Democratizing the Internet: A Care Ethics Analysis in Establishing the World Wide Web

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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

When thinking of who sparked widespread information and documentation with their invention of the Printing Press, Johannes Gutenberg comes to mind without hesitation. However, when the Printing Press is replaced with the World Wide Web, Tim Berners-Lee is not nearly as recognized in such a similar context. This stark difference may be due to educational structure or the name, "Gutenberg Press," but most likely, the cause is Berners-Lee's care for society.

In 1993, when Berners-Lee invented the World Wide Web, he made conscious efforts not to monetize his invention and make it accessible to all. Scholars who have analyzed his ethical decision have used virtue ethics, molding him into a hero, even though the computing field asserts care as fundamental for ethical decision-making in computing. While care is also a virtue in itself, scholars' views are limited as they have yet to prioritize care as the singular lens of ethical interpretation for Berners-Lee's action. It is essential to include care ethics in the research of Berners-Lee's invention because care ethics is centered around the importance of relationships and care in ethical decision-making, and his invention embodies the connection of people through information access. As a result, neglecting care ethics in research of Berners-Lee could lead to an incomplete understanding of the ethical implications embedded in the World Wide Web's design–a significant invention whose influence potentially rivals the printing press.

Tim Berners-Lee's conscious decision to democratize his invention of the World Wide Web is ethical through the care ethics framework because he exhibited attentiveness, responsibility, and competence. The care ethics framework attributes care through relationships, such as Berner-Lee's care in his asymmetrical relationship with society, as the driving force for ethical decision-making and defines care as a process of attentiveness, responsibility, and competence. Using this framework, I will specifically analyze Berner-Lee's book, interviews,

press releases, and personal accounts, which all officially document the World Wide Web's inception to construct Berner-Lee's stages of care and thus argue for morality in his actions.

Background

The Internet was originally developed in the 1960s when the United States Department of Defense researched a way to connect computers to enhance communication and information sharing among researchers and scientists (CERN, n.d.). In 1989, while working at the European Council for Nuclear Research (CERN) in the particle physics laboratory, a British computer scientist, Tim Berners-Lee, made a scientific breakthrough. He proposed a system for organizing and accessing information over the Internet, which he called the World Wide Web (CERN, n.d.). The Internet and World Wide Web differ in that the Internet existed prior and is the global network of computers that enables the transfer of information and communication across vast distances, whereas the World Wide Web leverages this technology to make information accessible to everyone by linking together documents in Berners-Lee's proposed manner since 1991.

Literature Review

While many scholars agree that computer scientist Tim Berners-Lee is virtuous and his conscious decision to make the Internet public benefitted many, scholars have yet to consider Berners-Lee's democratic heroism under a care ethics lens. Their works recognize society's relationship with Berners-Lee, precisely their admiration and praise for his decisions, and the importance of care ethics in software development. However, they neglect how the care obligations in Berner-Lee's societal relationship drove his ethical decision-making and expanded care ethics' importance in software through exemplifying practical care.

In Chapter 2 of the *Internet Myth*, Paolo Bory equates Berners-Lee to a mythological hero for not democratizing the World Wide Web. In Bory's argument, he relies heavily on a virtue ethics framework attributing heroic virtues, such as "humble," "altruistic," and "open-minded," to Berners-Lee as an inventor (Bory, 2020). He perpetuates his analysis of Berners-Lee's virtues by citing other scholars, such as Katie Hafner, who also describes Berners-Lee as a "hero" who is "not just creative but democratic, diplomatic, polite, and generous with credit and praise" (Hafner, 1999). After diving deeper into the virtues that constitute Berner-Lee's strong morals and altruistic decision-making, Bory continues his argument for Berner-Lee's heroism by equating his development to the traditional mythological hero's journey. Bory briefly mentions Berners-Lee's duty towards the good of humanity but does not analyze this relationship as a driving force and likewise Berners-Lee's care as his central virtue. Altogether, Bory's argument supports Berners-Lee as a man of high ethics due to his autonomy in open-sourcing the Internet; however, Bory, as well as scholars such as Hafner, does not extensively explore Berners-Lee's virtue of care, relationships, and specifically how care ethics guide his strong morality.

Nick Seaver's *Care and Scale: Decorrelative Ethics in Algorithmic Recommendation* pinpoints care as the most important virtue to uphold when scaling software. He illustrates care's foundation in software development ethics by highlighting the care and lack thereof, specifically in algorithmic recommendation. Seaver asserts that scale directly opposes care and argues ethical decision-making in algorithmic recommendations requires balancing these competing values. Care, in this case, is the same virtue in care ethics–the ethical obligation to uphold respect and dignity between the engineer and their relationships, whereas scale is growing a technology. Seaver acknowledges that many scholars and scientists believe human care cannot be scaled,

which heightens its importance for Seaver and pushes him to propose an ethical framework, "decorrelative ethics," that balances and upholds care amidst scale (Seaver, 2021). This framework prioritizes care ethics over scaling by adopting a collaborative and interdisciplinary approach, considering social and cultural contexts, and incorporating attentiveness, responsibility, and competence when developing and deploying software (Seaver, 2021). Essentially, the framework is the application of care ethics in software development to eliminate bias, discrimination, and inequality in technology. Seaver's work establishes care as a prominent virtue in software ethical decision-making but fails to demonstrate care in practice, only the absence of it.

Bory's article confirms that Berner-Lee's actions are morally ethical, primarily under virtue ethics, and cements Berner-Lee's heroism. This view from many scholars overlooks Berner-Lee's virtue of care which Seaver argues is a crucial virtue for software engineers through absent care in the recent development of algorithmic recognition. Drawing on Seaver's attention to care, my argument connects care ethics to Berner-Lee's development of the World Wide Web under the perspective that care is his primary virtue. This argument advances the research of ethics in computing by addressing a different perspective on Berner-Lee's strong morality and exemplifying ethical decision-making prioritizing care in software development, which, together, elevates care ethics' established importance in this field.

Conceptual Framework

My analysis of Tim Berners-Lee's immediate efforts to maximize the Internet's accessibility draws on the care ethics framework, which allows me to argue for his morality through his demonstrated care in his relationship with society. Care ethics was inspired by the works of Carol Gilligan in 1982, in which her theory centers around the belief that morals and

ethics are not derived from learning general moral principles but instead emphasize the importance of relationships (van de Poel & Royakkers, 2011). Under this theory, "moral problems are first and foremost in terms of the responsibility of an individual with respect to the group" (van de Poel & Royakkers, 2011), and thus, care encompasses all human interactions that continue, maintain, or repair our world (Tronto, 1998). Relationships in which care manifests are not always symmetrical, and as a result, asymmetrical relationships, such as parent-child or inventor-user, influence care differently based on the degree of imbalance in the relationship.

Care is commonly established as responsibility drawn out from relationships, but Fisher and Tronto further define care so that it can be discerned in practice. They break care down into a process with four intertwining stages–"caring about," "taking care of," "caregiving," and "care-receiving" (Fisher & Tronto 1990). "Caring about" entails attentiveness to others in need of care. "Taking care of" labels the responsibility for others' needs. "Caregiving" is the competence to act upon others with good and successful care. Additionally, "care-receiving" responds to the care action provided through acknowledgment or appreciation (Fisher & Tronto 1990). When defining care in care ethics, it is also important to distinguish that care is both a mental disposition of concern as well as the action taken (Tronto, 1998). My argument draws on care in practice, analyzing Berners-Lee's relationship with society and its influence on distinct actions that exhibited three of the four care stages–attentiveness, responsibility, and competence–thus constituting morality under the care ethics framework.

Analysis

The very first principle of the Association for Computing Machinery (ACM) *Code of Ethics and Professional Conduct* states, "A computing professional should [c]ontribute to society

and to human well-being, acknowledging that all people are stakeholders in computing" (ACM, 2018). This written rule demonstrates the inherent responsibility and relationship computing professionals have towards society's care. This code "serves as a basis for ethical decision-making" (ACM, 2018), exemplifying care ethics as a widely accepted framework for assessing morality in computing. Care ethics specifically determines morality through analyzing care in which the caregiver follows a multiple-stage process: The three caregiver steps are "caring about"–attentiveness to others' needs, "taking caring of"–responsibility for others' needs, and "caregiving"–competence with good and successful care. In designing the revolutionary World Wide Web, Tim Berners-Lee's conscious decision to democratize his invention is driven by his asymmetrical relationship with society. Within this analysis, I will demonstrate how his deliberate efforts exhibit attentiveness, responsibility, and competence, which constitute the care process and, thus, ethical decision-making under the care ethics framework.

Attentiveness

Berners-Lee acted ethically in democratizing the World Wide Web by demonstrating attentiveness evidently through consideration for the needs of the World Wide Web's users in its initial design, specifically for physically and socially marginalized groups. Berners-Lee immediately recognized the importance of designing webpages accessible for people with physical disabilities, such as those who are blind or visually impaired. In a 1997 press release, he stated, "The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect" (World Wide Web Consortium, 1997), demonstrating explicit attentiveness to the needs of people with disabilities. Using the word "power" gives his invention autonomy, which establishes Berners-Lee's recognition of his invention's implications. More specifically, he understands the World Wide Web maximizes society's benefits when accessibility is at its

highest. This understanding pushes Berners-Lee to not just consider everyone "regardless of disability" but view their access as an "essential aspect." Here, Berners-Lee considers the needs of physically disabled groups in forming his technology and therefore exhibits attentiveness.

In addition to expressing equal access physically, Berners-Lee directly addresses the needs of socially or economically marginalized groups in his creation of the World Wide Web. In his personal book, he stated:

> "The Web is more a social creation than a technical one. I designed it for a social effect — to help people work together — and not as a technical toy. The ultimate goal of the Web is to support and improve our web-like existence in the world. We clump into families, associations, and companies. We develop trust across the miles and distrust around the corner. What I wanted to do was make the Web such that it was more like that: decentralized, individualist, and even anarchic. The Web should be a tool for freedom, not a tool of control" (Berners-Lee & Fischetti, 1999).

Berners-Lee's use of words such as "decentralized," "individualist," and "anarchic" directly oppose words describing figures of power such as "centralized," "group," and "government." He perpetuates this notion of universality by describing his tool's purpose for "freedom" and not "control." Freedom distributes autonomy to all, whereas control assigns autonomy to the powerful. Berners-Lee's rhetoric expresses concern for underrepresented groups to be given equal access to the World Wide Web over groups of power, such as the government, who were the original owners of the Internet. By recognizing the social implications of his technology and the effects on individuals directly, Berners-Lee exercises attentiveness. Altogether, Berners-Lee expresses attentiveness to the needs of both those marginalized physically and those socially by recognizing how his technology's societal implications address society's needs.

Responsibility

Berners-Lee's care and resulting morality are further solidified through demonstrating clear responsibility toward the needs of others, particularly those physically and those socially

disabled, by engaging and communicating with representing stakeholders. In advocating for accessibility for people with disabilities to the World Wide Web, Berners Lee worked directly with disability rights groups to develop guidelines for accessible Web design. Additionally, he encouraged the adoption of these guidelines across the industry, specifically stating, "The Web is for everyone, and collectively we hold the power to change it. It won't be easy. But if we dream a little and work a lot, we can get the Web we want" (Berners-Lee, 2019). Here, he establishes engagement with stakeholders using words such as "we," "collectively," and "everyone." These words create a collaborative effort that includes marginalized groups in developing the World Wide Web. Acting on this "dream," Berners-Lee specifically established the Web Consortium (W3C), and underneath it, the Web Accessibility Initiative (WAI) in 1994 to work collaboratively towards accessibility through carefully crafted guidelines (World Wide Web Consortium, 1997). WAI's mission from 2004 explicitly states it "welcomes volunteers to review, implement, and promote guidelines" (W3C, 2004). This desire for diverse perspectives to not just make suggestions but have equal autonomy in core operations, such as "review," "implement," and "promote," perpetuates Berners-Lee's responsibility by involving relevant stakeholders.

Furthermore, in founding W3C, Berners-Lee also combated the original risk that the World Wide Web would become fragmented by competing proprietary technologies. W3C ensures that the World Wide Web would remain open and accessible to everyone socially by developing common standards for the Web. Berners-Lee recognized the importance of engaging with a broad range of stakeholders in this process, including representatives from industry, academia, and civil society. In regards to the stakeholders, he states, "We have a responsibility to ensure that the Web serves humanity and empowers all of us, from the least connected individual to the largest commercial and government organizations. This is why we need the Web to be

open, interoperable, and accessible to all" (Berners-Lee, 2019). In this quotation, Berners-Lee draws the stark comparison between the "least connected individual" to the "largest commercial and government organizations. The difference in these parties is drawn out by the use of opposite absolutes, such as "least" and "largest" and "individual" and "groups." By using contradicting definitive language, Berners-Lee establishes a massive disparity, which emphasizes his earlier stated importance of "ensur[ing] that the Web serves humanity and empowers all of us." Appealing to individuals and reusing collaborative language demonstrates his involvement with stakeholders to deliver in response to the need he recognizes. By not only addressing different groups at play but actually bringing these groups together with W3C's establishment, Berners-Lee was able to create a shared vision for the World Wide Web and ensured that its development was guided by a commitment to accessibility. Berners-Lee's work in building consensus and collaboration while developing the World Wide Web, his advocacy for open standards, and his engagement with marginalized communities all reflect his responsibility to care for truly all users of the World Wide Web.

Competence

Berners-Lee's decision-making is ethical because he exhibits the final step for the caregiver in the care process, which is competence demonstrated by his implementation of good features that successfully include all groups. One of the most significant contributions made by Berners-Lee is the use of HyperText Transfer Protocol (HTTP), commonly known as hyperlinks.
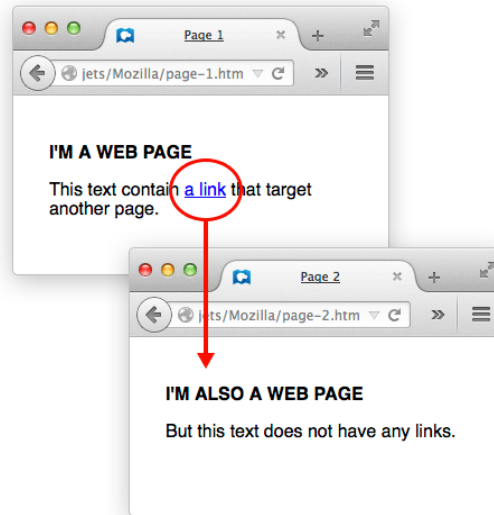
Figure 1: Diagram showing how hyperlinks connect documents

Hyperlinks enable users to navigate the Web without needing to use a mouse. This tool is particularly helpful for individuals with physical disabilities, particularly those with motor impairments, those who may not be able to use a mouse, or those who have difficulty navigating the Web (GCFGlobal, n.d.). Additionally, Berners-Lee also introduced HyperText Markup Language (HTML) coding, which also enabled easy navigation using the keyboard. With just a keyboard, Berners-Lee's designs allowed any user to access any webpage. Both these technologies are visualized in Figure 1, which demonstrates the simplicity of navigating through hyperlinks and how HTML coding sets up webpages and consequently makes everything accessible with just a keyboard. As the image demonstrates, using a screen reader or moving through the page with a keyboard alone allows all users to simply access a hyperlink coded with HTML giving access to any page on the internet for any person. Berners-Lee confirms that these were the technologies' intentions in a personal account of his discoveries by stating, "HyperText Markup Language (HTML) and HyperText Transfer Protocol (HTTP) published on the first server in order to promote wide adoption and discussion" (Berners-Lee, 1998). This establishes

that these technologies were developed for inclusion, and he further supports this claim by explaining how they succeed in this intention by affirming, "The dream behind the Web is of a common information space in which we communicate by sharing information. Its universality is essential: the fact that a hypertext link can point to anything, be it personal, local or global, be it draft or highly polished" (Berners-Lee, 1998). Here, using the word "dream" to describe the purpose of his invention illustrates his deliberate intentions to make the Web a common space. He then demonstrates his success in this area by denoting universality as "essential" and attributes hyperlinks and consequently HTML coding as the tools that make this possible.

In addition to hyperlinks, Berners-Lee leveraged a variety of other tools and practices made possible by HTML coding, which successfully implement accessibility in his design. He encouraged alt tags that provide a text description of an image that can be read by screen readers for individuals who are blind or visually impaired (GCFGlobal, n.d.). Similarly, Berners-Lee's HTML coding also allows for the use of captions and subtitles, making videos accessible to individuals who are deaf or hard of hearing (GCFGlobal, n.d.). Another important feature implemented by Berners-Lee is the ability to resize text. This feature particularly aids individuals with visual impairments who may require larger text to read comfortably (GCFGlobal, n.d.). Furthermore, in the past, Internet users had to remember each entire and specific Web address, which was time-consuming and limited access to websites. With Berners-Lee's invention, clickable hyperlinks, users no longer had to memorize links, and website owners could easily create their own links. As a result, Berners-Lee made the World Wide Web more accessible, reaching those who may not have the tech experience, knowledge, or expertise that was associated with higher socio-economic class. Berners-Lee's emphasis on Web standards and

accessibility guidelines with effective features have successfully made the Web more accessible to all users and thus demonstrate good and successful care.

Berners-Lee's incorporation of features that help increase accessibility to the World Wide Web for all represents good and successful care and thus argues for Berners-Lee's morality. However, many people notice Berners-Lee's presence in still advocating for equality online and argue that his care might not truly be sufficient because the care efforts that exist today may indicate that his original care was not entirely successful. While it is true that there are still marginalized communities who do not have equal access to the Internet, it is unfair to dismiss Berners-Lee's contributions as unsuccessful. Berners-Lee's work on Web accessibility has significantly improved the Web's inclusivity and made it easier for many individuals with disabilities to access online resources. Without Berners-Lee's contributions, the Internet would be significantly less reliable. He explicitly states, "[The World Wide Web] changes the way people live and work. It changes things for good and for bad. But I think, in general, it's clear that most bad things come from misunderstanding, and communication is generally the way to resolve misunderstandings" (Laningham, 2006). Here, Berners-Lee acknowledges unanticipated outcomes can still arise from the Internet but not from his contributions. The "bad" described in the quotation is apparent in that there are still significant barriers to Internet access for many individuals and communities. However, these barriers include issues, such as a lack of infrastructure, high costs, and limited digital literacy. Marginalized communities, including low-income households and rural areas, often lack access to high-speed Internet and may not have the financial means to purchase the necessary technology to connect to the Internet. All of these obstacles are not attributed to the result of the care that Berners-Lee gave. The care Berners-Lee provided was successful in that his invention's design itself gave the opportunity for

all to have equal access to the Internet, and while he still advocates for accessibility, it is not prompted by his original decision-making.

Conclusion

Tim Berners-Lee's efforts to democratize his invention, the World Wide Web, are driven by care through an asymmetrical relationship with society. His actions demonstrate attentiveness by considering the public, including those physically or socially marginalized, responsibility by engaging with stakeholders representing both target groups, and competence by building features designed with the consultation of these groups. By exhibiting attentiveness, responsibility, and competence and fulfilling the care process under the care ethics framework, Tim Berners-Lee's conscious decision to democratize the World Wide Web was ethical. The analysis of Berners-Lee's action under care ethics is crucial because the World Wide Web has a substantial impact on how people connect with each other and access information. As a result, his design decisions have a direct impact on people's relationships and ability to extend care to each other. Without understanding how care is central to Berners-Lee's vision, the knowledge of the World Wide Web's ethical implications is limited. Furthermore, applying care ethics, a critical foundation to computing ethics, to a central example of moral software decision-making spreads awareness and inspires software engineering practice to include increased and improved care-driven, ethical decision-making.

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