions 🤔 [crying emoji, used humorously].*” By framing ChatGPT as a relationship partner who had suddenly disappeared, users softened the anxiety of disconnection through playful exaggeration.

These findings reinforce the claim that AI adoption entails not only instrumental utility but also affective engagement. Outages, therefore, destabilize emotional as well as functional reliance.

Functional Reliance

The outage also revealed the extent of *functional dependency*, aligning with TAM’s emphasis on perceived usefulness. Users frequently reported difficulties in academic, workplace, and creative contexts.

- **Academic Disruption.** Students expressed dependence on ChatGPT for exam preparation and assignments: “*Bro, I need it to help me study for my final.*” This reflects how AI has become embedded in learning routines, often serving as a first-line resource.
- **Workplace Dependence.** Professionals similarly noted productivity losses: “*Everything I do for work takes twice as long without it.*” Another remarked: “*Now I actually have to*

do the homework, LMAO [laughing my ass off, an expression of humor].” The humor masked genuine concern over lost efficiency.

- **Productivity Vulnerability.** Several comments framed ChatGPT as indispensable: “Literally nothing gets done without it.” This blunt admission illustrates how reliance on perceived usefulness can escalate into structural vulnerability.

Together, these findings highlight that AI is not simply a convenience but a critical infrastructure in users’ daily lives. The outage foregrounded the risks of unexamined reliance, raising questions about resilience in education and professional contexts.

Cognitive Adaptation

The third dimension relates to *cognitive strain and adaptation strategies*, consistent with Cognitive Load Theory.

- **Humor and Cognitive Fatigue.** One user joked: “Ugh, I’m gonna have to quit my job or learn how to write gooder[intentionally incorrect form of ‘better,’ used humorously] words now.” The playful misuse of language signaled both fatigue and the recognition of difficulty in performing tasks without AI scaffolding.
- **Seeking Alternatives.** Users actively searched for substitutes, with comments like: “About to cheat on that hoe [slang metaphor for ChatGPT as a partner] with Gemini.” Switching tools required additional effort, reflecting increased cognitive demands.
- **Reluctant Self-Reliance.** Some expressed resignation: “Guess I’ll have to use my own brain for once.” While humorous, this underscored the perceived challenge of reverting to unaided problem-solving.

These patterns indicate that the outage triggered heightened task demands, forcing users to recalibrate workflows and confront the cognitive debt accumulated through AI reliance.

Thematic Synthesis

Together, these findings demonstrate that AI reliance during the outage was simultaneously emotional, functional, and cognitive. The following table summarizes the main themes, subthemes, exemplar quotations, and theoretical mapping.

Table 1. User Responses to the December 2024 ChatGPT Outage: Themes, Subthemes, Exemplar Quotes, and Theoretical Mapping

Theme	Subtheme	Exemplar Quote	Theory Applied
Emotional Attachment	Anxiety & Frustration	“Have a project due at midnight, I’m cooked 🤔 [crying emoji expressing despair and stress].”	Attachment Theory
	Loneliness & Loss	“I actually feel so alone without ChatGPT 😞👐 [sad face emoji; folded hands emoji, signaling plea or comfort].”	Attachment Theory
	Humor as Coping	“I thought my AI ghosted me. Like FUCKKK [profanity, intensifier expressing frustration], I have more questions 🤔 [crying emoji, used humorously].”	Attachment Theory

Theme	Subtheme	Exemplar Quote	Theory Applied
Functional Reliance	Academic Disruption	"Bro, I need it to help me study for my final."	Technology Acceptance Model (TAM)
	Workplace Dependence	"Now I actually have to do the homework, LMAO [<i>laughing my ass off, an expression of humor</i>] ."	TAM
	Productivity Vulnerability	"Everything I do for work takes twice as long without it."	TAM
Cognitive Adaptation	Humor & Cognitive Fatigue	"Ugh, I'm gonna have to quit my job or learn how to write gooder [<i>intentionally incorrect form of 'better,' used humorously</i>] words now."	Cognitive Load Theory
	Seeking Alternatives	"About to cheat on that hoe [<i>slang: derogatory term, here used metaphorically to personify ChatGPT as a partner</i>] with Gemini."	Cognitive Load Theory
	Reluctant Self-Reliance	"Guess I'll have to use my own brain for once."	Cognitive Load Theory

Note. Quotes are anonymized but presented verbatim, with clarifications added in brackets where necessary. Theoretical mapping aligns with Attachment Theory (Bowlby, 1969), the Technology Acceptance Model (Davis, 1989), and Cognitive Load Theory (Sweller, 1988).

As illustrated in Figure 1, these three dimensions intersect to form a multidimensional model of AI dependency.

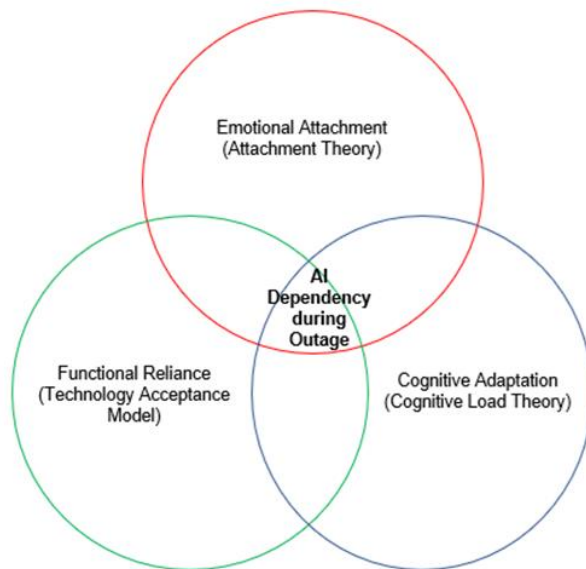


Figure 1. Conceptual model of AI dependency during the December 2024 ChatGPT outage, illustrated as overlapping emotion, functional, and cognitive dimensions.

To further illustrate the dynamics of these relationships, a process model is also provided. Figure 2 highlights the directional flows among the three dimensions: emotional attachment fuels functional reliance; functional reliance increases vulnerability to cognitive strain; and cognitive adaptation feeds back into emotional attachment.

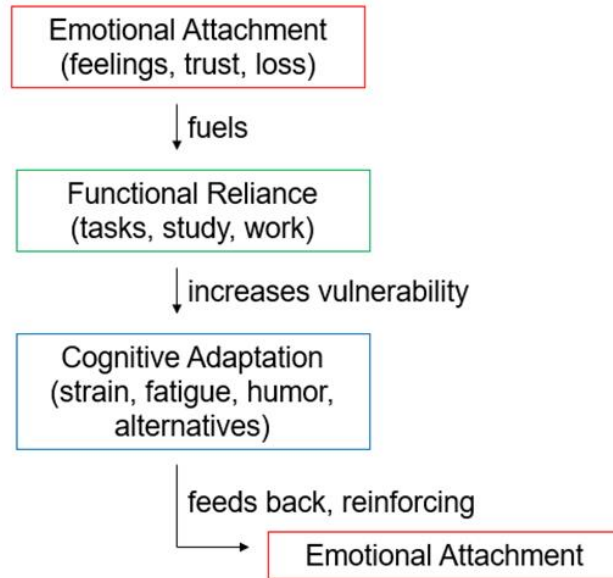


Figure 2. Process model of AI dependency during the December 2024 ChatGPT outage, showing directional relationships among emotional attachment, functional reliance, and cognitive adaptation.

Figures 1 and 2 together show that AI dependency is both overlapping (multidimensional) and cyclical (dynamic). While the Venn diagram emphasizes the interrelatedness of emotional, functional, and cognitive dimensions, the arrow model demonstrates how these dependencies reinforce one another during disruption. This synthesis provides the foundation for the discussion that follows.

DISCUSSION

The December 2024 ChatGPT outage provided a natural experiment for exploring the hidden dynamics of human reliance on generative AI. Unlike most prior studies that rely on hypothetical scenarios or survey-based simulations, this study leverages a naturally occurring global outage as a real-time stress test. This natural experiment provides rare empirical evidence of how AI dependency unfolds under actual disruption, extending current debates beyond speculation into observed behavior. By analyzing Reddit discourse during this disruption, this study contributes to a deeper understanding of how AI has become emotionally, functionally, and cognitively embedded in everyday life. The findings, structured around Attachment Theory, the Technology Acceptance Model (TAM), and Cognitive Load Theory, demonstrate that AI downtime is experienced as more than a technical inconvenience. It is a socio-psychological disruption that reveals the vulnerabilities and adaptive strategies of digital culture.

Interpreting Emotional Dependency through Attachment Theory

The intensity of affective reactions underscores the explanatory power of Attachment Theory in analyzing human–AI relationships. Users expressed anxiety, loneliness, and humor not merely as responses to malfunction but as relational responses to the absence of a quasi-partner. Similar to

the way children experience separation anxiety or adults feel distressed during relational disconnection, users interpreted ChatGPT’s unavailability as abandonment or loss.

Prior research on anthropomorphism suggests that when technologies are perceived as “social actors,” they elicit emotions akin to those directed at humans (Kim et al., 2022). This study extends such insights by demonstrating how attachment becomes most visible under conditions of disruption. Humor, often a coping mechanism for stress, reinforced rather than minimized the perception of AI as a partner whose absence required emotional management. These findings highlight the need to consider emotional resilience in digital contexts, where dependence on AI companions may exacerbate feelings of vulnerability during outages.

Functional Vulnerabilities and the Technology Acceptance Model

From the perspective of TAM, the outage revealed how perceptions of usefulness and ease of use had translated into structural reliance. Students, educators, and professionals all described tasks that could not be completed without ChatGPT. This functional dependence is not surprising: research consistently shows that when technologies are perceived as indispensable, they are integrated into routine practices (Davis, 1989; Susnjak & McIntosh, 2024).

Yet, this integration creates vulnerabilities. The same qualities that encourage adoption — convenience and efficiency — also foster overreliance. The outage made clear that AI had shifted from an optional aid to an essential infrastructure in education and work. This supports arguments that organizations and institutions must consider contingency planning when integrating AI into workflows (Financial Times, 2025). For students, overdependence risks undermining learning outcomes, while for professionals it may lead to productivity bottlenecks during system failures.

By reframing TAM in the context of disruption, this study demonstrates that the drivers of adoption can also be sources of fragility. This duality complicates the assumption that adoption is always beneficial, showing instead that seamless integration may mask latent risks.

Cognitive Strain and Adaptation: Insights from Cognitive Load Theory

Cognitive Load Theory provides further insight into user strategies during the outage. Without the scaffolding provided by ChatGPT, individuals reported increased difficulty, fatigue, and stress. Humor was again deployed, not only as emotional relief but also as acknowledgment of cognitive overload. Attempts to switch to alternative AI systems, such as Gemini, reflect adaptive strategies that nevertheless required additional cognitive effort.

These findings resonate with emerging research on “cognitive debt,” which suggests that habitual reliance on AI can erode independent problem-solving and originality (MIT Media Lab, 2025; Time, 2025). When AI is suddenly unavailable, the accumulated debt is “called in,” leaving individuals struggling to perform tasks unaided. The outage thus served as a real-time demonstration of how cognitive dependencies develop and how individuals adapt under strain.

The implications are significant for educators and policymakers. If AI reduces cognitive load in ways that foster dependency, then curricula and policies must ensure that users maintain baseline competencies. Without such safeguards, societies risk producing individuals who are less capable of functioning independently in the absence of AI.

AI Downtime as a Socio-Psychological Event

One of the most important contributions of this study is to reframe AI downtime as a socio-psychological event rather than a purely technical problem. Users' responses highlight that outages destabilize multiple layers of daily life: emotional attachment, functional reliance, and cognitive processing. This multidimensional disruption reveals the deep embedding of AI in culture and society.

By situating the outage within broader debates about digital resilience, this research underscores that resilience must be conceptualized not only in technical terms but also in human terms. Designing robust infrastructures is essential, but so is fostering user capacities to adapt emotionally, functionally, and cognitively when systems fail. Without such preparation, societies risk cascading effects when critical AI systems become unavailable.

Implications for Theory

The findings also carry implications for the theoretical frameworks themselves. Attachment Theory, traditionally applied to interpersonal relationships, proves useful for analyzing technological attachment but may require refinement to account for humor, irony, and other mediated expressions. TAM remains valuable for explaining adoption, but this study suggests extending the model to include *disruption effects* — how usefulness and ease of use lead to vulnerabilities in moments of failure. Cognitive Load Theory highlights the importance of offloading and overload, but the concept of *cognitive debt* pushes the theory toward longitudinal considerations of reliance and resilience.

Integrating these frameworks demonstrates the value of multidimensional approaches to human–AI relations. Rather than viewing dependency through a single lens, this synthesis captures the interplay of emotions, functions, and cognition in ways that better reflect lived experience.

Implications for Application and Policy

The study has clear implications for users, educators, developers, and policymakers. For users, it highlights the need to cultivate adaptive strategies that balance reliance on AI with independent critical thinking. For educators, it underscores the importance of integrating AI into curricula as a supplement rather than a substitute, with explicit attention to skill retention. For developers, it calls for robust infrastructures and ethical design practices that mitigate overattachment. For policymakers, it signals the need for guidelines that address not only data privacy and fairness but also the cultural and psychological impacts of widespread AI use.

Implications for Theory, Application, or Policy

The December 2024 ChatGPT outage illustrates how AI downtime functions as a socio-psychological disruption that exposes the depth of human–technology dependency. Theoretically, the study extends Attachment Theory, TAM, and Cognitive Load Theory by demonstrating how they intersect in conditions of disruption. Application-wise, the findings suggest that users and educators must foster resilience by balancing AI reliance with independent competencies. Developers are encouraged to design systems that are transparent, robust, and

attentive to emotional as well as functional impacts. At the policy level, regulators should address not only technical standards but also the social and cognitive vulnerabilities associated with AI integration. Together, these implications underscore the need for holistic approaches that consider human well-being, functional continuity, and cultural adaptation in the era of generative AI. In practical terms, this means educators might require occasional “no-AI assignments” to safeguard critical thinking, while organizations could develop explicit “AI downtime protocols” to ensure continuity of essential functions during disruptions.

CONCLUSION

The December 2024 global outage of ChatGPT offered a rare opportunity to observe how people respond when a widely used AI system suddenly becomes unavailable. By analyzing Reddit discourse during this disruption, this study revealed that dependency on generative AI is not limited to instrumental use but extends across *emotional, functional, and cognitive dimensions*. Users expressed feelings of anxiety and loneliness, reported significant disruptions in academic and professional tasks, and demonstrated cognitive strain as they attempted to adapt.

Interpreted through the lenses of *Attachment Theory*, the *Technology Acceptance Model (TAM)*, and *Cognitive Load Theory*, these findings highlight the multidimensional nature of AI reliance. Emotional bonds with AI systems amplified distress during downtime, functional integration created vulnerabilities in education and work, and cognitive offloading fostered dependency that became visible when users were forced to operate without support. Together, these dimensions underscore that AI has become structurally embedded in daily routines, shaping not only how individuals work and learn but also how they feel and think.

The study contributes to scholarship on human–technology relations by reframing AI downtime as a *socio-psychological event* rather than a purely technical failure. This perspective enriches current debates by demonstrating that resilience must be understood in human terms as well as technical ones. The emotional, functional, and cognitive strains observed here suggest that societies cannot treat outages as trivial inconveniences. Instead, they should be recognized as events that test the depth of integration between humans and intelligent systems.

Several practical implications follow. *For users*, the findings stress the importance of cultivating adaptive strategies, such as diversifying digital tools and maintaining offline competencies. *For educators*, the results highlight the need to position AI as a supplement to — not a substitute for — critical thinking and creativity. *For developers*, the outage underscores the ethical responsibility to design robust and transparent systems that minimize disruption and reduce the risks of overattachment. *For policymakers*, the findings demonstrate the necessity of guidelines that account for the psychological and cognitive consequences of AI dependency, not only its technical reliability.

The study also points toward future research. While this analysis focused on a single event, comparative studies across platforms, user groups, and contexts could deepen our understanding of how dependency unfolds in different cultural and institutional settings. Longitudinal research may also explore the cumulative effects of AI reliance, particularly the concept of *cognitive debt*. Experimental designs simulating outages could provide further insights into adaptation strategies, while cross-cultural netnographies might highlight variations in how societies manage technological disruption.

Ultimately, the December 2024 outage demonstrates that generative AI has moved from the margins of technological life to its center. Outages are no longer minor interruptions but *stress tests* that reveal the vulnerabilities of digital culture. Recognizing dependency as multidimensional provides a foundation for developing strategies that balance the benefits of AI with safeguards for autonomy, resilience, and well-being. By situating AI downtime as both a technical disruption and a socio-psychological event, this study advances our understanding of the human dimensions of technology use. It reminds us that in a world where intelligent systems increasingly shape thought, work, and emotion, resilience cannot be measured solely in uptime or server strength. It must also be measured in the capacity of humans — as individuals, communities, and societies — to adapt, reflect, and sustain themselves when the systems they rely on go silent. This includes practical steps such as educators introducing “no-AI assignments” to preserve critical thinking and organizations developing “AI downtime protocols” to maintain continuity during future disruptions.

ETHICAL CONSIDERATIONS AND DECLARATION OF GENERATIVE AI USE

This study adhered to established ethical standards for online and *netnographic* research (Kozinets, 2010). Data were drawn exclusively from a publicly accessible Reddit thread that became active during the December 2024 ChatGPT outage. Because the content was openly available and participation was voluntary, the dataset was treated as part of the public domain.

To protect participant privacy, no usernames or personally identifiable details were recorded. Only textual content relevant to the research questions was analyzed. Emoticons, slang, and colloquial expressions were retained to preserve authenticity but were accompanied by clarifications in brackets where necessary to ensure accurate interpretation. Profanities were reported verbatim to maintain the integrity of user voices but were contextualized to avoid sensationalism.

The analysis prioritized respectful representation of users’ perspectives. Rather than treating posts as individual profiles, the study interpreted them as collective expressions of experience during technological disruption. Findings are presented thematically, with exemplar quotations used to illustrate broader trends. No attempt was made to contact participants or intervene in discussions. Because the research relied on data already in the public domain and involved no interaction with human subjects, risks to participants were minimal.

During the preparation of this manuscript, the author used ChatGPT to assist with language refinement and structural clarity. The tool was applied for purposes such as polishing grammar, enhancing readability, and reorganizing draft sections. All substantive decisions regarding research design, analysis, interpretation, and conclusions were made by the author. After using AI assistance, the author carefully reviewed, edited, and verified the content to ensure accuracy and scholarly integrity. Full responsibility for the final version of the manuscript rests with the author.

FUNDING AND CONFLICT OF INTEREST STATEMENT

This research received no external funding. The author declares no conflicts of interest.

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