

Digital humanities analysis from the perspective of virtual communities

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Abstract: As an innovation engine for the humanities, Digital Humanities is typically described as a research and teaching practice that integrates computer information technology with academic endeavors in the humanities. This article attempts to define Digital Humanities from the perspective of virtual communities and explores the significance of this conceptual approach. Within the context of virtual communities, Digital Humanities constitutes an online virtual space for the scientific community; while foundational tools must be ensured, only by establishing effective connectivity and interaction between the online and offline worlds—and thereby achieving the interconnection and convergence of virtual and real-world communities—can a closed-loop ecosystem for Digital Humanities ultimately be realized.

Keywords: Virtual communities, Digital humanities, Ecological closed loop

1. Introduction

In the Internet era, the power of online media has reshaped social connections. Through mechanisms such as sharing, commenting, private messaging, and hyperlink citations, individuals and organizations can gather in virtual spaces based on shared interests. Digital humanities represent a new academic community that utilizes the Internet and social media to showcase and define itself; it also constitutes a novel form of collaboration aimed at "constructing contemporary knowledge systems and cognitive frameworks through a 'new technological perspective' " [1], with its essence lying in the formation of a knowledge community within virtual communities. The integration of resources across nations and disciplines facilitated by the development of the Internet has made virtual communities within scientific communities the norm; consequently, digital humanities have been liberated from the constraints of mere digital methodology and tool-centric approaches, shifting instead toward the sharing, preservation, and transmission of digitally enabled knowledge concerning the ontologies of research subjects. Currently, the ambitions of digital humanities research have far exceeded the scope of methodological innovation; employing the research dimension of virtual communities to analyze digital humanities not only aligns with the developmental trends of the field but also offers a potential pathway to addressing the challenges currently confronting digital humanities.

2. The scientific community and virtual communities

2.1. Scientific community: the prototype of virtual communities

Like the concept of a community, virtual communities are also defined by their categorical framework. The virtual community category examined in this paper pertains solely to the domain of knowledge—specifically, scientific communities within virtual spaces. The term "scientific community" originally referred to the knowledge communities formed by European intellectuals during the 17th and 18th centuries; in the modern sense, it generally denotes the "invisible university" [2]. Tracing its conceptual origins, the scientific community can be regarded as the prototype of a virtual community. Following the global integration of early knowledge communities via the Internet, a new type of virtual scientific community—one dedicated to the creation and dissemination of knowledge—emerged. Both scientific

communities and virtual communities rely on the study of the fundamental structure of social communities, and they are inseparable from the role of the Internet, as well as the institutional and economic foundations underlying human behavior in forming these communities.

2.2. Early definitions and controversies regarding virtual communities

As early as 1993, Howard Rheingold first defined virtual communities: when a sufficient number of people engage in prolonged public discussions online, social aggregation occurs, accompanied by adequate social interaction, giving rise to an interpersonal network within cyberspace. [3] During the era when the Internet was not yet widely adopted, computer technology could not yet create the virtual space necessary for forming a community. As a result, scholars at the time questioned whether the Internet would undermine the development of communities rather than give rise to new communal spaces; some also doubted whether new virtual communities could foster the same kind of close relationships as offline communities. [4] For this reason, early research on "virtual communities" on the Internet largely focused on the use of specific tools—such as email and chat rooms. Indeed, computer-based tools were a prerequisite for virtual communities; however, obtaining these tools at that time did require certain socio-economic conditions—such as owning a computer, having access to the Internet, and possessing the requisite knowledge to utilize these tools. Yet, even with such tools, could a "community" necessarily be formed?

2.3. The shift from instrumentalism to social relations

A community, as a collective entity, should first and foremost embody social relationships. As social animals, humans inevitably develop attachments to communal life and engage in social interactions. Secondly, such a community must possess a certain scale and sense of ritual; individuals within this community can be connected through shared value bonds.[5] Consequently, with advancements in technology, the human-centric aspects of communities have begun to break free from the constraints of instrumentalism; thus, the focus of virtual community research has gradually shifted from the "virtual" to the "community," and from "technological infrastructure" to the "process" —distinguishing them from virtual populations found in conventional cyberspace. Simply put, a virtual community is a collective entity formed by individuals who, based on shared interests or goals, utilize the Internet to share knowledge or information and engage in communication.[6] The key points of this definition are: a virtual community must exist within the virtual space of the Internet and rely on the support of computer information technology to enable its members to interact based on shared interests, generate content, and ultimately establish social relationships through such interaction.[7]

3. The essence of virtual communities in digital humanities

As a discipline that continually wrestles with its very origins, Digital Humanities has seen its very question of origin remain highly debated.[8] Many proponents argue that the pioneering work of priest Roberto Busa should be regarded as the starting point of Digital Humanities; his "Aquinas Project," conducted in collaboration with IBM, was the first to apply computer technology to book editing and textual indexing.[9] Conversely, many others contend that the connection between the humanities and other sciences was commonplace during the Age of Natural Philosophy, and that the emergence of Digital Humanities serves as a bridge linking different cultures following the disciplinary differentiation of the 19th and 20th centuries.[10]

If "community" is taken as the criterion, digital humanities must be predicated on the widespread adoption of computers, which facilitates connections between individuals. From the 1970s to the mid-1980s, the humanities—particularly the linguistic disciplines—began forging interdisciplinary links with computer science, thereby enabling the construction of corpora and the computational storage of texts. It was not until the advent of email that virtual communities within digital humanities were formally established; this marked the emergence of an online virtual academic community in its true sense. Subsequently, the rise of the Internet, particularly the World Wide Web, propelled the development of digital humanities onto a stable trajectory. Graphical-user-interface (GUI) computers and hypertext became ubiquitous resources in universities and other research institutions; "archives" acquired entirely new significance within cyberspace; interdisciplinary teams comprising humanities scholars, computer professionals, and librarians came

together to form genuine digital humanities research groups; this process formalized the discipline of digital humanities and significantly expanded its scope.[11]

In a vast number of academic papers and monographs, Digital Humanities has been defined solely as research and teaching activities that integrate computer information technology with academic practices in the humanities. It is evident that contemporary Digital Humanities research has long since transcended the scope of mere methodological innovation. The White Paper on the Establishment of Digital Humanities Centers identifies the following challenges facing current Digital Humanities research: the Internet-related challenges confronting humanities research and the corresponding transformational evolution required to address these challenges; the significant advancements made by algorithms and computational tools in processing heterogeneous and complex social data; and the challenge of harnessing the social benefits inherent in the humanities disciplines—those rooted in linguistic, cultural, and historical understanding.[12] Many scholars hold such visions; they may be academics within the humanities field or engineers within the field of computer science; they engage in processes of disciplinary transformation and educational policy formulation, and even aspire for Digital Humanities to become accessible to every citizen.

4. The challenges faced by digital humanities

4.1. Scholarly publishing and the limits of online communities

Early bibliometric studies in digital humanities have demonstrated that scholars in the humanities generally prefer to publish their research findings in book form. Even for a digital project—whether one that utilizes software platforms and digital humanities research tools—researchers typically do not use virtual communities as the primary platform for releasing their research outputs.[13] An analysis of existing academic databases reveals that research conducted on virtual communities is confined to only "a very limited set of disciplines, such as collaboration, institutional frameworks, library and information science, education, history, and linguistics." [14]

4.2. Current distribution of disciplinary areas covered by published research outputs

In other words, the scholarly outputs generated within virtual communities are primarily published in fields such as computer science and information science, or within the humanities through disciplinary approaches—including literature (e.g., computer-based text analysis), linguistics (e.g., electronic corpora), and history (e.g., 3D representation of cultural relics). Numerous studies in computer science and related fields also indicate that when humanities scholars engage in digital humanities research and need to publish their findings, they generally do not use "digital humanities" as a key keyword in their publications. Additionally, a small number of publications are categorized under the "humanities and multidisciplinary" category; the essence of such categorization lies precisely in the integration of the humanities with digital humanities research.

4.3. Lack of an evaluation mechanism and challenges to sustainable development

Digital humanities scholars actively advocate for policies regarding online publications and open data; however, from the perspective of tool development, the evaluation criteria used within the academic community constitute the key to transforming the field of digital humanities. The most sensitive issue revolves around "how to reward other, often intangible forms of labor" [15]. Many digital humanities projects severely lack comprehensive contribution assessment mechanisms—such as those employed for peer-reviewed journal articles—and their outcomes struggle to be incorporated into various academic review and promotion processes, resulting in numerous highly valuable contributions failing to receive the recognition they deserve. Furthermore, knowledge exploration in the humanities is rarely an overnight endeavor; research progress is updated in real time. In the absence of immediate returns, ensuring the sustainable operation and growth of such projects presents a formidable challenge. In a sense, operating digital humanities platforms is akin to engaging in venture capital investing—requiring continuous financial investment to support both development and maintenance. Questions such as how to prevent the loss of key talent among research teams, how to ensure the sustainable development of projects when personnel changes are inevitable, and how to guarantee that the research outputs of the digital humanities are preserved

in the virtual world as data—all these represent urgent challenges that must be addressed within the field of digital humanities.

5. Establish a community ecological closed-loop system

5.1. The global development and interdisciplinary significance of digital humanities

The global connectivity enabled by the Internet has facilitated international cooperation in the humanities, significantly accelerating the popularization and development of Digital Humanities. Virtual communities formed through the integration of resources across nations and disciplines shift Digital Humanities from a purely digital methodology and tool-oriented perspective to the digital preservation and application of the knowledge ontology underlying research subjects, thereby endowing Digital Humanities with a universal interdisciplinary significance.[16] Digital Humanities focuses on ontology-based research centered around specific interest themes, rather than being confined to a narrow range of disciplines. Consequently, numerous specialized associations or organizations dedicated to Digital Humanities have been established worldwide; there exist dedicated journals, international conferences, and funding grants within the field. Universities in many countries have established Digital Humanities Centers and introduced doctoral programs in Digital Humanities. Currently, Digital Humanities "can already support all forms of digital scholarship" [17], and its essence lies in the formation of knowledge communities within virtual communities. Therefore, the mere application of computer information technology in the humanities no longer suffices to meet the demands of Digital Humanities; it is imperative to build sustainable virtual communities and establish an ecological closed-loop system to achieve the sustainable development of Digital Humanities.

5.2. Technical elements: platform tools and operability

In the Internet era, the connectivity of knowledge communities relied on virtual community platforms such as email, online libraries, publishing databases with their information retrieval systems, social networking platforms, and course platforms; consequently, technological elements serve as the foundational prerequisite for these virtual communities. Among these platforms, there are specialized virtual community platforms designed specifically for scientific communities—such as ResearchGate—where registered users can connect with peers, share research findings and updates, and participate in scientific forums and interest groups. Additionally, there are numerous tools that do not explicitly aim at knowledge sharing but are widely utilized by the scientific community, such as blogs and video-sharing websites. The most prominent concerns surrounding these online virtual community platforms primarily revolve around issues pertaining to user privacy, user interface design, and usability.

It is particularly important to emphasize the issue of tool usability. The interdisciplinary nature of Digital Humanities dictates that humanities scholars must master certain computer skills to conduct digital analysis within the humanities domain, while researchers in computer science must also gain an understanding of the complexity and diversity inherent in the humanities to preserve the unique characteristics of the humanities within the unified standards of computer logic. On one hand, standardized foundational computer training courses are crucial, enabling researchers in the humanities to adapt to new technological developments, which is far more practical than merely learning a specific tool that may become obsolete within just one or two years. On the other hand, in terms of technical architecture design, it is essential to provide application interfaces that are easier for beginners to use, thereby helping community members quickly access various features on the platform and facilitate data sharing or even cross-project utilization. These foundational tasks rely on the joint efforts of both computer scientists and library professionals.

5.3. Community development and the online–offline ecosystem closed loop

5.3.1. Limitations of the collaborative platform

Once the foundational tools are in place, the task of fostering virtual communities falls upon the development of these "communities" themselves. The numerous emerging social virtual platforms mentioned earlier not only enable scientific communities to share academic achievements and research

developments in real time but also facilitate communication and interaction across disciplines. Collaborative tools such as Google Docs allow multiple users to edit documents simultaneously, ensuring that all participants can stay updated at any moment. While these social or collaborative platforms provide scientific communities with a virtual space for individual exchange, their effectiveness depends on user engagement and activity levels; they cannot inherently foster strong social bonds.

5.3.2. *Online-offline ecosystem closed loop*

While many online communication platforms can facilitate interaction and knowledge sharing within virtual communities—such as attending meetings via video conferencing software, engaging in academic exchanges through electronic publications or blogs, or utilizing digital humanities-specific tools like online data repositories and collaborative platforms—viewing from the perspective of future user demands, possessing merely a virtual research and sharing environment is far from sufficient; an offline physical environment is essential to establish genuine strong social relationships. In this sense, it is only through the connection and interaction between the online and offline worlds, as well as the interconnection and overlap between virtual and real-world communities, that a closed-loop ecosystem for digital humanities can be formed. The Internet has enabled connections unimaginable in the offline world; building upon this foundation, we should strive even further. By leveraging the existing social relationships within virtual communities to organize offline events such as conferences and lectures, we can strengthen these pre-existing community ties. Such events should ideally follow a fixed frequency to create a sense of ritual, thereby ensuring the cohesion and engagement of the community.

5.3.3. *Institutional safeguards and offline resource alignment*

Furthermore, when applying for competitive grant funding, temporary research groups and online organizations represent the norm rather than the exception. However, the sustainable development of an emerging field requires stable institutional frameworks; establishing university professorship and tenure evaluation systems within the digital humanities sector is an effective way to enhance such stability. From a venture capital perspective, offline resource matching is also a critical requirement. Without the ability to facilitate offline resource matching, it is unrealistic to expect a purely online digital humanities project to achieve lasting viability and continuity. [18]

6. Conclusion

To date, building upon the framework of virtual communities, we have analyzed the concept of Digital Humanities and its future development. A key characteristic of social communities in the Internet era is that these communities never exist in a purely online or offline state; rather, those communities with the highest engagement levels and strongest activity often operate in a hybrid online–offline format. The scientific community is no exception to this pattern—through the seamless integration of virtual and physical spaces, scientific communities such as the Digital Humanities are fostered via standard academic platforms—including shared publishing venues, dissemination channels, conferences, and seminars. The Digital Humanities represent not only a reflection of societal and technological demands but also a manifestation of needs arising from the interaction between society and technology. While we emphasize the social relationships within virtual communities and the shared values derived from these relationships, both the relationships and the values themselves depend on the development of online and offline infrastructures, as well as funding mechanisms that support the healthy growth of these communities. In summary, the Digital Humanities constitute an integral part of the broader effort during the Internet era to prevent the marginalization of the humanities; they should evolve into a vast interdisciplinary network of virtual communities rather than isolated research projects scattered across numerous academic fields.

7. References

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