Community-Centered Strategies

for sustaining digital humanities scholarship

White Paper Version 1.0

Katrina Fenlon (PI), Jessica Grimmer, Alia Reza, Courtnie Thurston, and Travis Wagner

University of Maryland, College Park

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CENTER FOR ARCHIVAL FUTURES

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White Paper Version 1.0
A report by the project team of the
”Communities Sustaining Digital Collections” Project

Katrina Fenlon (PI), Jessica Grimmer, Alia Reza, Courtnie Thurston, and Travis Wagner

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1

Introduction

In the past two decades *sustainability* has become entrenched as a key term in the discourse of digital humanities. Despite significant research, theorization, and discussion of the concept and potential solutions to a well recognized sustainability problem, progress on the perceived challenge of sustainability—either toward a shared conceptualization, or toward widespread and pragmatic approaches to improving the durability of digital scholarship—has been incremental at best. Outside of exceptionally well-resourced institutions, there persists a well documented, systemic lack of support for maintaining digital scholarship after its initial creation. The prevailing paradigm of institutional stewardship, which largely falls back on digital humanities centers and libraries, cannot accommodate the diversity, complexity, and community-centeredness of digital humanities scholarship. While various policy interventions and technological advancements have made important headway on preserving the burgeoning mass of digital scholarship scattered across institutions, the least tractable challenge to sustaining digital scholarship continues to be the most essential: many digital humanities resources resist institutional stewardship due to the depth of ongoing investment and control that communities wish to retain over the resources they have created.

Digital humanities scholarship is by nature *community-centered*: collaborative teams of technologists and researchers create and maintain digital resources to meet their own needs. Often, the goal is to fill gaps in the cultural record by gathering and providing access to new evidence about communities, histories, and cultures that are underrepresented in mainstream cultural institutions. Communities build shared resources—from digital editions to databases, from software to data models, from corpora to digital archives—to serve their constituents and closely related communities, both for research uses and to support community-building (Poole, 2017; Cooper Rieger, 2018; Maron Pickle, 2014; Palmer, et al., 2009; Palmer, 2004). Digital humanities projects and their outcomes serve not only as new contributions to and published records of scholarship and research, but also as active, generative, dynamic hubs for collaboration and communication. Such resources are sustained not by transfer from communities to preservation institutions, but through continued life and development (Fenlon, 2017; Fenlon, 2020).

We lack models for sustaining digital projects in ways that are truly community-centered—which are responsive to dynamic community needs and values, and which effectively complement rather than exclusively reckon on institutional support. The roles that communities play in sustaining digital scholarship are understudied. Most of what we know about sustainability focuses on financial, organizational, and technical factors in the longevity of digital resources. All of these factors are vitally important, but they overlook the roles of the nebulous but often more enduring entities that transcend institutions, individuals, and teams. Communities of different shapes and sizes surround and support digital humanities scholarship and digital community archives. How these communities define sustainability, and what sustainability therefore requires, varies significantly across contexts. But in all cases communities play important roles in sustaining digital scholarship and digital archives. To advance the sustainability of digital scholarship, a wide variety of stakeholders in digital scholarship—including libraries, scholars, digital humanities centers, funders, and publishers—need a foundational understanding of how research communities affect sustainability.

The “Communities sustaining digital scholarship” project is a study of how communities interpret,

impact, and implement the sustainability of their own projects and resources. Through a case study of four digital humanities projects, conducted over a two-year period from 2019 to 2021, we sought to answer the question: How do the teams and communities surrounding each project understand, affect, and implement the sustainability of their community-centered digital collections? What it means to be sustainable within a community requires (a) more precision about what sustainability means in different contexts, for different communities; and (b) what the relationship between communities and sustainability actually is. Through interviews with teams and communities surrounding each project, triangulated with evidence from participant-observation of each project and relevant documentation, we sought to understand how communities defined sustainability for themselves, and the implications for community-based strategies for sustaining their efforts. This white paper reports on the initial outcomes of this research effort.

Each of our four case studies serves a different core community by gathering and providing access primary evidence in new forms, to support research, collaboration, and community-building:

- **Enslaved: Peoples of the Historical Slave Trade** (Enslaved.org) is an online, open-source linked data hub focused on the history of enslaved people.
- **The Lakeland Digital Archive** is an effort to document a 130-year-old African American community adjacent to the University of Maryland through a digital community archive.
- **The Music Encoding Initiative** (MEI) is a community-driven, open-source effort to define a system for encoding musical documents in a machine-readable structure.
- **The Open Islamicate Texts Initiative** is a multi-institutional effort to construct a machine-actionable corpus of premodern Islamicate texts.

These cases diverge in their topicality and disciplinary backgrounds, in their size and geographic distribution, and in how they relate to their communities and relevant institutions. Together, they shed light on how communities define sustainability differently, and on community-related factors in sustaining digital scholarship.

The main contribution of this white paper is a framework of factors that affect the community-centered sustainability of digital scholarship. These factors derive from systematic, comparative analysis of our four cases, as described in our About this project chapter, below. Figure 1.1 provides an overview of the six factors, which highlight the relationship (and mutuality) between communities and project sustainability. The ways in which communities interpret, plan for, and implement each of these factors provide alternative models for community-centered sustainability. We hope this framework helps communities think holistically about their own sustainability. To this end, we describe potential implications of each factor in the final chapter of this white paper. While our framework focuses on community-related factors, we acknowledge the concomitant and essential roles of different institutional players in this landscape.

In the rest of this section we offer definitions for key terms in this work: *sustainability*, *community*, and *community-centered sustainability*.

1.1. What do we mean by sustainability?

Despite a rich body of research and discourse on sustainability in the digital humanities, we are rarely operating on a unified definition—either of what exactly we're trying to sustain, or what sustainability entails (Maron Pickle, 2014; Edmond Morselli, 2020; Eschenfelder et al., 2016). While *sustainability* has been a key term (or buzzword, depending on context) across academic disciplines and in the realm of policy for decades, the concept invites reinterpretation in every new context, including in digital scholarship as a whole and for specific communities and projects.

Bell and Morse (2008) address the difficulty of defining, operationalizing, and measuring sustainability in their work on the more general concept of sustainable development, which transcends academic disciplines and domains of application. A sustainable system may be understood as one that:

- Maintains a dynamic equilibrium among inputs and outputs (Fresco Kroonenberg, 1992);
- Meets the needs of the current generation (or project or community) without diminishing the possibilities for the next generation (or project or community) (adapting from the WCED, 1987, definition); or
- In which the quality of the system stays constant or improves over time (Bell Morse, 2008).

Figure 1.1: Framework of factors in community-centered sustainability

The difficulty of finding shared meaning stems from the essential subjectivity and relativity in all of the terms here: of how we define the "quality" of a system—whether in environmental terms, financial terms, in the accessibility and usefulness of a digital archive, or its social and intellectual impact—and in how we bound our systems and the timescales under consideration.

The goal of this research is, in part, to answer the question of how different communities define sustainability, and what the implications of differences are for practice and planning. We will come back to what our project has discovered on this topic in the Framework chapter. Here we lay out the theoretical framing of the concept that has guided our research.

In our work, digital humanities (DH) *sustainability*, in its most basic sense, refers to the capacity for an entity to remain viable over time. What exactly "viability" entails will necessarily vary across contexts—and we are interested in the nuances of these variations. This basic concept of sustainability may apply to any kind of relevant entity or "unit of analysis": to a DH project, to the various resources stemming from a project, to the teams, organizations, and communities that are involved in a project, or to all of these at once. We understand that while sustainability means different things for each of these entities, the entities are also interdependent, often co-constitutive, and the boundaries between them can be fluid. Sometimes we are hoping to sustain something as nebulous as an intellectual contribution, which may transcend the particular form or edges of any given resource. Sometimes we are hoping to sustain a complex, sociotechnical infrastructure—a dynamic arrangement of people, tools, processes, and content. And some strands of DH discourse are concerned with the sustainability of the overarching humanistic or DH domain (see, for example, McGann, 2010; Drucker, 2021).

Of course, the sustainability of any given project or community is inextricable from the sustainability of contextualizing systems: from the institutions and infrastructures that support scholarship, encompassing higher education, cultural heritage, and publishing, to the wider economic, sociopolitical, and environmental contexts. Clearly increasing instability at these higher levels profoundly impacts the sustainability of digital scholarship in ways that urgently demand further research and action. Some of these concerns arise in concrete ways in our framework. However, in this research we mainly leave aside the systems-level factors undermining the sustainability of DH as a whole enterprise and narrow our focus to more immediate factors affecting individual projects and communities. We refer readers interested in the broader issues of sustainability to:

- Research on the environmental impact of digital scholarship, digital preservation, and environmental humanities more broadly: for example, Pendergrass et al., 2019; Nowviskie, 2015; and Neimanis et al., 2015.
- Relevant work in infrastructure studies, science and technology studies more broadly, and critical systems thinking: for example, Bietz et al., 2012; Millerand Baker, 2020; McCord Becker, 2019; and Smith, 2011.

In fact, we narrow our project- and community-level focus further, leaving aside the critically important but well documented issues of organizational resilience, management, financial sustainability, and technical maintenance and preservation—all of which have received significant prior attention (as described in our Background chapter). We will focus instead on the relationship between sustainability and the *communities* that surround and support digital scholarship.

1.2. What do we mean by community?

We define *community* broadly, as any group of people organized around some common identity, purpose, or activity. The term "community" is a foundational term in the social sciences, loaded with theoretical background and implications. We adopt a purposefully open definition at the start of this research, to help us see the various kinds of collective entities that may have a bearing on sustainability in DH. Communities may comprise groups of people with different backgrounds and expertise working on a shared problem, interested in a particular theme or kind of material, or using the same kinds of methods. DH projects are often supported by and responsive to multiple interested and affected communities at once: research groups from different disciplines or domains that intersect around a specific topic, smaller groups collaborating directly to develop or maintain a resource, distributed crowds of volunteers, broader publics whose families, identities, or histories are represented in collections, K-12 teachers and learners, and many more. Communities vary in size, scope, homogeneity, level of organization, and the tightness of their interconnections.

1.3. What do we mean by community-centered sustainability?

When we refer to "community-centered projects" we refer to a broad range of grassroots initiatives that originate in, are propelled by, represent, and are responsible to communities of different kinds, including digital community archives and academic digital scholarship of all stripes. We are drawing a basic distinction between community-based projects and projects that are primarily institutional, or deriving from and supported by the imperatives and resources of academic and cultural heritage institutions. There are two main reasons for making this distinction, despite its limitations:

- First, a subset of community-centered projects resist institutional affiliation and subsumption, due to fraught historical relationships with academic and cultural institutions, or simply due to the depth of control that communities wish to retain.
- Second, the distinction highlights the fact that most DH projects lack stable, ongoing institutional support. Even where limited institutional support exists, these projects rely on volunteer teams and communities of various kinds to sustain projects over time.

Digital scholarship does not readily admit a simple divide between community- and institutionally supported projects, nor is such a divide desirable. People in institutions are part of communities, too, of course. Many or most projects, including all four of our case studies, are supported by or affiliated with institutions in different ways and to varying degrees. The goal is not to exclude the possibility of institutional support alongside community efforts, nor is it to downplay the critical importance of the contributions of institutions—particularly of cultural institutions, libraries, publishers, and institutions of higher education—to the support and sustainment of digital scholarship generally and to the advancement of research and practice in this area. It is to suggest that institutional support is neither the only path nor a panacea for sustainability.

Community-centered projects share some common characteristics. The defining characteristic of these projects is that they are created and maintained by communities to fill gaps in our records of knowledge and culture, to gather and share unique and novel forms of evidence, often collected directly from or by communities that the evidence represents. This is the hallmark of a community-centered project, and the essential aspect motivating this research. We are guided by the belief, shared by

others in the DH community (e.g., Posner, 2013), that meaningful conversation about sustainability in DH must prioritize the human beings and communities doing digital humanities work.

A second common characteristic pertains to who is doing the work and how they are supported—whether as volunteers in fully grassroots initiatives or drawing on institutional support in limited ways. These projects often rely on some level of volunteer labor. Some projects are led entirely by volunteers, or by people working outside of academic or cultural institutions. Even for projects born within institutions, or those with staff paid by institutions, the institutional support is often short-term or non-programmatic. Project staff may have contingent and part-time employment. Or these projects may be peripheral to their main responsibilities, so that their time is supported by leeway in their duties or bought out by grant, funding rather than being institutionally mandated. Even for those whose time is fully and stably supported, including those with tenure-line academic positions, much of the labor on these projects is notoriously unrewarded by conventional paths to promotion and tenure.

Community-centered sustainability

"a digital humanities resource is sustained as long as it responsively supports the endurance of the communities it serves—as a locus of memory, communication, and knowledge production—for as long as useful, and in whatever forms are useful" -Fenlon & Muñoz, 2020

Our definition of *community-centered sustainability* is as follows: a digital humanities resource is sustained as long as it responsively supports the endurance of the communities it serves—as a locus of memory, communication, and knowledge production—for as long as useful, and in whatever forms are useful (Fenlon Muñoz, 2020). This definition emphasizes the relationship between communities and sustainability in DH, and the mutual benefits of digital scholarship and communities of many kinds for supporting one another. Following from that relationship is the imperative of reframing our discourse from one oriented toward artifacts and preservation, or ensuring things stay the same, to one that embraces adaptation and change. Finally, the definition acknowledges an indefinite but eventual endpoint for sustainability work, one determined by community needs.

2

Background

2.1. What makes sustainability hard

Digital humanities (DH) projects, including digital community archives, are notoriously difficult to sustain for a host of reasons—each thorny on its own, and seemingly intractable when considered all together. While these factors will be familiar (perhaps even tiresomely so) to those who do and support DH, we rehearse them here in order to establish a complete and shared picture of what we are confronting at the outset. The factors considered in framing this research include the following, each explained briefly below.

- Financial constraints
- Lack of institutional support
- Reliance on volunteer labor
- Technical fragility and impediments to shared infrastructure
- Disconnect from systems of scholarly communication
- Systemic instability

Financial constraints: DH projects are resource-scarce. Most are unfunded or funded sporadically by small, short-term grants. Funding for critical maintenance is lacking, and is often built as a "sidecar" onto grants supporting new developments or innovations. That said, maintenance and sustainability are areas of increasing emphasis among funding agencies, with new programs targeting technical and financial sustainability accompanied by increasing requirements for data management and sustainability planning. For example, the National Endowment for the Humanities' "Infrastructure and capacity-building" program,[1] instituted in 2020, provides funding to sustain existing projects. The Andrew W. Mellon Foundation's Public Knowledge program[2] also includes a strategic focus on the "innovative maintenance and sustainability of technology, tools, and infrastructure"; and recent awards have targeted sustainability planning for prior grantees as well as research into alternative business models to support financial resilience of DH projects and centers beyond the terms of grant funding.[3] While these developments are auspicious, needs in this area still vastly exceed available resources (Poole Garwood, 2019) and emergent, alternative business models are far from being broadly applicable across the DH ecosystem.

Lack of institutional support: Whether considered at the project level or as a whole domain, DH tends to lack programmatic support from academic and other institutions for aspects of project and community lifecycles after the start-up phase (Maron Pickle, 2014). Community-centered projects, by definition, transcend institutional boundaries, and for this reason are particularly vulnerable. Institutional commitments to and roles in community-based projects tend to be unclear or ambiguous and prone to shift over time (Fenlon, 2020). Even where institutional support exists, it may be disconnected from programmatic priorities and vulnerable to administrative turnover.

[1] https://www.neh.gov/grants/preservation/infrastructure-and-capacity-building-challenge-grants
[2] https://mellon.org/programs/public-knowledge/
[3] https://mellon.org/grants/grants-database/?grantee=&q=financial+resilience

Reliance on volunteer labor: DH communities involve people in a diversity of positions—including tenure-line faculty and administrators, but also jobs with more contingent status or power differentials, including graduate students, librarians, alternative academic positions, curators, developers, administrators, and more (Risam, 2018). In addition, DH and community archiving initiatives involve volunteers operating outside of their institutional capacities, or from among the general public. Reliance on volunteerism is most visible in community archiving and crowdsourcing efforts. Less visibly, DH also relies on in-kind donations of time by key staff. Even for those doing DH or building community archives as part of their institutional roles, this work often happens at the margins of their duties and time, and is disconnected from systems of evaluation, reward, and promotion (Boyles et al., 2018; Risam, 2018; Graban et al., 2019). This disconnect puts more vulnerable community members, including early-career scholars and those in contingent positions, at particular risk. A reliance on volunteerism for community-based projects is not inherently problematic when implemented in accord with community ethics, but volunteer labor is notoriously difficult to sustain.

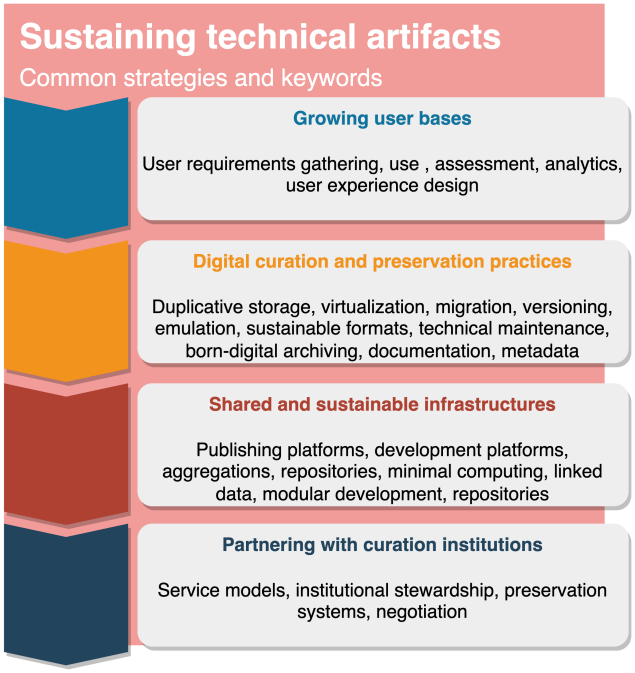
Technical fragility and impediments to shared infrastructure: Despite long-running recognition of the necessity of shared infrastructures for sustainability (e.g., ACLS, 2006; Borgman, 2010), the notorious difficulty of implementing interdisciplinary infrastructures (e.g., Dombrowski, 2014; Smithies et al., 2019) has given rise to a proliferation of projects maintained as siloes of content. As DH projects and digital archives more broadly adopt new approaches to development—moving toward more networked digital objects in the linked data universe, and toward environments of services with "complex and extensive dependencies" (Kilbride, 2015)—new burdens for ongoing maintenance arise. Sustaining technical environments requires the preservation of rapidly growing volumes of objects in addition to the maintenance of networks of dependencies: of relationships among objects and services that are prone to change, and which may be distributed across a variety of host institutions or platforms; of collaborative workflows that surround and support objects, and the social facets of socio-technical infrastructures; and of the performative, personalized, and dynamic aspects of digital objects (Kilbride, 2015; Becker, 2018; Fenlon, 2020).

Disconnect from systems of scholarly communication: Digital scholarship remains largely disconnected from conventional systems undergirding scholarly communication and publishing, including systems supporting the discovery, access, and citation of scholarship, and systems providing evaluation and credit for scholarship. Digital projects tend to lack basic features supporting widespread discovery and access—including mechanisms like universal persistent identifiers (such as DOIs or ARKs)[4] and citation guidance for users, but also integration with knowledge organization systems undergirding libraries, publishers, and web search aggregators, including catalogs, indexes, publishing platforms and repositories. By dampening the use, citation, and impact of digital projects and their resources, this disconnect from the wider scholarly communication ecosystem feeds into a cycle of unsustainability: undercutting resources' long-term viability and credibility (Ell and Hughes, 2013), and ultimately curtailing administrative and institutional investments in these projects and infrastructures to support them.

Systemic instability: Sociopolitical challenges to sustainability of the wider DH enterprise are bigger and less tractable than any of the forerunning concerns. In a higher education labor landscape increasingly characterized by adjunctification and automation, DH is beset by exceptionally precarious labor conditions: short-term positions are shallowly rooted in soft money, resources lag far behind the demand for highly specialized expertise, and tenure and promotion pathways are limited despite ongoing movements to valorize digital scholarship, define progressive pathways for alt-ac positions, and evaluate individual credit within fundamentally collaborative initiatives (McGann, 2010; Smithies et al., 2019; Risam, 2018). DH projects are known to struggle with finding qualified staff and technical support, and with navigating staff turnover or management changes (Zorich, 2008). Compounding these sustainability problems, DH labor is often invisible to administrators and authorities inside and outside of the academy, and to the public (Boyles et al., 2018; Graban et al., 2019; Warwick, 2012). These challenges are rooted in deeper shifts, including resource scarcity and shifts in undergraduate and graduate education, that have destabilized the humanities as a whole (McGann, 2010; Warwick et al., 2008; Fitzpatrick, 2011; Terras, 2011; and many others).

[4] See Koster (2020) for useful information about these and other identifier types.

Figure 2.1: Sustaining artifacts and infrastructures: Strategies and key terms in the DH literature



2.2. Sustaining artifacts and organizations

The rich DH literature[5] on sustainability has focused on sustaining two main kinds of things:[6]

- Technical artifacts and infrastructures: This body of work considers what it means to preserve the resources of DH projects, including data, metadata, tools, data models, and sometimes more complex, sociotechnical infrastructures supporting projects. Common approaches to sustainability in this vein, which are interrelated or deployed in tandem, include: strategically growing the user bases for projects, digital preservation and curation practices, building shared infrastructures, and partnering with curation institutions to preserve projects.
- Organizations: This body of work is concerned with the maintenance, management, and financial resilience of the organized teams and institutional units that do DH work. Common approaches to sustainability in this vein include: leveraging local institutional contexts, building inter- and intra-institutional partnership networks, approaches to management and governance, and developing business models.

Figure 2.1 illustrates a set of common strategies—with associated key terms or approaches—that characterize the DH literature on sustaining artifacts and infrastructures. Figure 2.2 does the same for the DH literature on organizations. The DH sustainability literature is overwhelmingly concerned with sustaining these two main categories of entity. But there is an emergent body of work on more holistic sustainability planning, which takes into account not only the technical artifacts and organizations that structure DH projects, but also the communities that surround and support these projects—the individual and collective human aspects of sociotechncial infrastructures.

[5] This review of prior work draws heavily on a comprehensive critical review of the concept of sustainability in digital scholarship, which is coauthored by PI Katrina Fenlon and collaborator Trevor Muñoz, Director of the Maryland Instiute for Technology in the Humanities. This review article is currently being prepared for submission for publication, and a DOI to a preprint will be included in Version 2 of this white paper following community review of Version 1.

[6] Edmond and Morselli (2020) offer a similar division in their review of sustainability in DH, among categories of metaphors guiding sustainability planning: sustainability as the preservation of data and metadata or as ensuring the technical robustness of tools; and sustainability as the maintenance of organizations or institutions. They offer an additional category: sustainability as a user issue, which resonates with our work on community-centered sustainability.

Figure 2.2: Sustaining organizations: Strategies and key terms in the DH literature

2.3. The roles of communities

Over the past decade or so, research and reflections on the roles of communities in the sustainability of DH have increased into a small but deep body of knowledge. This work has focused on the following facets of communities' roles in sustaining DH:

- Community-driven sustainability planning: How research on communities needs can factor into planning for sustainable projects and organizations (e.g., Edmond Morselli, 2020; Smithies et al., 2019; Langmead et al., 2018; Warwick et al., 2008);
- Network models for organizing related and allied communities: How networks of cognate projects, or networks of specialized service providers focused on local community needs, can form broader infrastructures to sustain DH (e.g., Edmond, 2013; Blanke et al., 2018);
- Community-building and -maintenance practices: Strategies and practices for building and maintaining active communities (e.g., Mahony, 2017; Skinner, 2018; Arthur, 2014; Clement et al., 2013); and
- How cultural knowledge can be "activated" to serve immediate and future community needs (Treloyn and Emberly, 2013; Cifor et al., 2018; Caswell et al., 2018; Stevens et al., 2010, etc.)

Figure 2.3 illustrates some common strategies and associated key terms in this emergent area of work. In summary, Figure 2.4 brings together the three categories of DH sustainability literature described in this brief overview—distinguished by what their central target or object of sustainability is, whether artifacts, organizations, or communities—and summarizes the approaches endemic to each.

Despite the exciting growth in this area of work, most of the pragmatic guidance on sustaining digital projects—even that which takes the importance of communities into account—nevertheless fall back on the necessity of support from academic and cultural institutions, and downplays the sustaining role of communities themselves. What is missing from the broader discourse on DH sustainability are models for sustainability that center communities and their active and ongoing contributions to sustaining digital scholarship and digital archives. This is the gap our research aims to address.

Because the most commonly acknowledged barrier to systematizing sustainability stems from inadequate or irregular resourcing (including funding, technical support, and labor) prior research has focused on project management and institutionally based approaches to sustaining digital collections. In practice, approaches to sustaining digital scholarship have largely pivoted on formalizing institutional policies and roles for centers, libraries, and preservation repositories in the lifecycles of digital objects.

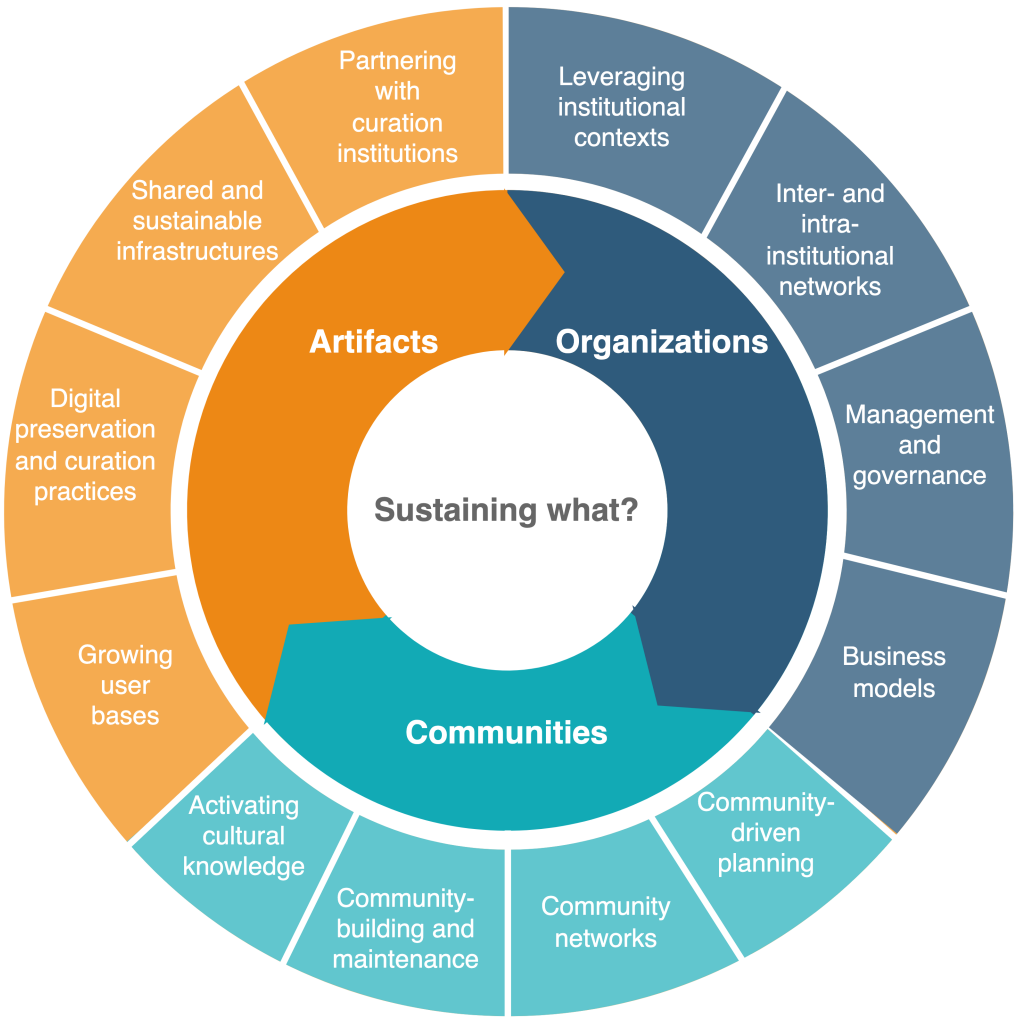
Figure 2.3: Sustaining communities: Strategies and key terms in the DH literature

Institutionally focused sustainability strategies have taken three forms: (1) tasking digital humanities centers or digital scholarship units—where they exist—with ongoing maintenance and preservation efforts; (2) formalizing libraries' commitment to constrained components of digital scholarship through pre- and post-project negotiation with researchers/creators; and (3) advancing repository, publishing, and data management infrastructures to increase the capacity of institutions to hold and maintain increasingly complex digital scholarship (Fenlon, 2020; Madsen and Hurst, 2018). Institutional sustainability efforts have largely been limited to well-resourced institutions or one-off, experimental efforts.

Where digital humanities centers exist, they tend to serve as inadvertent (sometimes reluctant) memory institutions. In their account of the challenges of managing the accretion of dozens of digital humanities projects at King's Digital Lab, Smithies et al. (2019) describe digital humanities as being at an "inflection point," in which a generation of projects without ongoing funding, built on fragile technical infrastructures, are confronting critical security vulnerabilities. Most digital humanities centers assume responsibility for long-term stewardship despite an organizational context in which preservation is not mission-critical. Because centers necessarily prioritize their limited resources for research and new development, they are usually bound to assume reactive strategies to the maintenance of digital projects, only intervening when something breaks (Fenlon, 2017). King's Digital Lab is a rare example of a center that has sought to "embed archiving and maintenance deep into the culture of technical development," through a range of preemptive strategies (which are decided early in a project's planning phase) including costed service-level agreements, migration, static conversion, dataset deposits, and minimal archiving (Smithies et al., 2019). But most digital humanities projects do not have access to a center at all (Sample, 2010; Fraistat, 2012). On campuses where there is a dedicated digital humanities center, there is rarely end-to-end support for digital scholarship from creation to disposition (Maron Pickle, 2014). While exemplary centers and other institutional efforts have made significant, valuable advancements to practice and research, their efforts have not yet been demonstrated to have scalable or system-wide impact on the ubiquitous problem of sustainability. This is partly because the problem is paradigmatic.

Exclusively institutional models—models that rely entirely on institutional support, or which consider only managerial, financial, and technical imperatives—for sustaining digital scholarship are inevitably inadequate. Pragmatically, most institutions lack capacity to comprehensively collect and preserve digital humanities projects. Even when a library or stewardship institution has sufficient capacity to commit to some level of stewardship, the project "handoff" is generally subject to significant constraints, including constraints on the kinds of materials the institution is willing to keep, at what level of fidelity,

Figure 2.4: Common approaches to sustainability in the DH literature, organized by object of sustainment



and for how long.

More essentially, handoff from communities to institutions tends to be a fraught prospect. It is difficult for collection creators to determine appropriate timelines for handoff, since digital scholarship and its products are rarely understood to be finished (Brown et al., 2009; Kirschenbaum, 2009; Fenlon, 2020). Compounding this challenge, Maron and Pickle (2014) found that institutions struggle to reconcile with issues of ownership and value for community-based digital scholarship, in light of the distributed, collaborative, and often amorphous nature of digital humanities projects. A critical and understudied final0 factor in the unsustainability of digital humanities scholarship stems from its community-centeredness. The vast majority of digital scholarship is born and thrives (and, ultimately, declines) outside of preservation institutions. In general, if the communities that create digital scholarship cannot continue its maintenance, the resources gradually decay as undergirding technologies shift. Yet, we do not know enough about what sustains the communities themselves.

Drucker (2021) observes that sustainability must be understood as a complex concept, as more than a "set of problems to be solved through instrumental means". Beyond the set of problems described above, and this brief review of literature responding to these problems, we acknowledge that sustainability is context-dependent in its meaning and implications. Sustainability is not a singular problem that can be solved, nor a status that can be permanently achieved. We acknowledge and embrace the complexity of this concept in our research in two ways:

- First, by seeking to understand how different communities define sustainability for themselves against the complex backdrop of digital scholarship and community archiving; and
- Second, by understanding that our research cannot offer a set of ready solutions or strategies. Instead, our overarching outcomes take the shape of a framework of factors intended to support local and context-specific thinking and planning.

Our next chapter details our findings about how communities define sustainability for themselves, and a set of factors that shape their understanding of community-centered sustainability.

3

About this project

3.1. Our cases

This research study was conducted as a set of four case studies of digital humanities projects. A brief introduction to each case is provided in the next section. We then provide the rationale for these cases and describe the methods we employed in this research. More detail about each case can be found in the examples and contextual information provided in the Framework chapter.

3.1.1. Enslaved.org

Enslaved: Peoples of the Historical Slave Trade (Enslaved.org) is an online, open-source linked data hub focused on the history of enslaved people. As a public humanities initiative, the project aims to engage many communities in the use and development of the project. It mainly serves scholars studying the history of the transatlantic slave trade, and family historians and genealogists, particularly among members of the community of descendants of the enslaved. The Enslaved.org data hub has been built upon datasets contributed by historians and other digital humanities projects. The data hub now accepts dataset submissions from scholars, the public, and cultural heritage institutions—usually of datasets manually derived from archival or family history records—and currently houses over 600,000 records of people and approximately 5 million data points. In addition to these data sets, the project also publishes peer-reviewed, data-driven research in its open access journal, the Journal of Slavery and Data Publication. The Enslaved.org project comprises a team of collaborators based primarily at Michigan State University's Matrix Center for Digital Humanities and Social Sciences, with other key team members at the University of Maryland and the University of California, Riverside. The Enslaved.org project has received substantial funding, including from the Andrew W. Mellon Foundation (Mellon) and the National Endowment for the Humanities (NEH). The project originated in an earlier DH initiative, the Slave Biographies project, and has been in active planning and development with founding partners since 2011. The proof-of-concept phase for the Enslaved.org linked data hub began in 2018, with the launch of its data repository in 2020, and the project continues its implementation, development, and sustainability-planning.

3.1.2. Lakeland Digital Archive

The Lakeland Digital Archive is a community digital archive project of the Lakeland community, a 130-year-old African American community adjacent to the University of Maryland in College Park, near Washington, D.C. Under urban renewal in the 1960s, much of the neighborhood's landscape was demolished, displacing nearly two-thirds of residents. For the past decade, Lakelanders—historical and current residents and their descendents—have worked to collect and preserve their history. The Lakeland Community Heritage Project (LCHP), a small organization of volunteers at the core of this effort, has gathered thousands of historical records from the community, along with oral histories and other documentation. In 2018, building on an existing community-university research relationship, LCHP embarked on a partnership with the Maryland Institute for Technology in the Humanities, along with faculty and students in UMD's American Studies department and College of Information Sciences, to prototype a digital community archive. With a dedicated team of approximately a dozen people (about

half from Lakeland and half from UMD), the digital archive is currently in development and a preview version was released this year. The LCHP has been engaged in the community-documentation work undergirding the current digital archive effort for more than 10 years as an exclusively volunteer-driven effort without further institutional affiliation. Beginning in 2019, the current digital archive effort and UMD partnerships have received NEH funding to support a community digitization workshop and digital archive development. The goal of this project is to serve its immediate community of Lakelander and to document and share the community's historical contributions and connections to African American history in the wider region. The LCHP's efforts to spread awareness about the history of the community gave rise to a restorative justice initiative in the city, and the City of College Park's Restorative Justice Steering Committee is now exploring reparations for the Lakeland community, making College Park one of the first cities in the country to take action on reparations specifically related to urban renewal.

3.1.3. Music Encoding Initiatve

The Music Encoding Initiative (MEI) is a community-driven, open-source effort to define a system for encoding musical documents in a machine-readable structure. MEI brings together specialists from various music research communities, including technologists, librarians, historians, and theorists in a common effort to define best practices for representing a broad range of musical documents and structures. The results of these discussions are formalized in the MEI schema, a core set of rules for recording physical and intellectual characteristics of music notation documents expressed as an eXtensible Markup Language (XML) schema. It is complemented by the MEI Guidelines, which provide detailed explanations of the components of the MEI model and best practices suggestions. The MEI community is organized around a governing body—which includes a board and a technical team, responsible for maintaining MEI's GitHub repository and preparing new releases, plus a set of interest groups addressing specific areas of development, such a pedagogy, metadata, or specific types of musical notation. The interest groups propel most of the activity around and ongoing development of the standard. This relatively small core of effort, largely consisting of volunteers from the academic musical community of scholars and librarians, is a hub for a wider community of users, conference-goers, and participants in the community's online forums, including a listserv and Slack space. MEI began as the effort of a single scholar and librarian, Perry Roland, more than 20 years ago, gaining traction among a wider community in the early 2000s, and garnering short-term funding from the German Research Foundation (DFG) and NEH to host meetings in 2009. In 2013 the community hosted its first major conference, and in the same year the Akademie der Wissenschaften und Literatur in Mainz offered to host the standard and budding organization. At this time MEI began to formalize its governance structures. The organization is still hosted and supported by the same institution almost ten years later, but the sustainability of the standard and community itself rely on the enthusiastic and voluntary contributions of an international community of contributors.

3.1.4. The Open Islamicate Texts Initiative and KITAB

The Open Islamicate Texts Initiative (OpenITI) is a multi-institutional effort to construct a machine-actionable corpus of premodern Islamicate texts. The goal of this project is to develop textual infrastructure—including a corpus and relevant tools—for Arabic, New-Persian, Turkish, and other languages common to Muslim cultures, to facilitate new forms of computational and macro-scale text analysis and digital scholarship. Our case study began with the OpenITI project as the central focus or unit of study, but came to embrace a second, closely related project, due to overlaps in the project team and the core missions of each project. OpenITI and the KITAB project exist as part of a constellation of interrelated projects and teams. The KITAB Project provides a digital toolbox and a forum for discussions about Arabic texts, with the goal of empowering users to explore Arabic texts in completely new ways and to expand the frontiers of knowledge about one of the world's largest and most complex textual traditions. KITAB is leading with methods that detect how authors copied from previous works and to discover relationships between these texts and the profoundly intertextual circulatory systems in which they sit. A small group of principal investigators (PIs) based at the University of Vienna, Aga Khan University-ISMC, London, and the University of Maryland, College Park, lead these initiatives, along with an internationally distributed team of collaborators including postdoctoral fellows, faculty, technologists, interns, and other specialists, most of whom have funded roles on the projects. The corpus they are building is organized on GitHub and invites participation and contributions from a wider community of scholars of languages, literature, cultural history, and from cultural institutions. The OpenITI

project began in 2016 as a collaboration among the three PIs, who had been independently building corpuses to support their work due to their dissatisfaction with existing digital text repositories. In 2019 the OpenITI project received funding from the Mellon Foundation to support the creation of a digital text production pipeline for Arabic and Persian-language texts, including the refinement of optical character recognition and handwritten text recognition systems. In 2021 the project received further funding from NEH, and recently in 2022 (after the end of our case study partnership) the OpenITI project garnered a further $1.75 million in funding from the Mellon Foundation to continue its work.

3.2. Why these cases

The first reason for studying these four projects is that each is community-centered. Each project aims to serve some core community as a locus of memory, knowledge production, and communication, but also exists within a dynamic complex of broader public and academic communities. Each project is maintained by members of its core community. And each began in a previously unmet community need—to gather and represent primary evidence in new forms to support novel research, historical narrative, scholarship, and collaboration. (More detail about the communities surrounding each case is provided in the Framework chapter.) All four projects bear varying relationships to academic and other institutions, in line with our definition of community-centered projects (provided in the Introduction), but their institutional affiliations do not diminish how they are centered in and sustained by various communities.

We selected projects in part to evince differences or contrast in key dimensions relevant to sustainability, including topicality and disciplinary origins, size and scope, duration or stage of development, level and kinds of institutional support, and funding history, as described in our case descriptions. Cases were also selected to leverage existing relationships between the PI and case study projects. Three of the four case studies—Lakeland, Enslaved.org, and the OpenITI project—have project team members at the PI's institution, the University of Maryland (UMD). The PI made connections with three out of four cases through her affiliation with the Maryland Institute for Technology in the Humanities. Leveraging existing connections was critical to this time-constrained study, since case study methods rely on relationships of trust among partners, and building partnership and research momentum takes time and effort.

These first three case studies have another aspect in common: while all are rooted to varying degrees in significant prior work and long-running collaborations, they each happened to be entering a new stage of development when this study began. For example, while the Lakeland Digital Archive project has been documenting Lakeland's history for more than a decade, including through a forerunning digital archive, the project joined this study as the Lakeland community embarked on building a new digital archive from scratch through a partnership with the Maryland Institute for Technology in the Humanities. The Enslaved.org project, too, had recently garnered major funding when this study began, and its data hub was newly under construction. The OpenITI project had just received funding when this study began, and while it built on an ongoing collaboration among its PIs, it was still in early stages of building its corpus and a toolbase.

The fourth case study—the Music Encoding Initiative (MEI)—was added to bring a complementary angle to the project: documenting a long-running effort with a track record of sustainability. The MEI has thrived for twenty years as a community effort. It is well established and did not enter any distinctive new phase of development during this study, in contrast to the other three cases. While not affiliated with UMD through project leadership, this case study leveraged the musicological expertise and MEI connections of one of our co-investigators.

All of the cases have histories of funding (including, in some cases, from the Andrew W. Mellon Foundation, which is funding this research) and varying levels of institutional involvement and support. For three out of four cases, major funding happened to coincide with or follow the beginning of this case study research. These projects are all built on longer trajectories of volunteer-based collaboration and community-building, and all bear the hallmarks of community-centered projects: they are grassroots initiatives created and maintained by public and scholarly communities to fill gaps in our records of knowledge and culture and to gather and share unique and novel forms of evidence. While the scale of funding these projects have received is exceptional, the focus of this research has been on the community-centered aspects of sustainability rather than the financial ones. These are, of course, inextricably linked, and where one cannot be distinguished from the other we have made the relationship

explicit in our analysis. We posit that our focus on community sustainability offers useful insights across DH projects that are community-driven, regardless of their funding history.

3.3. Research methods

This case was designed as a multiple-case study (Yin, 2018). The multi-case design aimed to support replication of general findings about factors that lend to community-centered sustainability of digital humanities and digital archives projects, while supporting cross-case analysis of expected contrasts in how different communities conceptualize sustainability and implement community-centered sustainability strategies. In each case the unit of analysis was a single project: either a predominantly academic digital humanities project or community digital archive project. Included in the data collection and analysis, however, were not only the projects and the associated core teams or organizations, but also the wider communities involved in each project.

This study began with the following theoretical propositions, which derive from our review of the DH and community archives literatures on sustainability:

- Communities of different sizes, scopes, and shapes surround and support digital humanities scholarship and digital community archives, and their specific characteristics impact the sustainability of digital humanities projects and their outcomes.
- How communities and projects define sustainability, and what sustainability entails, will vary depending on context. But in all cases communities of different kinds will play vitally important roles in sustaining digital scholarship and digital archives. These roles differ across contexts.
- Community sustainability and project sustainability are interrelated to some degree.

The goal of this project is to show how sustainability and its entailments are context-specific, and to identify and characterize the relationship between communities and the sustainability of digital scholarship and digital community archives.

Data collection and analysis for all cases were conducted from the fall 2019 through spring 2022. We gathered data for all cases in parallel using the same protocols for interviews and participant-observation in each case. Examples of these protocols are included as Appendix A. We gathered multiple kinds of evidence in every case, including interviews, participant-observation, and documentation of each project. Figure 3.1 provides an overview of the sources of evidence used in each case. Some cases were larger or involved “deeper dives” than others. For example, we engaged very closely with the Lakeland project, in part because the project is local and there were clear inroads for participation by the PI in this project. We also engaged closely with the MEI community due to the prior involvement of one of the co-investigators in that community. While direct engagement with the Open-ITI and Enslaved.org projects was less intensive than in the other two cases, we nonetheless gathered substantial, rich evidence in both cases through interviews with a majority of the core membership of each project, participant-observation and site visits, and review of project documentation as described in Figure 3.1.

Interviews with participants were conducted as semi-structured interviews, meaning that we began with a set questions that were standard to each interview, but also added to, expanded upon, and adapted questions to fit each interview context and dialog as it happened. Interviews generally lasted between 45 minutes and an hour. We conducted interviews both via Zoom video call and in person until the beginning of the COVID-19 pandemic, at which point all interviews and most participant-observation work happened via Zoom video calls. After each interview, audio from the interview was automatically transcribed using Otter.ai transcription software. Transcriptions were checked and edited for accuracy by a project team member.

We employed qualitative content analysis (Zhang Wildemuth, 2016) to analyze interview transcripts from each case by identifying relevant themes in each interview and attaching those themes to quotations as evidence for themes. To support this analysis, we used Atlas.ti qualitative coding software. The thematic framework we used to guide our work is laid out in our codebook, Appendix B, which defines the themes (a.k.a. codes) we identified and how they were applied to the interview transcripts. These themes were partly derived deductively from the theoretical propositions with which we began (described above), which are also reflected in the content of interview protocol or set of questions that structured each interview (Appendix A). In addition, many of our codes derived inductively from analysis of the data itself, arising from new and unexpected insights from participants or themes and patterns in

Figure 3.1: Sources of evidence in each case

their interviews. As we conducted analysis we adjusted and refined the codebook to reflect our growing understanding of the patterns and themes we were seeing across cases, and re-coded iteratively as needed. At least two coders independently coded every interview. The coders then met to discuss their codings and to achieve consensus on the codings, to achieve total interrater agreement (rather than meeting a statistical threshold of interrater reliability) (Zhang Wildemuth, 2016).

We conducted analysis by examining and discussing the themes arising from the interview data, and employing our observations of and memos from participant-observation sessions, along with our interpretation of documentary evidence from each case, to contextualize those themes. We first analyzed each case independently, and then sought to draw cross-case conclusions. We organized an initial set of themes about community-centered sustainability into case-specific sets of challenges and opportunities (which are summarized in Appendix C). We offered case study partners the opportunity to review these sets of challenges and opportunities for community-centered sustainability, and following their review, we organized the themes into the more general categories in our community-centered sustainability framework, described in the next chapter.

Throughout the case study we engaged our case study partners in the evaluation of our work. In summer 2021, case study partners participated in a roundtable discussion at the Association for Com-

puters and the Humanities (ACH2021) virtual conference, during which we shared some preliminary aspects of our framework. Case study partners were and will continue to be consulted prior to the publication of journal articles and conference papers related to their case. In December 2021, we invited representatives of each case study to review our preliminary results through a half-day workshop conducted via Zoom. Participants were given honoraria for their participation. (This was originally intended to be a full-day, in-person workshop held at the ACH2021 conference, but travel and meeting plans were altered due to the COVID-19 pandemic.) During this workshop we introduced participants to a set of preliminary findings related to their own case, and to provide us with feedback on how well the findings reflected their perspectives, projects, and plans. We also introduced preliminary cross-case findings. We used their feedback, gathered diligently during the workshop and afterward via email, in our continued analysis and further writing toward this white paper as a preliminary case study report. Case study partners will also be invited to review a first version of this case study report.

3.4. Limitations

Our study happened to begin at the outset of the COVID-19 pandemic in the United States, which curtailed our plans for site visits and direct engagement with all cases, as well as our plans to bring participants together for evaluation of our outcomes. The pandemic severely impacted higher education and human-subjects research generally and our research was not alone in having to reconsider its strategic approach, and reevaluate the depth of expectations of case study partners, who were themselves experiencing significant new burdens in the transition to online work during a global pandemic. For some community members, the transition to virtual interviews took significant time. The pandemic's effects on our case study partners and our own research team reduced opportunities for interviews and participant-observation, reduced the pace of operations, and made us more circumspect in recruiting new voluntary case study participants given the unexpected additional burdens everyone was already experiencing. We nonetheless completed each case study, gathering interviews from all or most of each project team and surrounding communities, along with significant complementary participant-observation evidence and documentation to ground our interview findings.

Other limitations to this study stem from the study design and selected case study partners. Our level of engagement with each case study varied due to contextual factors—how busy our case study partners were, how well the timing of our research coincided with their own timelines, the physical locations of our partners and whether there were clear inroads for investigator participation in each project. Variation in the level of engagement across cases is to be expected, and we have worked to reflect on how our varying levels of engagement affected our interpretation through our memoing processes. We also rely on evaluation by our case study partners to help confirm our understanding of each case.

While they exhibit many important and useful differences for the purposes of understanding the roles of communities of varying disciplines, shapes, sizes, and with varying intellectual and social objectives, our cases proved to be homogenous in certain ways that limit our capacity for analytic generalization (Yin, 2008). Our cases do not include any projects without prior funding, or any projects that are completely independent of institutional affiliations. (In fact, three out of four of our cases have significant attachments to the University of Maryland, as described above). While further cases to probe these facets—of funding history and institutional affiliation—are out of scope for this study, we hope to come back to these important facets in future work.

3.5. Acknowledgements

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With deep gratitude we acknowledge our case study partners, whose exceptional generosity of time, energy, knowledge, and insight have made this research possible.

[Case study partners have the option to be acknowledged by name in the final version of this white paper.]

We also acknowledge our collaborators at the University of Maryland, including Trevor Muñoz and the Maryland Institute for Technology in the Humanities, Dr. Mary Sies, and our collaborators in the Recovering and Reusing Archival Data Lab within the Center for Archival Futures at the University of Maryland College of Information Studies. Our conversations about and collaborations on strands of related research have helped shape and propel this work.

4

Framework of factors in community-centered sustainability

In this chapter we provide an overview of the outcomes of this research, in answer to our overarching research question: How do the teams and communities surrounding each project understand, affect, and implement the sustainability of their community-centered digital collections? This chapter is organized into two overarching sections. First, we address the first part of this question, on *understanding*, examining how different communities define *sustainability* and the meaningful nuances in their varying definitions. Second, we cover the second part of our research question, on *effects and implementation*, by providing a framework of six factors that contribute to community-centered models of sustainability for digital scholarship.

4.1. How communities define sustainability

Our case studies elicited a wide range of definitions of sustainability both across and within cases. As an alternative framing of the question of what sustainability means, we also asked interview participants what it would mean for their projects to be complete, both in the sense of ”whole” and in the sense of ”done”. This, too, elicited a range of responses for each case, which shed light on the complexity of long-term planning for projects. Different community members shared different and often conflicting views about what sustainability would mean or would entail, both in the larger and looser group (MEI) and in the tight-knit, smaller teams. Some elements common to multiple definitions or cases are intuitive: projects want to grow their communities, serve community needs, and maintain their data and relevant tools. Other common elements include:

- Building accessible and scalable workflows for including broader community contributions in the projects.
- Solutions for ensuring control over community resources remains in community hands.
- Visions for how resources will change and adapt over time to changing community needs.

The most significant disagreements *within* case studies, among different participants’ visions for sustainability, revolved around the breadth of communities and specific partners imagined to be involved in sustaining each project.

Examples: What sustainability means...

"As far as sustainability... I keep going back to the same place: whatever [the archive] needs in order to be found. Whether that means to be in the care of an institution, or whether it means to be available on a website that's maintained, such that it can be found. All I'm trying to do is to leave breadcrumbs."
-Lakeland participant L11

"...that diversity principle of being able to have people at the table—when you're thinking about solutions and policy—who have experience with how their communities operate and are affected, is absolutely central. And if that doesn't happen, you're not going to have equitable sustainability. You're going to have sustainability that benefits the moneyed interests and the political interests in the society. But you're not going to have any kind of equitable sustainability, because in order to have that you need to be…allowing people to develop policy based on their own experiences. ... So I guess that's the last thing I would say that sustainability has to have: it has to be culturally-based"
-Lakeland participant L12

Almost all participants across all cases described being unable to imagine a point at which the project would ever be "whole" or "finished". For participants, the question of completeness evoked the core, long-term intellectual and community objectives for their projects, minus the limiting frame of short funding cycles. It is widely acknowledged that DH projects struggle to find a place of "doneness" (e.g., Brown et al., 2009)—hence the widespread interest in the question of project sustainability as opposed to the question of preservation. Figure 4.1 gives examples of participants' responses to the question of what it would mean for each project to be complete. These examples are only a subset of responses to this question, meant to illustrate the range and common themes among responses. While the particular reasons the projects may never be complete (or completed) are different within and across cases, there are common themes to note. Namely, projects are never done because:

- **The project aims to reconstruct a historical record that is necessarily incomplete**—because certain histories are omitted from archival records, or because the record itself is fragmented or missing. For example, the end goal of Enslaved.org is not just to build and maintain a data hub for its own sake. It is rather to enable the possibilities of reconstructing family histories and tracing the arcs of lives of enslaved individuals. These possibilities work against the grain of an archival record originally constructed and maintained by enslavers and colonizers for the purposes of conducting the business of slavery. These possibilities, too, test the limits of a record that is scattered across a wide range of institutions internationally and still in largely analog (rather than digital) form, where it even exists in the first place. In Lakeland, on the other hand, where the community archive is still being created, the threats to the historical record include community diaspora and the aging and passing of community members.
- **The nature and scale of the material at hand makes completeness infeasible.** For example, music continues to evolve, as does its interpretation and notation—so the MEI standard for encoding music hopes to evolve with it. In OpenITI, on the other hand, across the many languages and textual traditions included under the umbrella of "Islamicate", the scale of texts yet to digitize is massive. The texts are predominantly in manuscript form and in languages that automated approaches, like optical character recognition and handwritten text recognition, have inadequately accommodated to this point—all posing a significant barrier to the growth of the corpus. For this reason a complete corpus of all printed and manuscript texts relevant to this project represents, as one participant described it, "more than a lifetime project" (I02).
- **Community needs are dynamic.** Even if completeness for the materials or evidence of the project were possible, the needs and priorities of communities change over time, or have indefinite endpoints, making completeness a shifting goal. For example, MEI participants describe how ongoing advancements in available analytic and composition software continuously open up new possibilities for how the community can use MEI, necessitating continuous adaptation in the data

model itself. As another example, an overarching objective of both the Enslaved.org and Lakeland Digital Archive projects is to achieve some measure of historical, restorative, or reparative justice. When is the pursuit of justice complete? In both cases, this represents an objective with an indefinite or ambiguous endpoint.

How participants think about "completeness"...

"'complete' has a an element of continuing, so that you can continue to grow the archives. So I don't know that complete means there's a period at the end, but just that at a point where it's fully capable for use. That the University now knows that there is the ability to use it for study and access, and maybe Lakeland itself is doing walking tours and allowing people to use their devices to digitally see what it used to look like...whether it's off of your own personal computer, or maybe it's something that you could access through the community center, ...but just that it's available and accessible."
-Lakeland participant L07

"even if you have 10-15%—just the printed works in Persian and Arabic—all digitized and available, that's going to really change the way that we write literary history… That's 'complete' in the sense of what I'd like to see as a research tool. But then there's also other components to it … I'd like to see a thriving community built up around producing these texts. I want there to be a digital text production pipeline…"
-OpenITI participant I02

4.2. Community-centered sustainability factors

In this section we provide our framework of community-centered sustainability. The framework consists of six factors in community-centered sustainability, which emerged from our study:

- Factor 1: How communities engage wider interested and affected communities;
- Factor 2: How communities factor in the wellbeing of their members and of the community as a whole;
- Factor 3: How communities reify their values in the organization and design of their projects and outcomes;
- Factor 4: How communities navigate issues of ownership and control;
- Factor 5: How communities implement an ecosystem perspective; and
- Factor 6: How communities embrace disruption and change.

The ways in which communities interpret, plan for, and implement each of these factors provide alternative models for community-centered sustainability. These factors add to the various strategies and approaches identified across the wide body of DH sustainability literature, discussed in our Background section above, to provide a more complete and nuanced picture of how communities envision sustaining their resources—and themselves—by foregrounding community needs and values.

We intend for our framework to help communities think holistically about their own sustainability. In particular, we hope to shed light on aspects of sustainability for DH projects that are related to communities themselves, rather than to the preservation of technical artifacts or the financial and organizational resilience of projects. This framework does not offer specific approaches to sustaining communities. We identify factors rather than, for example, strategies or approaches, because how communities address each factor will vary to support widely varying conceptions of what sustainability means and entails. This framework emerged from the study of our four cases, and does not represent a complete or generalizable picture of what's entailed in community-centered sustainability for all imaginable projects or communities. The factors included in this framework emerged as relevant to each of our cases, and represent a complete overview of community-related factors raised in this study.

Figure 4.1: Elements of how communities define ”sustainability” and ”completeness”

Figure 4.2: Framework of factors in community-centered sustainability

Below we describe each factor, then delve into specific examples of how these factors come up in our different cases. It is the nuances in these real-world examples that may provide the most value and interest toward understanding how community-centered sustainability looks different in every context. Finally, we offer Appendix C, which offers an overview of the challenges and opportunities for community-centered sustainability identified across cases. Selected examples of these challenges are discussed under each factor, below.

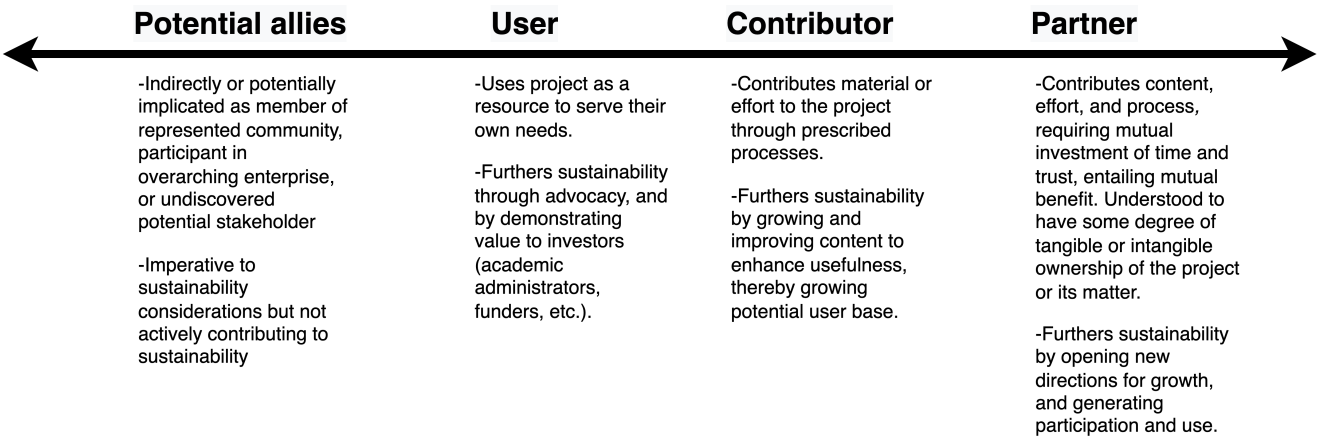
4.2.1. Factor 1: Engaging interested and affected communities

Every DH project or initiative can be understood to exist within a dynamic, shifting complex of surrounding communities. These communities play vital and varying roles in the sustainment of projects. At the center are the small groups—often most accurately described as teams or organizations—that are actively involved in the development and maintenance of the project. Surrounding that core is an ever widening pool of interested and affected groups: communities of different kinds, with different levels of investment and interest in the project, playing different roles in its sustainability. In some cases the core community or organization plays a formal governance or organizing role in relation to wider communities and their involvement in the project. In other cases, the relationships are looser and more dynamic.

The first factor in community-centered sustainability is identifying, understanding, and engaging a comprehensive set of interested and affected communities. For each of our cases we worked to enumerate a complete list of the broader communities that our partners perceived to be surrounding or potentially supporting their projects, and to understand the roles those communities play or could play in sustainability.

Understanding and designing for users and user-groups is a long-standing, well documented factor in the longevity and impact of DH projects (e.g., Warwick, 2008; Edmond Morselli, 2020; Smithies, 2019). The cases we studied, however, go beyond “users”, taking a much broader set of potential users and contributors into account: not just passive audiences for the project, but also a wider set of communities that may engage with the project in different ways. These communities include those with previous or active involvement in the project, and those whom the project speculates or hopes will be involved in the future. They also include communities that may never directly interact with the project,

Figure 4.3: Spectrum of community engagement for sustainability



but which have an interest nonetheless because they, their histories, their ancestors, or their cultures are represented in the digital archive or data.

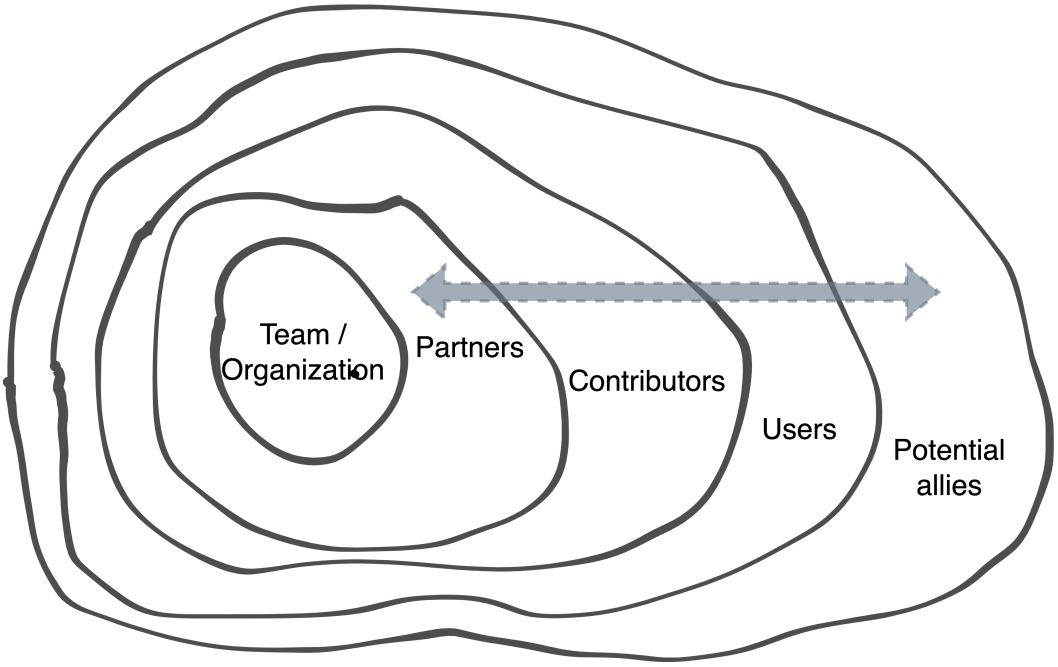
Based on our analysis of their descriptions of these relationships, Figure 4.3 offers a spectrum of communities documented across our cases. Communities with an active or potential interest in any given DH effort include: (1) potential allies, (2) users, (3) contributors, and (4) partners. Users, participants, and partners are all central to the project's sustainability. Each contributes to sustainability in different ways, as depicted in Figure 4.3. Any individual or group may move between the categories, or act in multiple modes at once.

Potential allies are individuals and groups with a (currently) passive role in sustaining the project. They do not actively use or otherwise engage with the project, but they are on the spectrum of engagement because their community is represented in the archive or data, or because the outcomes of the effort in some way impact them. For example, members of the descendent community of enslaved peoples are potential allies to the Enslaved.org data hub, because their families or ancestral communities are or could eventually be represented in the data hub. Even if they never use the hub, their existence matters to the project—to the representational choices made in the development, and to planning and justifying sustainability measures. Similarly, members of the distributed Lakeland community and descendants are implicated in that effort, even if currently uninvolved. Members of the wider disciplinary communities surrounding OpenITI and MEI (e.g., scholars of comparative literature and the scholarly musical communities, respectively) are affected, to a degree, even if currently unaware of these projects, because the projects are creating and spreading methodological transformations that are intended to have field-wide impact. These potential allies could move to the right on the spectrum in the future, becoming users, contributors, or partners, if engaged with the project through outreach. Potential allies also include the nebulous body of potential "re-users": people and communities that could make novel, unanticipated use of the data, archive, or tools provided by a project in the future.

Several factors may be understood to differentiate users from contributors, and contributors from partners. A main distinguishing factor is the degree of mutual investment by contributors and project team into the relationship between them. Users can be understood to become contributors to the project when they are making a unilateral contribution (uploading data, for example). Contribution generally happens through prescribed workflows, created in a top-down way by the core project team.

The relationship between participant and project moves closer to partnership when it can be understood to entail some level of tangible or intangible benefit for both participant and project, or when significant interaction, discussion, and collaborative work is entailed. Here the emphasis is on mutuality: of benefits, of responsibilities. Potential benefits of partnership for the core project and its sustainability are clear: partners help develop the project into new directions, attract funding, and bring new communities of their own. Benefits for partners, on the other hand, may include increased visibility of their communities and relevant histories, expanded research and discovery opportunities, the possibility of

Figure 4.4: "Oyster" model of community engagement: Widening pools of potentially allied communities. A bidirectional arrow indicates dynamism and the movement of communities among strata.



publication for academic credit, etc.

These roles play into feedback loops of sustainability. Interactions between partners and the project tend to develop processes and workflows that later enable more widespread participation. For example, in the Enslaved.org project, the original project partners worked intensively to negotiate the project's core data model and reconcile their independent datasets in order to prepare them for submission to the data hub. This initial investment of effort among partners established a shareable, common project data model and enabled more widespread data standardization with a lower barrier to contribution by the wider contributor community. In the same way, contributor engagement indirectly feeds into growing the user base by improving and increasing content in the resource, so that more potential allies can become users, and more users contributors in turn.

We offer a second illustration that recasts this spectrum in another light: as a set of radiating pools of potentially invested communities, with the project team at the core. We affectionately dub this model the "oyster model" due to its appearance, its pattern of nested pools of communities, each with wavy edges–meant to illustrate the permeability, fluidity, and dynamism of these categories. In this visual an arrow represents the pull from outer strata to the core of the project, which is explicitly part of the sustainability planning of multiple of our case study partners: how to "reel" communities and their members closer to the core of the project, to increase their investment and their role in sustaining the project. At the same time, the arrow is bidirectional, to acknowledge that there is a natural and necessary movement in and out of various levels of engagement.

Examples in practice: Lakeland

Participants described the Lakeland Digital Archive as a metaphorical hub: a center of activity and memory serving not only the historical Lakeland community and its descendants but also broader groups who are currently less active in the archive effort: current residents of the Lakeland area, neighboring communities within wider College Park, the adjacent University of Maryland community, and Route One Corridor communities, etc. Several participants saw the archive's yet unrealized value for these communities as a key to the project's sustainability: "It's not just Lakeland history, it's College Park history. And if it's College Park history, then it's obviously University of Maryland history as well" (L07). One participant saw the archive as a platform for promoting social causes with benefits beyond Lakeland: the archive's potential to "keep the idea of racism on the table" would be "a boon to Lakeland as well as to the greater College Park community" (L08). Participants envisioned the archive as the hub of active outreach efforts. One participant imagined reaching out through the archive to the University

community—an "incoming UMD student of color seeing the archive and saying, 'Okay, let me try to get off campus housing in this community so I can work closely with them over four years'" (L06). Another indicated that the archive might gain traction toward sustainability through increased connections with other local civic associations through events hosted in Lakeland (L04).[1]

Figures 4.5, 4.6, 4.7, and 4.8 exemplify how communities surrounding each project can be understood to radiate out from a core group of volunteers and project staff. As the circles get wider, the communities have been less directly involved in the development of the project—from partners in the immediate outer rings to contributors and then users in the further rings—but all represented communities can be understood as potential allies in the effort for sustainability.

Examples in practice: MEI

The MEI community's interest groups serve as pathways for potential MEI users into the organization. They are critical venues for reaching out to new and potential users, leveraging their niche scholarly interests as gateways to the wider MEI community. Many of the participants who identified themselves as engaged with the community cited the importance of the activities of these groups. One participant indicated the interest groups do the work of identifying uses and furthering inroads for users through creating new resources, and even holding workshops to illustrate possible uses (M06). Several participants cited the necessity of bringing in new and more diverse voices as a central tenet of sustainability, e.g., "We definitely want to bring in new voices and perspectives." (M05) One participant indicated the interest groups do the work of identifying uses and furthering inroads for users through creating new resources, and even holding workshops to illustrate possible uses (M06). Because the interest groups typically bring together subject area experts, they often generate insightful updates or improvements. One participant reflected that in the interest group, they "are out there trying to figure things out, and then they're gonna come and tell the community, this is what we should do." (M02) Other participants echoed these thoughts, and cited the interest groups as the origin of many recent improvements. (M09) One participant drew the connection from the outreach to internal work, saying, "I think that the interest groups are really what make it, make it run…through their teaching when they do their workshops,...they're contributing back to the guidelines, right, and they're contributing to the schema. So it's all interconnected." (M05)

Beyond bringing new users to MEI, the interest groups deepen involvement, as miniature communities to foster contributions to and a sense of belonging in the community. At the same time, the groups help move more peripheral users toward the core organization, at first by gradually engaging experts in conversations that lead to additions to and improvements of the schema. They have now moved into the realm of contributors, and closer to the core of the oyster model, after which they may be tapped for interest group leadership and eventually, in some cases, a role in the central organization.

How participants think about community engagement...

"a single interest group may may drop out, because there's no interest in that topic anymore, or people don't have the time to continue work on it. But if all interest groups would go away, MEI would sort of freeze and that would be the first step into decline"
-MEI participant M09

"So one of the areas in which different communities can get involved is by contributing with some of the data that they have. And that's something that, of course, will take a lot of time…it's work that needs to be done collaboratively. And that's why it has not yet started because...there's this intention of being intentional in all the work that we're doing, …in doing work that we know that we can sustain"
-Enslaved.org participant E07

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[1] Parts of this section were previously published in Fenlon et al. (2021). Please see that paper for more detail on the Lakeland case study.

Figure 4.5: Lakeland communities

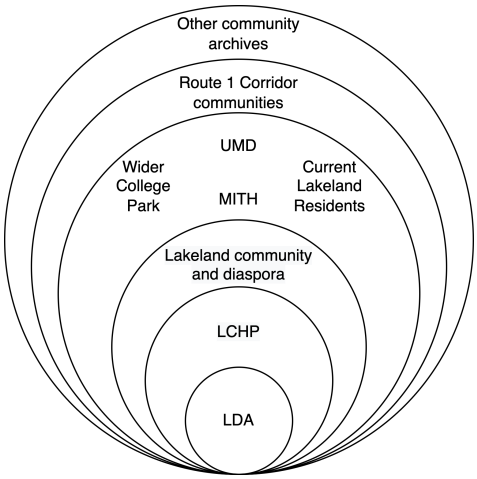


Figure 4.6: MEI communities

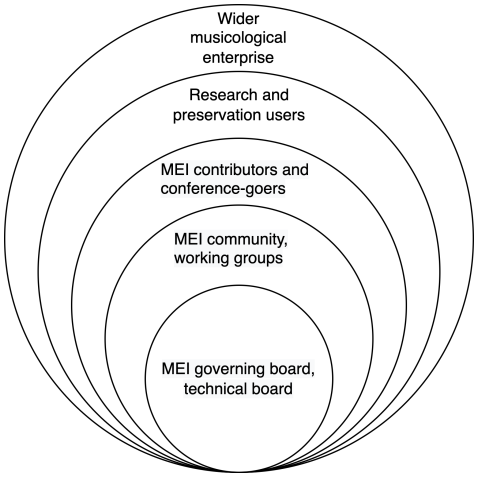


Figure 4.7: OpenITI/KITAB communities

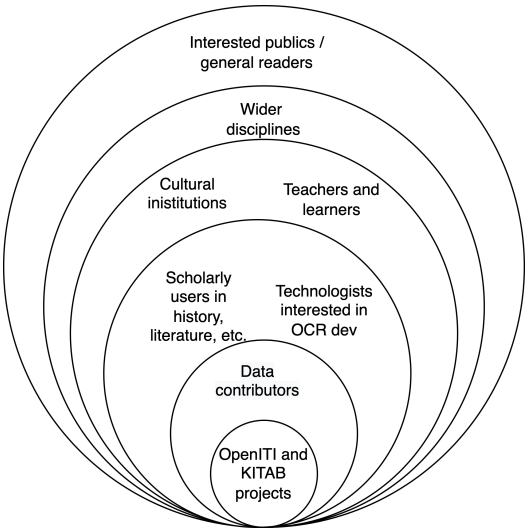
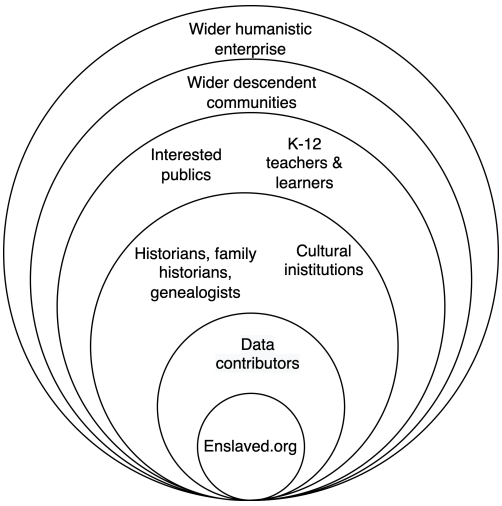


Figure 4.8: Enslaved.org communities



4.2.2. Factor 2: Wellbeing of individuals and communities themselves

The sustainability of a DH endeavor may be understood as co-constitutive of, and sometimes coterminous with, the wellbeing or sustainability of the individuals, teams, and core communities that make up the project. Each of our case study partners conceived of sustainability as entailing the wellbeing and thriving of team members or a core community, albeit to varying degrees, and in different ways. This is visible in the Community Definitions section, above. What does it mean to put the wellbeing of individuals and communities at the heart of how a project conceptualizes sustainability?

Sustainability as team wellbeing...

"I worry particularly about our postdocs—that they'll do this work, everyone will move on, and people will forget the work they did. And that's a real risk. I think there's a particular risk for grants, you know, where people spend years doing something, and then it's a group project and they don't necessarily have intellectual property recognized. So to me, sustainability requires probably both of those—making sure all the data is accessible…and then under that, too, is that those who are contributing to it are recognized for that."
-OpenITI/Kitab participant I03

This factor concerns how each project actively serves its own team and core community—how it advances their wellbeing or their sustainability—in several layered ways:

- **First, through its immediate purpose or impacts.** Most DH projects, being grassroots initiatives, originate to meet an unmet need among a small group of people. The priority objectives of a project are often designed to serve the immediate needs of a core, originary community. These include research needs and other community needs of a core group, such as: making new forms of research and analysis possible, gathering evidence of memory and identity to support shared storytelling and historical work, and other purposes and impacts described in "Definitions of sustainability," above.
- **By serving as a hub for communication and collaboration.** Beyond the immediate objectives of the project, the project serves its core communities by acting as a hub or locus of shared or collaborative effort, reciprocal exchange, and communication. In other words, sometimes the process of developing and maintaining the project helps to serve and sustain the community as much as (or even more than) any given product of the project. This has effects beyond the boundaries or life of the project. For example, the Lakeland Digital Archive aims to act as a hub for community memory, but the process of developing the archive became in itself a boon to

sustaining the community, by bringing community members into conversation and collaboration around a shared purpose.

- **By advancing the careers of team members.** Every case study partner considered the role of the project in the careers of its team members as pivotal to sustainability. This includes providing solid and reliable employment, where feasible, and ensuring good placements or improving the prospects for team members in non-permanent positions. Of course, depending on resources and institutional contexts, each case study partner has fluctuating capacity to employ team members. But all were concerned with how the project would contribute to the trajectories of team members, particularly students, early-career scholars, and team members in contingent positions. For example, one OpenITI participant equated the sustainability of the project or endeavor as a whole with whether the project could adequately support team members with good jobs and meaningfully advance their careers.
- **By skilling broader communities.** Case study partners considered how the project could serve broader groups, both public communities and across academic disciplines, by providing training and instruction to increase technical skills with the goal of adding to their toolbelts and potentially increasing their employability across sectors. While plans for different kinds of training and instruction have reached different levels of maturity in different cases, each considered this a vector of sustainability.
- **By supporting advancements in and viability of academic disciplines.** Multiple case study partners understood sustainability for their project to be connected to the sustainability of a broader disciplinary enterprise. This comes up more vividly in factor 5 (F5: Implementing ecosystem perspective), but is relevant here, expanding from each project's role in careers of its team and skills of broader communities, to consider how the project advances a whole discipline or domain of scholarship. Case study partners understood sustainability for their project to be tied to advancing the viability of digital scholarship in their home academic domains, by for example sharing new methods and lending credibility to digital scholarship by facilitating the peer review and citability of datasets. By participating in the valorization of digital scholarship within a given discipline, projects help clear the path for other DH practitioners in the field.
- **By supporting advocacy, activism, and planning.** Public-facing and community-centered projects contribute to their communities' wellbeing by serving as focal points for relveant advocacy, activism, and planning for sustainable development. In this way efforts go beyond historical or cultural documentation and are *activated* toward community thriving. This is key to sustaining the effort and the community at once. For example, Lakeland participants related the archive's sustainability to its potential to serve as a foundation for active political and social efforts, ranging from urban development decisions to the city's (then nascent) restorative justice initiative. When asked to describe how the archive might become sustainable, one participant (not a Lakelander, but a member of the greater College Park community and the archive development team) described how "a sustainable archives...has more meaning in the present, for present action", specifically observing that the archive's documentation of the impacts of past transportation, land use patterns, zoning, and development policy standards could helpfully influence decisions about ongoing development in the local area (L04). This participant saw the sustainability of the archive as unfolding through an active role in "resurrecting the original idea of Lakeland," by informing development efforts to mitigate the effects of physical barriers like high-rise architecture and train tracks, which divided and displaced the original Lakeland community during urban renewal and which now separate the community from surrounding neighborhoods and local amenities (L04). In the context of a city-wide strategic planning initiative that is currently underway, another participant related the archive to the Lakeland Civic Association's efforts to bring the community's voice to bear on the city's strategic plans. This participant noted that the aim of collecting and preserving the history was in part to provide "a basis for attempting to formulate future plans" (L08). Because of Lakeland's history, the idea of the archive being sustained as a tool for political and social change focuses on issues of racial equity and justice. The same participant noted that a goal of the archive is, in part, "making sure that past racial inequities are not perpetuated" (L08).[2]

[2] Parts of this section were previously published in Fenlon et al. (2021). Please see that paper for more detail on the Lakeland case study.

Examples of sustainability through community wellbeing...

"in terms of a sustainable archives, *that has more meaning in the present, for present action*: its history of transportation and land use patterns, zoning, development policy, standards around things like height limitations and mixed use development, connectivity of that Baltimore Avenue-oriented development to the community itself... "
-Lakeland participant L04

"Culture is always left out in the major theoretical framework [of sustainable development]. And culture I think is really crucial. I don't think you can have equitable sustainability...if you're not thinking about your assets in a cultural manner, and being inclusive in who's at the table to figure out what needs to be done..."
-Lakeland participant L12

4.2.3. Factor 3: Reifying community values in organization and design

Across our case studies we identified multiple examples of how communities sought to establish a set of community values or ethics, and realize their ethical principles or values in the organization and design of their projects and outcomes. This is a third factor in community-centered sustainability, as participants highlighted these practices of ethical grounding as an essential component of the project's sustainability. These processes—of distilling community values and reifying them in practice—are considered essential by some case study partners because they can play a determinant role in other aspects of community-centered sustainability, particularly the project's commitment to the wellbeing of community members (Factor 2), its capacity to engage communities effectively (Factor 1), and setting priorities for project ownership and control (Factor 4).

In practice the process of reifying values can take many forms. The most immediately evident examples are projects explicitly documenting their community values through ethics statements, codes of conduct, or guidelines on community norms. The Enslaved.org project, for example, worked to produce a Statement of Ethics as a touchstone for their project. MEI offers a Code of Conduct for its conference, as well as guidelines for interaction on its digital platforms. The Lakeland Community Heritage Project has articulated a Community Vision to guide a broader restorative justice initiative.

There's nothing novel about the idea that values statements (and codes of ethics, codes of conduct) strengthen communities and promote diversity, equity, and inclusion—which are essential to community sustainability. They are commonplace for formalized organizations and institutions, including major professional associations in the DH landscape and DH conferences. The American Historical Association, for example, has developed a thorough set of "Statements, Standards, and Guidelines of the Discipline", covering a wide range of topics that are fraught with ethical considerations, including professional conduct, improving employment conditions in the academy, best practices for publishing and evaluation, etc. Spiro (2012) explains the importance of articulating shared values to establish a coherent sense of community, particularly in DH, where communities include people with diverse disciplinary and professional backgrounds and theoretical inclinations. We can think of projects as microcosms of DH in this way, each surrounded and supported by potentially diverse communities, so that the importance of shared ethics to sustaining the whole becomes visible. It is less common to see documented commitments, like codes of ethics, at the project level, before the teams guiding them have formalized to the point of becoming an organization, or grown to the point where the need becomes compelling. Yet, our case study partners have undertaken efforts to document their values and visions, and reflected on how these are a factor in sustainability and planning.

Centering broader community needs in project workflows...
"One thing we're interested in when we think about sustainability is descendant communities. And we think about that when we're accepting and peer-reviewing datasets, and when we're publishing datasets—you know, really, what's the thinking behind this data set? Have descendent communities been involved? Have they voiced an opinion? What language do we use in describing the people in data sets?"
-Enslaved.org participant E08

Beyond these documentary efforts, this factor also includes the concrete ways in which projects relate the implementation or realization of their values or ethical codes—in their practices, in organization, and in design—to their sustainability. For example:

- The MEI Community working to ensure that its governance structures and training and instruction opportunities all match the community's express values of inclusivity, accessibility, and openness, to increase community involvement and therefore sustainability.
- The Lakeland community making technical design choices and developing accessible maintenance workflows to ensure that—once the archive has been built and the funded developers with technical expertise have moved on—the community can continue ownership and management of the collection.
- The Enslaved.org project examining project workflows to identify loci for increased community consideration and involvement, in line with their Statement of Ethics.
- The OpenITI and KITAB projects seeking to ensure early-career team members have sufficient space to publish alongside their digital scholarship work, so as to continue their career development.

Reifying value of community ownership in sustainability planning...
One Lakeland participant imagines the archive existing in multiple forms to support community control. They imagine a dynamic, database-driven website, a static version of that website, and a minimalistic file-based version of the archive that could be distributed to the community on jump drives:
"...those jump drives can be easily distributed to the community so they have copies in a way that they can use and look at, but we have this very well functioning but low maintenance website that we can turn back over to the community to maintain in a way that works for them. I think that's as good of a sustainability outcome as we can hope for. Because then if one of those things fails…there's other copies of the jump drive, there's still the website, you know, it's living in all kinds of forms and in places. I think that would be ideal."
-Lakeland participant L01

Considering how organizational model does or does not manifest community values of openness and inclusion...
"MEI is a very, very small community, small world, even though it may be growing...the people that really control it and have a say are very few. And also, I think it's sort of very concentrated in certain institutions...I think in terms of sustainability, there is a major issue in how centralized things are right now, despite whether that is intentional or not; it is a small community, and it is difficult to make a lot of people care"
-MEI participant M02

4.2.4. Factor 4: Navigating ownership and control

By definition these collections are community-centered, which often (but not always) means they are also community-owned and -controlled. In practice, ownership and control over community-based DH projects and their resources tends to assume complex and shifting arrangements. Different components of the project—pieces of technical infrastructure, tooling, data, etc.—may be owned or controlled by different groups and organizations at different times. The project may be mainly managed and propelled by a central organization, but with significant input from a wider community or formal governance mechanisms ensuring democratic control. Alternatively, the project's infrastructure may belong to and be managed by an overarching academic institution, while the data or content remain community property. The potential arrangements are limitless.

All case study participants understood ownership and control to be core considerations for sustainability. But ownership and control over what? The answer varies by case, and is, of course, inextricably linked to how each project defines sustainability for themselves. The foremost issue is whether the core community surrounding the project—whether a small team or a larger domain community—retains the prerogative and responsibility for setting the project's direction and making decisions about how the data, collection, standards, and other project resources continue to be developed, represented, and shared (or not shared) over time. A community can retain this level of control without actually retaining ownership or doing day-to-day maintenance or preservation work, which might be offloaded to a cultural memory institution or data repository. On the flip side, a community might retain ownership but relinquish significant control to a partner institution. In some cases, the concern for ownership and control covered not only tangible project assets (such as the digital archive) but intangible aspects, such as the story the archive tells, or in other words how the digital archive is used and represented as a proxy for the community's own story. Specifically, Lakeland participants expressed concerns that the archive's materials could be misrepresented to remake histories in conflict with Lakeland's narrative of its own history. They wondered whether it was possible to constrain the use and representation of openly web-accessible archival contents, e.g. through user agreements and donor agreements (in the case that materials are eventually donated to a preservation institution). This highlights the tradeoff between wanting to make public-facing and broadly accessible digital resources—resources amenable to duplication, remixing, and reuse—yet wanting to retain some control over whether resources could be used to the detriment of the community. Here the sustainability of the community comes into potential conflict with the sustainability of the digital resources themselves.

Each case navigated issues of ownership and control as they thought through sustainability, and even within cases, participants held varying and conflicting views of how sustainability would be related to community ownership and control. Across multiple cases, some community members saw the sustainable future of the project as necessarily entailing a hand-off of ownership and control over all of the digital objects and technical components of the project—either to a new, ensuing projects under different leadership, or to academic or memory institutions with commitments to preservation. In this case, sustainability means paving the way for eventual hand-off through, for example, detailed project documentation, clear rights statements that enable data reuse, tailored donor agreements or service agreements, and a project infrastructure that is capable of migrating to new environments.

More commonly, participants across all cases envisioned retaining control and ownership of the project and its data in one form or another, while bolstering the project with different institutional and community partnerships. Even if project assets are meant to stay within the originary community indefinitely, relevant issues still arise around how project decision-making, workflows, and design reflect the core community's needs and values, and how internal transitions and shifts of leadership and responsibility will be handled.

Partnership can be essential to sustainability, and depending on the scope of partnership, it can also raise issues of ownership and control. Some Lakeland participants, for example, expressed hesitation about partnering with institutions—including the City and the University of Maryland—perceived to have played a role in historical harms done to the Lakeland community. The fear was that partnerships grounded in a historical legacy of inequity would undermine the sustainability of the digital archive, or continue that legacy of harm to the community through the vector of the archive. Even potential partners with a legacy of allegiance and equity to the community raised the specter of community loss of control over the archive. Lakeland participants imagined countering these concerns by creating multiple copies of the archive to live in multiple forms and places, and by pioneering models of equitable partnership and carefully constrained partnership agreements, as described under Factor 3, above.

Ensuring ongoing community control...

"I would want to have a heck of a deed of gift that really spelled out ongoing community involvement and responsibility and decision-making power within reason. So that the community and the entity, you know, taking in the archive, or helping to steward or shepherd the archive, could understand that this isn't just a transfer from us to you. It's an agreement of an ongoing partnership that we Lakelanders expect to be involved in and providing oversight and guidance for…. I think this needs to have lawyers involved, attorneys involved. And I think it needs to be reasonably spelled out in order to ensure that what I believe usually happens, doesn't happen. Which is, you know, 'okay, it's ours, and now we're going to do what we want with it.' So I think that's tricky. And, you know, there aren't as many models out there."
-Lakeland participant L12

Finally, many participants acknowledged that while the project may control its own digital assets, DH projects are generally is enmeshed in wider infrastructures, control over which lie outside of any one community's purview. Whether in cloud-based and commercially serviced infrastructures, in the local infrastructures of academic institutions, or relying on a diversified landscape of open-source tools and communities, at the edges of every project, sustainability demands relinquishing control, and making infrastructural and partnership choices based on informed assessments of the landscape, and on trust.

Reflecting on the trade-offs entailed in democratic governance...

"If you're a subscriber to MEI-L [the MEI listserv], you get to vote in elections. Anyone can come to a conference. Anyone can submit a proposal to form a study group or interest group... I look at that as MEI is maturing now. On the other hand, that does come with some significant downsides. ...As we have been experiencing in the last few years, the more voices you have, the more confused things become. And so that's a constant struggle, to maintain a democratic organization"
-MEI participant M01

4.2.5. Factor 5: Implementing an ecosystem perspective

The fifth factor concerns how communities and their projects are connected to and affected by relevant, surrounding ecosystems—of digital scholarship and digital publishing, of open-source tools and services, of institutions, and of disciplinary systems of evaluation and communication. How projects understand and leverage their connections to surrounding socio-technical ecosystems plays a determining role in their sustainability.

Our case study partners reflected on various facets of how their projects participated in wider ecosystems, and implications for their sustainability. Aspects of this factor came out in concerns participants expressed about how instability in overarching systems would affect the sustainability of their projects and communities. These include the systemic challenges to DH sustainability more broadly, discussed in the Background section, above, including resource scarcity, shrinking humanities departments, and the rise of contingent labor. These also include much broader systems, including national and international political trends.

- Crisis in humanities graduate education. Participants in the MEI case study expressed concern that a perceived crisis in humanities graduate education would curtail community growth: decreasing both the number of students and support for those students, causing the compression of curricula and graduation timelines, and reducing career opportunities in academia. These factors combined could limit students' ability to engage with the MEI standard and community and gain essential technical training, and subsequently reduce opportunities to grow or sustain the community in the next generation of scholars and practitioners.

- Disconnect from disciplinary systems of publishing, credit, evaluation, and promotion. The widely acknowledged and cross-disciplinary lag in how disciplines and faculty within disciplines evaluate and credit digital scholarship attenuates the sustainability of these projects by reducing the pool of potential staff and leadership (and, more broadly, communities with capacity for and investment in digital scholarship), and by potentially compromising the career prospects of invested students and early-career researchers (related to Factor 2). Cultures of scholarship—of funding, of publishing, of credit and evaluation—vary across different cultures and global regions. Funding and prestige or scholarly recognition for projects like MEI is more forthcoming in parts of Europe, for example, than in the United States, leading to varying levels of uptake and investment across international communities.
- Barriers to uptake of computational methods in the humanities. For certain case study partners, a systemic concern influencing the viability of the project is the relatively low level of uptake of computational methods in their home disciplines, which implies a necessarily constrained set of interested communities for the project. This concern is related to other systemic challenges described above, including the disconnect between digital scholarship and traditional disciplinary systems of publishing and evaluating digital scholarship, and the crisis in graduate education, which limits opportunities for training students in relevant methods.
- A range of political factors:
  - Political supportive and public interest are clearly boons to project sustainability, but are equally as changeable. Participants in both the Enslaved.org and Lakeland case studies reflected on the effects of tides of political interest and public goodwill on the sustainability of their projects. Particularly for more peripheral communities in the oyster model, including the broad but sometimes shallow base of public interest in public-facing scholarly projects, this community's contribution to the sustainability of any project is likely to wax and wane. Lakeland participants observed a wax and wane cycle for public interest and support for the archive, which is likely to swell when racial justice initiatives are palatable to powerful institutions and majority groups, and likely to shrink when these same institutions and group tire of the issues or the movement. They expressed concern that the archive's growing visibility and impact could even undercut its sustainability, believing that groups in power might be inclined to discredit or silence the archive "because of the light it shines on the harm done to the Lakeland Community" (L06). Participants expressed concern that the archive might be "swept under the rug" if surrounding communities "might not want to see that every time they go on the College Park website, or drive through Lakeland" (L06).[3]
  - International relations: Politics played a different role in sustainability for the OpenITI and MEI projects, which include international communities in different regions. Here this factor pertained to how national and regional policy and legal differences affect infrastructures for international collaboration. For example, U.S.-based projects are subject to a different regime of data regulations than are European projects, so U.S.-based technical infrastructures may raise doubts among potential European funders and administrators. In addition, internationally distributed infrastructures are prone to disruption in the event of international conflicts, as in the OpenITI project, which experienced a period of disruption at one point when their U.S.-based GitHub organization was blocked due to the involvement of team members from Iran.

While Factor 5 was most visible in participants' expressed concerns about sustainability, some imagined how their projects might contribute to improving the sustainability of aspects of these wider systems. For example, the Enslaved.org community imagined connecting to and leveraging the wider ecosystem of digital media ecologies and open source communities by embracing and adapting relevant, existing open source tooling. Both the OpenITI project participants and Enslaved.org participants also hoped to provide a model for the wider discipline/domain, of the viability of digital scholarship, for example by enabling new analytic methods and lending credibility to digital scholarship through peer review, publication, and citation of data.

[3] Parts of this section were previously published in Fenlon et al. (2021). Please see that paper for more detail on the Lakeland case study.

Reflecting on positive and negative systemic factors in sustainability

"sustainability is not thinking like, 'well we [need to endow] this project so you know it has like an endowment, that it can just last forever and ever and ever.' It's more that I'm thinking, 'Okay, this project... we can make it indispensable in our scholarly community."
-OpenITI/KITAB participant I02

…This kind of digital work [is] kind of in the limbo, or purgatory. Maybe, at some point it should change, but again, only if or when we make a contribution to the field through this corpus that will be impossible to ignore…
This is the most challenging thing for developing this project, is the credit that you don't get"
-OpenITI/KITAB participant I04

Reflecting on contributing to wider disciplinary sustainability

"at any university, you've got scholars who are doing what scholars have done for decades, and you have some folks who are pushing in new directions...And we are offering peer review... So if you've got a data set, you want to preserve it, you can. You're thinking about sustainability—you can publish with us and get credit for a publication as well"
-Enslaved.org participant E08

4.2.6. Factor 6: Embracing disruption and change

The final factor in community-centered sustainability considers how communities can embrace the inevitabilities of disruption and change as they plan a sustainable future for their projects. For all of the reasons, the systemic barriers, described in Factor 5, sustainability of any given project is never fully in the hands of the project's team or core community. It is subject to numerous factors outside of community control. Every project will encounter disruption. Clearly some disruptions will hit harder than others. Project leads move on or retire. Institutional support wanes. Grant funding ends. Formats and media obsolesce. Community membership and priorities shift.

The projects and communities that thrive beyond the lifespan of a few funding cycles, or beyond the commitment of one project creator, are resilient to such changes in different ways. For them, sustainability is not about preserving a project or its outcomes in amber—the metaphorical objective of many approaches to digital preservation—but about seeing projects grow, change, adapt, and transform for new uses and new or evolving communities over time. And, in true community-centered sustainability, sustainability does not target a specific set of project assets or a particular project formation; it targets the network of communities surrounding the project. A domain or disciplinary community, a community of practice, a community of shared interest, communities defined around identity or memory—these all tend to outlast any particular project, but of course they are themselves continuously evolving in membership and scope and focus.

This is not to suggest that the problem of sustainability will be solved by a collective attitude adjustment. Embracing disruption and change is one among a constellation of factors within a galaxy of other pragmatic influences that together determine the sustainability of any given initiative. However, this factor resonates with Drucker's recent admonition to the field, to "be wary of the reification of sustainability as a thing, one that is addressed through mechanistic and instrumental approaches. Instead, we need to think of the work of digital humanities as *radically incomplete, always ongoing*" (Drucker, 2021).

Our case study partners were clear that adaptation and change are core to their visions of sustainability, though details about how these attitudes manifest in practice were inevitably hazy. This factor entails speculative work and builds upon community values discussed under Factor 3, above.

In Lakeland's case, implementing Factor 6 means ensuring that core communities and the core development team retain the capacity for change over time: that they include new generations, not only among Lakeland descendants but in the wider, present-day community; that they prepare the archive to evolve into new forms, to serve new purposes; and that they prepare for shifts in ownership and control to ensure that even as the community's membership and leadership change over time, the community's story, and its core values, endure through adaptation.

Imagining the adaptation of the archive...

"I hope the thing that will exist in 20 years will have the materials of those memories present in it, in some form. It may be that, you know, what they look at in a browser right now, maybe in 20 years—I mean, I'm not a huge virtual reality person, but you know—maybe somebody will be looking at it as a virtual space. Maybe people put on some glasses or something and they walk around what was Lakeland, and they see images that are relative to that place and hear interviews from people that were…you can imagine the content being repurposed in that way. And that may involve reformatting it…But that transformation could happen and that hopefully, also, the provenance of what those transformations are would still be legible in a way."
-Lakeland participant L02

On failure

"We're trying to do something that's really, really hard. I think as a research center, that's what we should try and be, we should be trying to do. And so that's kinda, it's exciting and a little bit scary. And then at the end– like digital humanities a lot– you try, and fail, and you just keep going."
-Enslaved.org participant E01

5

Implications and Future Work

In this final chapter we offer a preliminary set of practical implications for DH project creators and others. These implications derive from our framework of community-centered sustainability factors. We offer this set of implications in this section in the following form: as a brief summary of each factor followed by a simple list of implications that have been logically deduced from our study of the factor, or which emerged from our observations of the practices, plans, and visions articulated by our case study participants. The sustainability imperatives we offer are focused on the creators and maintainers of DH projects.

We hope these imperatives are a useful starting point for the practical application of our findings, to help our case study partners and others across the wider landscape of DH and digital community archives understand their own roles in sustaining the projects, or engage in clearer dialog about what sustaining a project in a community-centered way might entail. We also hope these implications will add nuance to and meaningfully build upon an existing, rich set of pragmatic guidance aimed at the projects, teams, and communities that constitute DH. For a list of potentially useful guidance, please see Appendix D.

Finally, we describe our directions for future research: into the expansion and application of this framework of factors, and into new research directions illuminated by this case study.

5.1. Factor 1 sustainability imperatives

Engaging interested and affected communities: The first factor in community-centered sustainability is identifying, understanding, and engaging a comprehensive set of interested and affected communities, beginning with a core team or organization and radiating out to include partners, contributors, user communities, and potentially allied communities, following this spectrum of community engagement or the related "oyster model".

Community-centered sustainability imperatives related to Factor 1 are:

- Imagine, research, and engage wider bodies of potentially allied communities
- Increase and diversify communities and their membership
- Intentionally center all communities (not just the core) in planning, development, organization, and maintenance work
- Understand how communities are actively or passively contributing to sustainability in different ways, including by creating "feedback loops" that enable more use, contribution, and partnership down the line
- Aim to "reel" communities from the periphery closer to the center of the oyster model, through:
  - Concerted engagement efforts and events, including ad hoc collaborations, instruction and training, and social events
  - Establishing a culture of inclusivity, approachability, and accessibility through explicating community norms and values, opening spaces for and inviting participation, and being adaptable

  - Honoring contributors with recognition, credit, or compensation
  - Honoring partners through models of mutuality and equitable partnership

5.2. Factor 2 sustainability imperatives

Wellbeing of individuals and communities: How communities factor in the wellbeing of their members and of the community as a whole, through their immediate purpose and impacts, by serving as hubs for communication and collaboration, by providing good work and advancing the career prospects of team members, by helping to provide technical and other skills to broader communities, by supporting advancement in academic disciplines, and by supporting community activism, advocacy, and planning efforts.

Community-centered sustainability imperatives related to Factor 2 are:

- Understand how the project can serve team members (professionally and personally), core communities, and broader groups to meaningfully advance wellbeing and sustainability in turn.
- In particular, think beyond the immediate objectives or priorities of the project to:
  - How the project serves as a hub for communication and collaboration, to help build community that transcends the project itself.
  - How the project serves to advance the skills and careers of team members (particularly those in vulnerable positions) or broader groups.
  - How the project can support advocacy, activism, and sustainable development to advance community goals.

5.3. Factor 3 sustainability imperatives

Reifying community values in organization and design: Ensuring that the workflows, technical development and design, partnerships, and structures of projects reflect or manifest the explicit and implicit values, ethics, and norms of communities.

Community-centered sustainability imperatives related to Factor 3 are:

- Work toward articulating and documenting a set of team, organization, and community values or ethics.
- Intentionally return to and center these values or ethics in the process of design and development through planned check-ins to consider how values are reflected in the project's documented and informal workflows, staffing practices, credit and recognition practice, technical development choices, documentation, partnerships, and outreach and engagement practices.

5.4. Factor 4 sustainability imperatives

How communities navigate issues of ownership and control: Understanding how partnerships, institutional affiliations and relationships, and internal shifts in leadership or organization may affect the community's ownership and control over a project, its assets, and its future.

Community-centered sustainability imperatives related to Factor 4 are:

- Develop a complete picture of the project and its tangible and intangible assets. Edmond Morselli (2020) offer a useful guide to documenting a DH project's tangible and intangible assets as part of holistic sustainability planning.
- Ensure that who owns what is clear, and ensure that commitments to project assets – tangible and intangible – are clear and documented, particularly in advance of project transitions
- Beyond the project "assets", document or map out the workflows that propel development and maintenance. Where are ownership and control in this picture? Where are the points at which ownership and control transition? Where is the community, and are community values and needs reflected in these workflows, and in the ownership and control of the project from a processual perspective?
- Know what potential partners and service-providers involved in sustaining the project bring to the table - not only in terms of hte resources they can provide, but also their expectations, their limitations, and the constraints of their investment in the project. Relying on the goodwill of one project ally or liaison is not enough

5.5. Factor 5 sustainability imperatives

How communities implement an ecosystem perspective: How communities understand and leverage their interconnections with relevant, surrounding ecosystems—not only of institutions and funders, but of digital scholarship and digital publishing more generally, of open-source tools and services, of institutions, and of disciplinary systems of evaluation and communication.

Community-centered sustainability imperatives related to Factor 5 are:

- Understand how the project fits into a broader landscape of related projects, institutions, digital media ecologies, tools and services
- Anticipate potentially impactful systemic and political factors.
- Imagine how the project works actively to improve conditions for sustainability on the whole in a multifaceted sense. How is the project incrementally improving conditions for or increasing the sustainability not only of itself and its core communities, but for the outermost rings of potential allies?
- Reflect these conditions and contributions into project documentation and planning.

5.6. Factor 6 sustainability imperatives

How communities embrace disruption and change: How communities can embrace the inevitabilities of disruption and change stemming from internal and external sources as they plan a sustainable future for their projects. More than an "attitude adjustment", this factor calls on communities to imagine how adaptation, resilience, and change can be anticipatory measures and core to their conception of a sustainable future. The imperatives arising from this factors are largely speculative.

Community-centered sustainability imperatives related to Factor 6 are:

- Imagine and build concrete plans around ways in which the project's team, organization, core communities, and institutional supports will change over time
- Consider and document alternative futures for the project and its resources. What are the exciting opportunities? What are the worst case scenarios? What are some alternating scenarios of success or completeness for the project? What would it mean to fail?
- Identify those aspects of projects that should and should not be susceptible to change over time:[1] What absolutely must not change, in order for the project to retain its core intellectual and social value or contributions to recorded knowledge? In contrast, what can and should change over time?
- Build planning efforts around the values and visions that surface in this imaginative exercise.

5.7. Future work

Significantly more empirical research and theoretical work are needed (and underway), on:

- To expand upon this framework with a broader survey community-based digital scholarship and digital archives, and their specific sustainability needs;
- To understand the implications of this work for other entities in the DH ecosystem, including funders; professionals in library, archive, and museum settings; data curators and repository managers; publishers; etc.
- To tie these outcomes to the broader theoretical literatures on infrastructure studies, organizational studies, and sustainable development; and
- To understand how digital humanities and digital community archives serve local and public communities, and reinforce community resilience.

We aim to publish more interpretation and detail stemming from each case and from our cross-case analysis. What we learned and continue to learn from each case vastly exceeds the scope of this project report. The amount of information still to share is a testament to the generosity of our case study partners, who will review Version 1 of this white paper prior to its final publication as Version 2.

[1] This is inspired by and akin to identifying significant properties in digital preservation planning.

For decades, scholars have acknowledged that sustainability will rely on coordination and strategic collaboration among funders, institutions, publishers, academic leadership, and other stakeholders in digital scholarship. Yet, sustainability solutions are also necessarily localized, situated within and responsive to local organizational contexts and the communities that surround projects, and shaped by the intellectual imperatives of DH projects themselves. Future work will consider a fuller breadth of this landscape, to understand how community-centered approaches to sustainability can improve the durability and impact of a more diverse, inclusive, and equitable knowledge ecosystem.

6

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A

Interview and participant-observation protocols

Interview Protocol

Summary of RQs:
How do communities understand, affect, and implement the sustainability of community-centered digital collections?

- *The meaning and forms of sustainability*
- *The meaning, making, and use of collections*
- *Use implications of how collections are made*
- *Sustainability implications of making and use*

This semi-structured interview will be conducted as an active interview *in which the narrative or dialog is constructed collaboratively by participant and interviewer. Questions may be skipped, elaborated, redirected, or rephrased in light of the dialog; and participants are also welcome to ask their own questions.*

1. Tell me about your background/experience in relation to the [project name] project.
   [prompt] What is your current institutional affiliation and position?
   [prompt] How long have you worked/engaged with this project and in what capacities?
   [prompt] What is your research/disciplinary background?

2. [[For core members of active development team only:] Can you describe from your perspective the development process of the [project name] project so far? Can you give any insight into factors that have guided / are guiding decisions about infrastructure and implementation for this project?
   a. *[alternatively]* Starting from the last major development or development decision that you were involved with, or any example development you want to focus on: Can you characterize that decision/development for us?
      What happened and why?
      Who was involved, and how?
      How do you foresee this development impacting the use of the collection, if at all?
      How do you foresee this development impacting the sustainability of the collection, if at all?

3. What various stakeholders or stakeholder groups do you see as having a stake in, using, or benefiting from the [project name] project, now or in the future?
   a. *[prompt]* How do you perceive it to be used, or in what ways do you hope it will be used?
   b. Do you see community use and the network-building efforts as affecting the sustainability of the archive? If so, how?
      i. [*alternatively*] How do you understand the relationship between the community itself and the sustainability of the corpus?

4. What would constitute or how would you characterize meaningful interactions that users and other stakeholders have/could have with [project name] tools and corpus?
   [prompt] What do you think or hope that the archive means to/for scholarly and public communities?

5. What would it mean for the [project name] project (and corpus) to be *complete* (not only in the sense of "finished", but also in the sense of "whole")? What would it mean for it to be successful?

6. What would it mean for the [project name] project to be *sustainable*? In other words, what, from your perspective, would it take for the corpus and tools to endure?
   a. Do you think that different stakeholders in this project have different views on this question?
   b. For this archive, what does "sustainability" mean to you? How about "sustainability" in an ideal sense vs. in a likely or pragmatic scenario?
   c. How would you imagine the archive to be different in 10 years? How do you imagine it could be used differently in 10 years?
      i. *[alternative/prompt]* Are there ways you would like the archive to grow or develop?
      ii. *[alternative/prompt]* Do you have any particular hopes for it, or for how people will use it in the future? Short-term (1-2 years)? Middle-term (2-10 years)? Long-term (indefinitely)?

7. What concerns do you have about the future of this project, if any? Mid- to long-term?

8. What role(s) do you hope various core partners, stakeholders, communities, and contributors play in sustaining or continuing the development of the [project name] project? (Draw examples of stakeholder groups from prior discussion.)
   a. In the mid- to long-term future of the archive, how do you hope your institution or your community is involved?

9. Is there anything else you'd like to share about the [project name] project?
   Do you have any questions for me?

Participant-observation protocol / Memo guide

Use the following protocol to guide memoing following a participant-observation session. This memoing should be done as soon as possible after a session, based on field notes jotted during the session.

Let the research problem guide the level of detail of your memo:
How do communities understand, affect, and implement the sustainability of community-centered digital collections?
Especially (for this protocol): The meaning, making, and use of collections, including workflows and processes of collaboration by different stakeholder groups

Observer

Date of Observation

Duration of Observation

Event or Activity Observed

Description. *Describe the session you observed. Include whether the observation covered a partial or complete session, what occurred, and who participated. Was this a formal event or more informal interaction? Were any materials distributed or used? What were the goals or agenda items of this session? Were decisions made, actions taken, or goals accomplished? By whom and how, and after what deliberations or conversations? What concerns were raised, and by whom? What was left unresolved? Are there follow-ups or next steps for anyone involved?*

Reflection. *What was your experience in this session (both how you experienced as a participant and how you experienced it as a participant-observer)? What stood out to you about this session, in light of our research problem? What was interesting or concerning or confusing? Flesh out any jotted notes on your thoughts, ideas, questions, and concerns as you were conducting the observation.*

Guide derived from https://libguides.usc.edu/writingguide/fieldnotes and https://www.nsf.gov/pubs/1997/nsf97153/c3app_a.htm

B

Codebook

Codebook

The table below provides an overview of the codebook used to structure our analysis of themes across interview transcripts. Each code or theme has a definition and an example quotation, to which the code was applied in analysis.

Included in some definitions is a parenthetical indicating “Induced” if the code was developed inductively through analysis of the data. Other codes here were derived from the theoretical propositions guiding this work. For more methodological details, including an explanation of what this means, refer to the *About* chapter.

Code	**Definition / Apply this code when participants…** *(Related proposition / Induced)*	**Example quotation**
Accessibility	Reference access to the collection or project outcomes, access to the community or its history, approachability or technical accessibility of the tool, project, collection, etc. *(Induced)*	“One point of sustainability is… of course, the free open access.” (M16)
Challenge	Reference a specific challenge, obstacle, or concern *(Induced)*	“What I realized is that the whole digital process is really a big thing. And it takes qualified people to do that. I'm willing to learn some of it. But, at some point, if you really want it to be expanded and to grow, it has to be with professionals that can do that.” (L03)
Completeness	Discuss what it means for a collection to be complete, whole, finished, done, or fulfilling its intended contribution *(P#)*	“On some levels, you can say it's never complete. It's not complete. But I think it gives something to work with. And at least there's a placeholder to say, ‘We were here.’ And that's really what I was looking for” (L11)
Impact/ Purpose	Discuss the broader intended impacts of the project, beyond immediate functions or uses, including both aspirational and	“I think the overall purpose has been consistent. It’s to be able to save what no longer exists. That even if the

	concrete intended and unintended impacts. Use this code also when participants refer to the project's immediate purpose, the functions of the project or its outcomes, or how any of these cultures/interactions impact the project as a whole as well as people and communities involved *(P#)*	community is not there, that the stories and the lived experience is able to be discovered" (L11)
Innovation	Describe original developments, new ideas, technical innovations or other innovations created or imagined by the project *(Induced)*	"There are also going to be developments in the commercial notation programs that may or may not spawn features that people want to see everywhere. So I think that that'll be something to have on the radar and also making sure that we don't miss the opportunities for experimental notation and also continuing support of tablature and pre-common practice, pre standard notation. I think there are always going to be avenues to either keep up with or to innovate and then offer new paths" (M16)
Maintenance of digital	Discuss aspects of maintenance of digital objects, data, metadata, databases, and technical infrastructure *(P#)*	"By going all in with MEI, we're really, or should be, committing to the fact that it's going to take maintenance. If file standards change, and we have migrations of material or things that need to be migrated to a new hosting or hosting platform or server or whatever… [we are] making sure that that back end is there to support it." (M13)
Maintenance of social	Discuss maintenance of social aspects of the project, community engagement, maintenance of physical development or aspects of the community *(P#)*	"The people side is going really well. That's always an issue, I think, with these large projects: how well do people get along? How are they working together?" (E04)
Origins	Discuss inception, conceptualization and early development, including processes and ideas, at origins of project *(Induced)*	"I was part of a conversation that started the Lakeland Community Heritage Project. Basically, a few people

		talking about the fact that we lived in a community that was dying, and that we felt that the community had a past that was worthy of being understood and kept alive beyond the life of the community that we knew" (L11)
Ownership	Reference who or what entities own or should own sources and project infrastructure, or other aspects of control and custody of records, ideas, etc. *(Induced)*	"So that's what I mean, when I say we want to have input or say, 'Well, I like this, but maybe not that,' or, 'I would like to add this.' We want to have that type of input" (L03)
Partners	Reference partnerships that contribute to the collection or project. *(Induced)*	"We put together [a series of grant activities]. Right now we're waiting on response from National Endowment for the Humanities, to begin to work with partner institutions Maryland State Archives, Library, Virginia Opens, which was a former slave plantation in Larimer County. And some of the work — I don't know how you're familiar with what James Madison's Montpelier — they've done this really fantastic work with slave descendent communities" (E03)
Project Structure & Culture	Reference aspects of the project's internal structure or organization, its culture, prevailing ethics, relationship to related projects (in terms of structure), or specific interactions among the group members *(Induced)*	"It's still more of a bottom up than top down kind of project community, whatever you want to call it. And while we have a board, which is always very good. You can sort of choose what level you want to participate. You can participate with your small little things and not feel you contribute contribute to anything or you can just fight your way up to the board if you really want that" (M12)
Projects, groups, use	Reference projects, working groups, or use scenarios and use cases that leverage a digital tool or collection (e.g., which	"I would not have kept going after the first one because it was pretty overwhelming. If people had not

scenarios	leverage the MEI standard) *(Induced)*	been really welcoming [and asked], 'What are you interested in?'" (M14)
Reuse	Discuss the reuse of any aspect of the digital project/collection: data, templates, workflows, etc. *(P#)*	"We very much [came] away from the planning phase of that with that idea in mind, that a good way to sustain this is to actually reach out, build bridges, make sure that what we're doing reuses and improves and returns, improved products to other people, with the goal in mind to building long term relationships. And I think that has impacted, over the last couple of years actually, the way we've approached relationship-building with some of these other groups that are doing [the Corpus development work]" (I02)
Stakeholders (a.k.a. Interested and affected communities)	Reference groups with a stake in the digital collection, even if not potential users. People/groups who are either potentially affected by the collection or who are otherwise invested in the collection. For example, this may include people represented in the digital collection, members of a community represented in the collection, funders invested in the project, etc. *(P#)*	"I think the only group that has a real stake in OpenITI are people who work with digital tools, so are looking for raw text. They can analyze with digital tools" (I06)
Sustainability	Reference sustainability explicitly: what they think needs to be done to make the project sustainable *(P#)*	"For instructors, or teachers who want to teach with some of the data available on the project, I feel that those are the two communities that are crucial for the project. And for the sustainability and for the extension and for the visibility and the outreach of the project. And for those two communities, there's still a lot of work to do" (E09)
Technical	Reference specific technical aspects of their projects/collections, including specific software, tools, scripts, platforms, matters of digital storage, and issues of data representation, description *(P#)*	"The repositories will just be mARkdown and TI" (I01)

Unsustainability	The flip side of *sustainability* code, and often used in tandem, when participants explicitly reference the unsustainability of projects, or concerns about longevity or finite relevancy *(P#)*	“The API, in fact, I think is is a quite brittle thing, because it requires a lot of infrastructure and that requires money. And I think that's the thing that is the most problematic part of this. We're trying to get this supported by -- in different ways I hope -- by anchoring, it more in the university. And, at the same time, I hope that this API might create some income streams that can help support it at some point. But I would say that this is definitely the layer that's most likely to break” (I06)
Users	Reference actual or potential user groups or intended audiences *(P#)*	“I'm mostly dealing with [converting OpenITI output into] formats that can be shared with wider digital humanities community that works with textual sources” (I01)
Workflows	Apply this code when participants discuss processes and workflows that contribute to the development of the project. Including standards, best practices, quality control, etc. *(P#)*	“So they were kind of working through what it might look like, and then how to design that, and how to develop it, and then design it. So, it is very much in that, vein of what you're talking about, about users, the community users, authorities associated to various types of users, and how that then gets, you know, structured in” (E03)

C

Data overview: Challenges and Opportunities

Overview of challenges and opportunities across cases

How to read this table:

- Here we organize a set of challenges and opportunities pertaining to each factor in our framework of community-centered sustainability factors
- These are challenges and opportunities identified through our case studies, things that came up explicitly in the course of our interviews and participant-observation work.
- To support a cross-case view, we use the "Occurrence in case" column to indicate whether each challenge or opportunity arose in each case study. Each case is indicated by the first letter of its project name: E for "Enslaved.org"; "L" for "Lakeland Digital Archive"; "O" for "OpenITI/Kitab"; and "M" for "MEI". This column should be read as a binary indicator (rather than a quantity): "1" means *Yes, the challenge or opportunity arose in this case*, while a blank cell indicates that the challenge or opportunity was not explicitly related to the case during the study. (A blank cell does not indicate that an opportunity or challenge is completely irrelevant to that case—just that it did not come up explicitly during the study.)
- What is classified as a "challenge" vs. an "opportunity" is really a matter of framing. Challenges are things that tended to be expressed or framed as *concerns* participants had about sustainability. Opportunities are things they expressed as *visions, advantages,* or *strategies* for sustainability during interviews and participant-observation sessions. In reality, challenges and opportunities are often flip sides of the same coin.
- Note that some challenges/opportunities appear multiple times, with slightly different framings, across different factors. We use "see also" to indicate this recurrence.

Factor	Related challenges identified in our case studies	Occurrence in case			
		E	L	O	M
F1. Engaging interested and	Challenge: Labor- and resource-intensiveness of outreach, training, and engaging potential contributor communities, including building scalable workflows for community contributions and increasing technical accessibility	1	1	1	1

affected communities	Challenge: Cultural barriers to engaging different communities and contributors, especially in how different disciplines value data-sharing and collaboration	1		1	1
	Challenge: Sustaining volunteer-driven and crowdsourced efforts over time, and against countervailing factors: shifts in wider political goodwill and public interest, community diaspora, aging, etc.	1	1		
	Challenge: Facilitating potential *reuse* by future communities is resource-intensive and not an immediate priority, but essential to sustainability			1	
	Challenge: More peripheral communities, including broad but shallow base of public interest, are changeable and prone to disappear after current wave of political support and goodwill (See also, F5)	1	1		
	Challenge: Support from the host institution, as a stakeholder, is impermanent—long-term possibility of declining support	1			
	Challenge: Core communities (those toward the inner rings of the oyster model) are necessarily small, which limits engagement and makes finding new, skilled staff and leadership difficult	1	1	1	1
	Challenge: Community growth and widespread uptake necessarily limited by ecosystem factors like copyright preventing application to modern works (See also, F4 and F5)			1	1
	Challenge: Wider crisis in humanities graduate education—including fewer students, limited support, more compressed curricula, and fewer career opportunities in academia—limit uptake, essential training, and community growth (See also, F5)				1
	Challenge: Limited core community because of difficulty of obtaining credit and recognition for digital scholarship in conventional systems of academic evaluation and promotion (See also, F2 and F5)	1		1	1
	Opportunity: Comprehensively identifying potentially allied communities, including currently latent ones, and planning for their likely needs	1	1		
	Opportunity: Engaging a broader set of communities through strategies such as: adapting standard/resources to new possible uses; prioritizing inclusivity; diversifying; involving communities as contributors; forging connections between academic and public communities	1	1	1	1

	Opportunity: Sustainability as reusability for new communities, novel and unanticipated uses, and reuse as community-building; implemented e.g. through careful documentation, metadata, and formal releases of versions of resources to support 3rd-party tooling	1		1	1
	Opportunity: Making resources indispensable to a community, because they are field-transforming and unique	1		1	1
	Opportunity: Positioning project and conducting outreach to harness waves of public interest and political support, to create a self-sustaining audience or broader set of interested communities	1	1		
	Opportunity: Creating ethical opportunities for involving students and new generations of scholars, and including pedagogy as a sustainability vector, skilling a broader community (See also, F2)	1		1	1
		E	L	O	M
F2. Wellbeing of individuals and communities themselves	Challenge: Disparities among community members' employment status, e.g., team members in contingent vs. permanent positions, postdocs vs. full faculty, etc.	1		1	
	Challenge: Obtaining credit and recognition for digital scholarship in conventional systems of academic evaluation and promotion, which can put particularly early career and vulnerable members of community/team at risk (See also, F1 and F5)	1		1	1
	Opportunity: Defining and evaluating sustainability *as* wellbeing of team and community–How does it shift planning?	1		1	
	Opportunity: Ensuring well-being of team members through careful planning around positions, staffing, and financial resilience				
	Opportunity: Leveraging the archive/resources to support community activism, advocacy, and planning efforts				
	Opportunity: Creating ethical (rather than opportunistic) pathways for involving students and new generations of scholars, to advance careers and disseminate digital skills to a broader community (See also, F1)				
	Opportunity: Advancing viability of digital scholarship in an academic domain to support sustainability of DH and practitioners more broadly, through advancing and sharing new methods				

	and lending credibility to digital scholarship through peer review, publication, and citation of data (See also, F5)				
		E	L	O	M
F3. Reifying community values in organization and design	Challenge: Concerns about whether the structure of the organization could inhibit community involvement: centralization of organization, decision-making power, and funding (See also, F4)		1		1
	Challenge: Understanding community needs to inform decisions about the design and development of the archive, so that it remains highly accessible, not only from user end but from development and maintenance side, to support community return (See also, F5)		1		
	Opportunity: Intentionally developing and documenting project workflows that are easy to pass off and maintain, accessible to new and potentially inexpert people, teams, communities	1	1		
	Opportunity: Developing, adopting, and implementing values statements or other documented ethical commitments and community norms, which increase diversity, equity, inclusion	1			1
	Opportunity: Ensuring governance structures within organization matches community values, e.g., through democratic governance, transparency, and accessible pathways to leadership		1		1
		E	L	O	M
F4. Navigating ownership and control	Challenge: Concerns about whether the structure of the organization could inhibit community involvement: centralization of organization, decision-making power, and funding (See also, F3)		1		1
	Challenge: The archive, data hub, or standard is part of a wider digital ecosystem of tools and services, and maintenance of critical components lies largely outside of community control (See also, F5)		1	1	1
	Challenge: The tradeoff between making the archive or data broadly accessible and concomitantly relinquishing control over how the community's story is told. Concern for ownership—not only over the data or archive, but how they are represented and used		1		
	Challenge: Intellectual property law and policy and copyright on modern works pose a potential barrier to widespread uptake of the standard and new use applications (See also, F1 and F5)				1

	Challenge: Understanding community needs to inform decisions about the design and development, so that the archive/data/standard remains highly accessible, not only from user end but from development and maintenance side, to support community return (See also, F3)		1		
	Challenge: Potential partnerships with institutions often carry risks for community ownership and control of the archive and the story, which must be carefully navigated, particularly where partners have history of harm to community		1		
	Opportunity: Identify models for equitable partnership and continued community control in parallel with institutional support, e.g., through carefully constrained donor agreements, explicit and documented commitments from all partners, and ensuring mutual benefits for all partners				
	Opportunity: Developing a digital collection, archive, or resource to support eventual community return and management, e.g., by ensuring maintenance workflows are minimal, highly accessible, and well-documented, and by creating duplicates that can be distributed to communities (e.g., archives on thumb drives or in multiple web locations)		1		
		E	L	O	M
F5. Implementing ecosystem perspective	Challenge: The archive or data hub or standard is part of a wider digital ecosystem of tools and services, which pose their own sustainability challenges (See also, F4)		1	1	1
	Challenge: Varying levels of uptake and investment in the project among different communities or in different parts of the world, due to varying cultures of funding, publishing, and scholarly credit for different kinds of curatorial work				1
	Challenge: More peripheral groups, including broad but shallow base of public interest, are changeable and prone to disappear after waves of political support and goodwill (See also, F1)	1	1		
	Challenge: Intellectual property law and policy and copyright on modern works pose a potential barrier to widespread uptake of the standard and new use applications (See also, F1 and F4)				
	Challenge: Wider crisis in humanities graduate education—including fewer students, limited support, more compressed curricula, and fewer career opportunities in academia—limit uptake, essential training, and community growth (See also, F1)				1

	Challenge: Overcoming gulf between this community (the project, its language, etc.) and wider discourse in the humanities/disciplines, where the methods and tools at the heart of this project can be foreign or altogether spurned			1	1
	Challenge: Obtaining credit and recognition for digital scholarship in conventional systems of academic evaluation and promotion (See also, F1 and F2)	1		1	1
	Challenge: National and regional policy and legal differences affect infrastructures for international collaboration, and technical infrastructure may be prone to disruption due to global politics			1	
	Opportunity: Providing a model for wider discipline/domain of viability of digital scholarship, through e.g. enabling new methods and lending credibility to digital scholarship through peer review, publication, and citation of data (See also, F2)	1		1	
	Opportunity: Connecting to wider ecosystem of digital media ecologies and open source communities by embracing and adapting relevant, existing open source tooling	1		1	1
		E	L	O	M
F6. Anticipating disruption and change	Opportunity: Ensuring the core communities, especially the core development team, retain the capacity for change		1		
	Opportunity: Adopting an attitude of experimentation and resilience	1		1	
	Opportunity: Planning for the digital archive, resources, or tools developed to change and evolve in form over time. This requires simultaneously identifying those tangible or intangible components and properties that must endure		1	1	1

D

Pragmatic Guidance: Annotated Bibliography

Pragmatic guidance on sustainability: An annotated bibliography

The following resources provide practical advice and toolkits for sustaining and preserving digital projects of various kinds, and for building community around projects.

"Digital Preservation Declaration of Shared Values." Digital Preservation Services Collaborative. Accessed August 22, 2021. https://dpscollaborative.org/shared-values_en.html.
KEY SUSTAINABILITY FACTORS: Operation and maintenance, technical infrastructure, community participation

The Digital Preservation Services Collaborative is a group committed to preserving cultural, intellectual, scientific, and academic records. The core values of their work include collaboration, affordability and sustainability, inclusiveness, technological diversity, portability/interoperability, openness and transparency, accountability, stewardship continuity, advocacy, and empowerment. The group's declaration of shared values summarizes and standardizes each of these values. It also helps identify the values to be considered during conflicts or uncertainties, provides value standards to hold each other accountable, and helps socialize new practitioners and members to the missions and values of digital preservation. The latest version of the declaration can be found on the Digital Preservation Services Collaborative website (https://dpscollaborative.org/shared-values_en.html).

Educopia Institute. (2022). *Community Cultivation Resource Library: Community Cultivation – A Field Guide*. https://educopia.org/cultivation/
KEY SUSTAINABILITY FACTORS: Operation and maintenance, community participation

Community Cultivation -- A Field Guide was issued by the Educopia Institute with the goal of assisting communities in evaluating and planning their own growth and development. The guide is meant to provide strategies for developing, managing, the community or organization for community leaders and staff members. Additionally, it contributes resources and modules – such as templates and workshops – used regularly by the Educopia Institute. The field guide is freely available through the Educopia website for use in community building and sustainability (https://educopia.org/cultivation/).

The Endings Project Team. (2022, March 8). *The Endings Project: Building Sustainable Digital Humanities Projects*. UVIC. https://endings.uvic.ca/
KEY SUSTAINABILITY FACTORS: Operation and maintenance, technical infrastructure

The Endings Project is a five-year project funded by the Social Sciences and Humanities Research Council (SSHRC) which looks at preserving projects and their dynamic features as well as how to archive projects. They create tools and policies for the digital humanities to help other DH projects become more sustainable and accessible. The Endings Project focuses specifically on post-conclusion strategies for long-term project usability through technological preservation, such as programming and digital librarianship. The outcomes of this project and the resources they create are listed and routinely updated on their website (https://endings.uvic.ca/accomplishments.html).

4C Project. (2013). *D2.8 – Curation Costs Exchange*.
https://www.4cproject.eu/d2-8-curation-costs-exchange/.
KEY SUSTAINABILITY FACTORS: Operation and maintenance, project benefits, technical infrastructure, resource distribution, community participation

The Collaboration to Clarify the Costs of Curation (4C) project seeks to help organizations across Europe better understand the costs and benefits of digital curation and preservation by using cost modeling methods to create sustainable tools for comparing cost data. Additionally, 4C attempts to examine how resources from existing work may be remade and reused for other projects as well as help project stakeholders understand how to employ such already existing resources. In order to maintain their own work, the 4C project has utilized various community building and outreach methods which help optimize engagement with developed resources in order to sustain its relevancy and accessibility. 4C's outputs and deliverables are continuously being updated as more models are developed and tools are created. Their full Digital Curation Sustainability Model (discussed in further detail below), Sustainability and Benefits Restoration Plan, and other reports and developed resources are freely available on the project website (https://www.4cproject.eu/).

> ***4C Project. (2013). The Digital Curation Sustainability Model. https://www.4cproject.eu/dcsm/***
> *KEY SUSTAINABILITY FACTORS: Technical infrastructure, resource distribution*

The 4C project's Digital Curation Sustainability Model (DCSM) highlights key concepts, relationships, and decision points for digital sustainability through digital curation. In the words of the 4C project team, the DCSM "offers a generic template and a series of components to support discussions, analysis and planning for designing a sustainability strategy." Ultimately, the goal of the model is to provide reference points and concepts that teams, organizations, and/or individuals can use to evaluate the activity of their project, so they can reflect on and change aspects of their project design as necessary.

Jules, Bergis. "Architecting Sustainable Futures: Exploring Funding Models in Community-Based Archives." Shift US (2019),
https://shiftdesign.org/content/uploads/2019/02/ArchitectingSustainableFutures-2019-report.pdf
KEY SUSTAINABILITY FACTORS: Financial stability

The Architecting Sustainable Futures Symposium was hosted in 2019 by Shift Design Inc. and the Andrew W Mellon Foundation to find new ways to equip community archives with sustainable funding. Various organizations participated in the symposium, most of them community-based archives serving marginalized groups and communities. These included LGBTQIA+, indigenous, African American, and Latinx groups, as well as victims of police violence and incarceration. The symposium's main objectives were (1) to better understand the scope, intent, and capacity of community archives, (2) to gain an understanding of current community archive funding models, (3) map the funding landscape, (4) identify opportunity to maintain and increase archive capacity, and (5) make recommendations for how community archives can receive funding. The findings and recommendation are available in the symposium's full report linked above.

Maron, N. L, Pickle, S. (2014, June 18). *Sustainability Implementation Toolkit: Developing an Institutional Strategy for Supporting Digital Humanities Resources* (Report No. 22853). Ithaka S&R. https://sr.ithaka.org/publications/sustainability-implementation-toolkit/
KEY SUSTAINABILITY FACTORS: Financial stability, operation and maintenance, technical infrastructure, resource distribution

The Sustainability Implementation Toolkit helps administrators develop long-term plans for supporting the digital humanities on their campuses. The toolkit is separated into three sections: (1) assessing the landscape, which evaluates who on campus is working in the digital humanities and how, (2) identifying overlaps and gaps, which helps analyze already existing resources on campus which can be used for digital project, and (3) discussing and addressing institutional priorities, which helps provide tools for developing plans and meeting with project and campus stakeholders. Overall, the toolkit can be used to assist with better understanding digital humanities on campuses and communicating the importance of such projects to key stakeholders in order to maintain long-term sustainability for digital humanities projects.

Miller, A. (2019). Digital Project Preservation Plan: A Guide for Preserving Digital Humanities/Scholarship Projects. Available at https://jewlscholar.mtsu.edu/handle/mtsu/5761
KEY SUSTAINABILITY FACTORS: Operation and maintenance, technical infrastructure

The Digital Project Preservation Plan is a freely accessible web resource designed to assist scholars in preserving their digital humanities projects. The plan is a working document centered on preservation infrastructure, which is to be created and agreed upon at the beginning of the project and referred back to and/or revised as the project progresses. As the title suggests, this plan focuses on the digital aspects of project development and preservation, such as the creation and maintenance of online platforms. PDF templates for different sections of the plan are available on the Digital Project Preservation website (http://jewlscholar.mtsu.edu/xmlui/handle/mtsu/5761).

Rieger, Schonfeld, & Sweeney (2022). The Effectiveness and Durability of Digital Preservation and Curation Systems - ITHAKA report
https://sr.ithaka.org/publications/the-effectiveness-and-durability-of-digital-preservation-and-curation-systems/

- See in particular Appendix B, Sustainability Studies Bibliography

Sociotechnical Sustainability Roadmap and Sustaining MedArt Project Report:

Langmead, A., Quigley, A., Gunn, C., Hakimi, J., Decker, L. (2018). *Sustaining MedArt: The Impact of Socio-Technical Factors on Digital Preservation Strategies*

(Report No. PR-234292-16). National Endowment for the Humanities, Division of Preservation and Access. https://sites.haa.pitt.edu/sustainabilityroadmap/wp-content/uploads/sites/10/2017/01/SustainingMedArt_FinalReport_Web.pdf

KEY SUSTAINABILITY FACTORS: Operation and maintenance, technical infrastructure

The Sustaining MedArt project looked at the sociotechnical history of the *Images of Medieval Art and Architecture* website (http://medart.pitt.edu) through the University of Pittsburgh. The goal was to analyze preservation and sustainability practices for the website in order to understand how user-facing, web-based digital humanities (DH) projects can maintain sustainability plans. This report documents the findings and outcomes of the project with regard to MedArt's creation and persistence conditions and their digital preservation and sustainability plans. It also offers recommendations for other project managers who are working to sustain their own DH projects. The results of this project also led to the creation of the Socio-Technical Sustainability Roadmap (http://sustainingdh.net) which outlines a potential sustainability and digital preservation model for other web-based DH projects. STSR is discussed in more detail below.

The Visual Media Workshop, University of Pittsburgh. (2021, January). The Socio-Technical Sustainability Roadmap. https://sites.haa.pitt.edu/sustainabilityroadmap/

KEY SUSTAINABILITY FACTORS: Financial stability, operation and maintenance, technical infrastructure, community participation

The Socio-Technical Sustainability Roadmap (STSR) is a workshop designed to help digital humanities teams make their projects more sustainable over time. The workshop is divided into three sections – project survey, staffing and technologies, and digital preservation plans – with three to five modules per section. The modules incorporate design thinking and collaborative learning to further discussions around social and technical sustainability, what processes can improve sustainability, and what unexpected occurrences might endanger project sustainability. STSR can be facilitated using one of the example module schedules on the website, or another way that team facilitators see fit. The full roadmap is designed to to be initially run at the project's inception. Team

members can then refer back to it regularly to discuss the vision, scope, and sustainability of the project. The goal of STSR is to leave team members with a greater awareness and more documentation of their project's scope, people, technologies, and digital preservation areas in order to provide a holistic and long-term view of the project's sustainability. (See Langmead et al., above, for project context)