Characteristics and Recommendations for Digital Humanities Project Development: A Postprint Based on Analysis and Evaluation of International Award-Winning Digital Humanities Projects

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Abstract

[Purpose/Significance] The "Digital Humanities Awards" is one of the authoritative awards in the international digital humanities field. Through systematic review and analysis of award-winning projects, common characteristics of "excellent projects" and "practical tools" in the digital humanities domain can be identified, and the deficiencies of unsuccessful projects can be summarized.

[Method/Process] Using literature survey methodology, content analysis, and informetrics, this study systematically reviews the award-winning projects of the "Digital Humanities Awards" over the years, and inductively summarizes the characteristics and deficiencies of these projects.

[Results/Conclusion] This study proposes that tool development in digital humanities should be guided by open-source code and user needs; project implementation should adopt linked data, the International Image Interoperability Framework (IIIF), Resource Description Framework (RDF), and artificial intelligence (AI) technology as the main technical frameworks; and projects with limited funding or resources may choose "minimal computing" as their practical model.

Full Text

Features and Suggestions for the Development of Digital Humanities Projects: Based on the Analysis and Evaluation of International Digital Humanities Award-Winning Projects

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Abstract: *[Purpose/Significance]* The Digital Humanities Awards represent one of the most authoritative honors in the international digital humanities field. By systematically analyzing award-winning projects, this study identifies common characteristics of "excellent projects" and "practical tools" while summarizing the shortcomings of failed initiatives. *[Method/Process]* This research employs literature review, content analysis, and informetric methods to examine award-winning projects from the Digital Humanities Awards across multiple years, synthesizing their distinctive features and limitations. *[Result/Conclusion]* The findings suggest that digital humanities tool development should prioritize open-source code and user needs; project implementation should adopt linked data, the International Image Interoperability Framework (IIIF), Resource Description Framework (RDF), and artificial intelligence (AI) as primary technical frameworks; and projects with limited funding or resources may consider "minimal computing" as a practical model.

Keywords: Digital Humanities Awards; tool development; technology implementation; minimal computing

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In recent years, digital humanities applications have flourished, exemplified by data infrastructure projects such as local chronicle knowledge bases and Chinese ancient books evidence-based platforms; the application of deep learning models, text mining technologies, knowledge graphs, and GIS in corpora; case analyses of European and American digital humanities practices represented by the "European Time Machine"; and project development for cultural heritage resources like "Digital Dunhuang" and the "Shanghai Library Historical Documents Platform." Scholars have habitually employed bibliometric approaches to macroscopically analyze application hotspots in digital humanities, reaching

consensus that linguistics, art history, and history constitute the primary application fields, with data infrastructure construction representing one of the current focal points in digital humanities practice [1-2].

1 Related Practice Research

Digital humanities emerged as an independent academic field in the 1990s from the interaction between information technology and humanities disciplines. Academic organizations and research institutions such as the Alliance of Digital Humanities Organizations (ADHO) have established numerous awards to advance digital humanities development, as listed in . Among the most influential are the Roberto Busa Prize, named after digital humanities pioneer Roberto Busa and regarded as the highest individual achievement award in the field; the Digital Humanities Advancement Grants (DHAG) established by the National Endowment for the Humanities (NEH), which primarily fund digital humanities project implementation; and a series of awards by the Canadian Society for Digital Humanities (CSDH/SCHN) for Canadian scholars, including the Outstanding Contribution Award recognizing major contributions to digital humanities research. While some scholars argue that contemporary digital humanities development emphasizes application and practice [3], evaluations and summaries of digital humanities project practices remain scarce. Awards represent an important form of recognition within cultural production, acknowledging and rewarding the best practical works. Diverse award mechanisms can further drive community building in the discipline. Behind award ceremonies lies extensive data collection and database construction, making annual comparisons of nominated and winning works valuable "material evidence" of practical development in the field. This study therefore examines award-winning projects from the Digital Humanities Awards to analyze and summarize current practices, revealing status and trends.

Research on awards in the digital humanities field remains nascent, given the relatively short history of "digital humanities" as a disciplinary term. The awards surveyed in primarily recognize researchers or provide project funding, with project-focused awards either limited to specific disciplines or institutions, or having short durations that fail to fully reflect the historical development of digital humanities practice. Furthermore, most awards in are relatively singular in scope, focusing on database construction, programming, visualization, and digital journals or blogs—non-traditional academic activities and outputs that face difficulties gaining acceptance within existing academic evaluation systems. As an emerging discipline, digital humanities requires diverse awards to recognize and publicize its achievements, attracting broader attention.

Digital humanities is a goal-driven research field with rich practical projects. Many scholars have analyzed current status and demand characteristics from perspectives of project content, technology, and thematic domains. Li Huinan et al. categorized projects by disciplinary field through analysis of digital humanities conference proceedings [15]. Xu Tongyang et al. summarized Australian digital humanities projects and established an evaluation system [16]. Han Yuzhe

identified characteristics of outstanding projects by examining introductions from foreign digital humanities center websites [17]. These clustering and comparative analyses, however, are limited to regional or conference-based samples, lacking horizontal comparison across global regions and vertical analysis across different time periods. This study therefore selects award-winning projects from the Digital Humanities Awards as research objects, organizing and summarizing their content characteristics to provide insights for digital humanities practice.

The Digital Humanities Awards (DHAwards), initiated by digital humanities enthusiasts in 2012, aims to publicize and recognize digital humanities resources, projects, and expertise, encouraging broader public participation in the digital humanities community and raising awareness. Unlike awards issued by ADHO, CSDH, and other societies, DHAwards winners are determined entirely by public vote. An international academic committee oversees nomination and voting, with members serving as volunteers from various countries. The process begins each March when nominations are solicited. The committee reviews whether resources belong to the digital humanities field and whether they were published or made significant progress that year, categorizing them accordingly. After a two-week public voting period, information about winners, runners-up, and other nominated resources in each category is published on the website [18].

2 Case Studies of Digital Humanities Awards

The Digital Humanities Awards has established several permanent categories: "Best DH Tool or Suite of Tools," "Best DH Data Visualization," "Best DH Blog Post or Series of Posts," and "Best Use of DH For Fun." Short-lived categories include "Best DH Contribution Not in the English Language," awarded only once before being discontinued as non-English resources increased; "Best DH Dataset," created in 2019-2020 due to the high volume of competing resources; and "Best Exploration of DH Failure/Limitations," established in 2014 but only resumed in 2018 due to insufficient nominations.

From 2012 to present, the Digital Humanities Awards has recognized 162 winning projects. 2019 saw the fiercest competition, with multiple ties across categories, including two resources tying for first place in "Best Use of DH For Fun" and two tying for third in both "Best DH Blog Post" and "Best Public Engagement." 2020 had the most submissions, with 124 resources competing. Statistical results show the United States as the most active participant country, followed by the United Kingdom, France, and Italy. In recent years, the Asia-Pacific region, particularly South Korea and China, has actively engaged in digital humanities practice, with China submitting six resources in 2020 alone, demonstrating the vibrancy of domestic digital humanities activities. Among winning institutions, the Digital Humanities Center at University College London (UCL) has been most active, with projects winning visualization awards in 2013 and 2016, and a fun category award in 2013.

2.1 Best Tools

From digital humanities infrastructure construction to related disciplinary discussions, tools remain an unavoidable topic, with some scholars arguing that the tool attribute constitutes the fundamental nature of digital humanities [19]. The "Best Tool" category has been the most continuously awarded, highlighting the supportive and interdisciplinary nature of digital humanities for humanities disciplines. Based on characteristics and types, winning tools can be roughly categorized into three groups:

2.1.1 Lightweight, Open-Source Programming Tools or Content Management Tools These tools feature open-source code, ease of use, and low technical barriers, helping humanities scholars quickly build content management platforms or construct virtual academic spaces. The most typical lightweight content management system (CMS) is Omeka [20], which offers advantages including free open-source access, simplicity, community support, integrated functionality, and flexible extensibility, making it widely used in digital humanities projects such as the Florida Memory Project, the University of Miami's DLP project, and the Buffalo Women's Oral History Project. Many award-winning digital humanities projects and platforms are built on Omeka, including the 2012 "Best Public Engagement" award winner The Boston Bombing Digital Archive, the 2016 "Best Tool" award winner Broken Books, and the 2013 champion—CBOX developed by the City University of New York—a tool for building virtual academic communities and online learning spaces with an intuitive setup process and mobile device support, widely adopted by humanities scholars as a teaching tool. The 2019 third-place winner EVT (Edition Visualization Technology) developed by the University of Pisa is another lightweight open-source tool for creating digital editions from XML-encoded texts, helping traditional humanities scholars without TEI knowledge avoid web programming burdens [22].

2.1.2 Text Analysis Tools Humanities computing originated earliest in literature and linguistics [23], making online dictionaries, corpora, text markup, and translation tools hotspots in digital humanities. SHEBANQ (2014 champion) is a Hebrew query tool [24]; DanteSources (2015 champion) is a Dante corpus encoded in RDF [25]; EAGLE (2016 champion) provides translation software for ancient Roman inscriptions [26]; Recogito (2018 champion) is a text and image annotation tool [27]; CDO (2019 champion) is an online dictionary offering translation between ancient Egyptian-Coptic and German, English, and French [28]; and Old English Online (2020 third place) helps beginners practice Old English pronunciation [29].

2.1.3 Platform-Based, Comprehensive Service Tools Increasingly, tools are offered as platforms providing comprehensive services. ALCIDE (2015 runner-up) is a web-based platform integrating natural language processing toolkits and visualization tools to analyze historical documents from temporal,

geographic, and semantic perspectives, enabling scholars to process historical texts more effectively and share research results [30]. Gale's Digital Scholar Lab (2018 runner-up) is a cloud-based research environment that OCR-processes documents within Gale Primary Sources databases and provides text mining and visualization tools [31]. The Civil War Photo Sleuth (CWPS, 2018 third place) platform led by Virginia Tech uses crowdsourcing to improve facial recognition algorithms, tagging soldiers in photographs and linking results with military historical archives to enhance American Civil War data [32]. Transkribus (2019 third place) developed by University College London is a manuscript recognition and transcription platform whose handwritten text recognition (HTR) model achieves 95% accuracy, supporting experts in managing personal files and exporting texts, enabling crowdsourced projects that use volunteers to improve deep learning models and encouraging them to upload documents to enrich platform resources [33].

2.2 Best Visualization

Visualization has long been a hotspot in digital humanities research. Scholars primarily utilize image processing, computer virtual environments, and user interfaces to present data analysis results and project construction. Research analyzing domestic and international digital humanities thematic fields reveals that text mining and visualization technologies, as the most commonly used research methods, frequently appear together at the core of the digital humanities field [34]. As a general-purpose technology, visualization runs through entire projects. Based on usage stages and presentation effects, award-winning projects can be divided into four types:

2.2.1 Virtual Reality Reconstruction Using VR and AR technologies to build virtual environments that recreate historical scenes, including reconstructing historical buildings and simulating historical settings, creates three-dimensional virtual worlds that provide humanities scholars with transtemporal "scene reproduction" capabilities. The 2014 champion Virtual Paul's Cross project used digital modeling to virtually reconstruct early 17th-century St. Paul's Cathedral, its choir, and surrounding cemetery buildings, offering visitors an immersive sermon experience. The 2018 Coins project from the Berlin Museum used PixiJS, d3, and React to virtually display collection coins with multiple interaction methods [35].

2.2.2 Interactive Maps The most widespread visualization application combines historical materials with Geographic Information Systems (GIS) to generate spatiotemporal interactive maps. The 2012 ORBIS project from Stanford University simulated ancient Roman shipping models, calculating routes, time, and costs based on user-selected stations [36]. The 2013 Touch History project also features an interactive map, allowing users to travel through Quebec City as it existed over 400 years ago [37]. The 2016 champion Peripleo project uses linked data technology to connect geographic data from different historical

sources and project them onto dynamic maps from different periods, providing humanities scholars with open-source historical geographic information annotation tools. All 2019 winning projects were interactive maps: the University of Edinburgh's Witches project created an interactive map of 16th-18th century witch residences, trials, and execution sites combined with a timeline; the French National Institute of Art History and the Louvre collaborated to visualize 19th-century antique trading and pricing information on a map, displaying 19th-century French cultural and social history; Harvard University's The Atlas of Economic Complexity is an interactive map showing global trade data, becoming an important tool for investors and scholars exploring global trade dynamics.

2.2.3 Social Network Visualization Another visualization direction in digital humanities research involves constructing social relationship networks based on information exchange between individuals. In recent years, scholars have begun combining spatiotemporal and social networks to provide more perspectives for humanities research. The most typical award-winning case is Kindred Britain (2013 runner-up), which connects 30,000 British historical figures through blood, marriage, or other relationships to form a network, macroscopically displaying British historical figures across three dimensions: time, geography, and network relationships [38].

2.2.4 Corpus or Historical Material Visualization In literary studies, humanities scholars practice "distant reading" by visualizing corpora. Large-scale text content visualization falls into two categories: overall feature description, such as word frequency word clouds; and internal structure revelation, such as knowledge graphs of historical novels' genres, types, and narrative structures. The 2015 champion Metaphor Map of English, based on historical versions of the Oxford English Dictionary, displays different meanings of words across different fields and periods. The 2014 Signs@40 project visualized themes from papers published in Signs journal over 40 years, demonstrating how feminist research themes changed over time. The 2017 Shape of History project from Georgia Tech uses a timeline to describe historical events, with colors representing political forces or event types, transforming historical events into shapes and colors [39].

2.3 Best Project/Best Public Engagement Project

Digital humanities represents a big data and computation-driven research model. Whether in infrastructure or data construction, progress is slow relying on single institutions alone, requiring collaboration among multiple cultural heritage institutions and public participation in co-construction and sharing of resources to achieve digital humanities service innovation. Based on the degree and content of public participation, projects can be divided into four types:

2.3.1 Transcription and Text Correction Transcription and correction represent the most common public participation model, primarily involving the transcription of manuscripts, archives, and ancient books. Projects like Texas Tech University's Manuscript Transcription Project (2013 third place), the National Institute of Anthropology and History's Codex Mendoza Digitization Project (2015 runner-up), and the Italian Paleography Project (2019 third place) all employ crowdsourcing models. Some transcriptions even require multidisciplinary experts, such as the 2016 third-place project Decoding the Civil War, which involves Civil War-era military telegrams and codes requiring specialized knowledge for transcription and interpretation [40].

2.3.2 Resource Co-construction Cultural heritage projects feature numerous and scattered resources requiring multi-party collaboration. Multi-institutional cooperative projects like Chile Memory (2017) bring together collections from the National Library of Chile, the National Cultural Heritage Department, and museums. Oral history projects represent another common resource construction method, with the Boston Marathon Terrorist Attack Archive (2013) and the American Religious Voices Project (2019) establishing oral history teams to collect and organize archives. Another approach encourages individuals to upload resources: Archive Alert (2017) calls on the public to upload important documents or historical materials to rescue endangered archives, while NumET (2018) encourages scholars to upload materials related to medieval cultural heritage.

2.3.3 Data Indexing Data indexing projects focus primarily on map annotation and literature indexing. The 2016 ToposText project [41], for instance, recruited students to index ancient Greek texts and connect text records with geographic dictionaries.

2.3.4 Collaborative Knowledge Creation This involves the public in distributed, collaborative knowledge creation through community interaction and open platforms. Open a GLAM Lab (2019) involved 16 experts from cultural heritage institutions across different countries collaboratively writing a book in five days. The 2014 projects The American Yawp [42] and Encyclopedia of the First World War [43] represent historical materials created through online collective contributions from hundreds of domain experts, demonstrating how scholars from different disciplines can discuss, interpret, represent, and construct knowledge around thematic tasks in virtual environments.

2.4 Best Use for Fun

Digital humanities projects can be viewed as innovative development and use of data. The Best Use for Fun category encourages humanities scholars to explore technology and resources in novel, innovative, and interesting ways. Some projects may represent mere flashes of inspiration with limited academic reference value, but creative use of resources and tools not only inspires other

project developments but also promotes digital humanities. The 2015 champion PAGANS is an interactive game investigating users' judgments of artwork similarity. Developed for Italian VVV (Verbo Visuale Virtuale) project artworks, it collects information to analyze correlations between user characteristics and artwork features, helping curators design exhibition paths more scientifically [42]. The 2016 champion A Generator of Socratic Dialogues represents an interesting experiment in machine-generated writing that simulates Socratic dialogue. The 2019 Digital Ghost Hunt from King's College London combines coding instruction, augmented reality, and fieldwork to encourage students to learn programming [44].

2.5 Best Blog Post or Series of Posts

In the digital scholarship environment, humanities scholars increasingly communicate, interact, share, and publish research results through blogs, communities, and websites. Social networks like Twitter and blogs have become important channels for academic communication and exchange, with some describing digital humanities as "blog humanities." Award-winning blogs and websites and their authors are shown in , revealing three characteristics: (1) a shift from individual to team collaboration—early winning blogs were maintained by individual scholars, but since 2016, most winners have been teams or multi-institutional collaborations, including peer-reviewed OA journals, digital tutorials, and thematic websites; (2) scholars from different disciplines show distinct concerns: historians are the most active, publishing research notes through personal blogs and collaboratively compiling tutorials on digital tools, methods, and open-source programs; linguists, represented by English departments, focus on establishing peer-reviewed OA journals; library, archive, and university digital humanities centers primarily publicize activities and resource construction through digital platforms; (3) team disciplinary backgrounds have evolved from single to multidisciplinary, with content no longer limited to specific fields but addressing more general digital tools and technologies.

2.6 Best Failure Case Study

This most distinctive category aims to encourage digital humanities scholars to embrace failure, continuous experimentation, and exploration. While innovation deserves recognition, failure experiences that provide learning and inspiration are equally worthy of encouragement. Scholars can learn lessons from failed practices, summarize problems, document solutions, and provoke reflection among practitioners. However, due to few nominations, this award has only been presented four times (2014, 2018, 2019, 2020). Based on scholars' reflections, major obstacles and problems in digital humanities projects fall into three categories:

2.6.1 Copyright Policy Issues Orphan works represent a resource black hole in digitization projects at libraries and other public cultural institutions,

with legal regulations on their fair use remaining inadequate in many countries. M. Terras documented in her blog the challenges of obtaining permissions for orphan works amid uncertain UK policy changes [45].

2.6.2 Communication and Team Collaboration Issues with Humanities Scholars Digital humanities projects bring together humanities scholars, librarians, and IT technicians, making smooth communication and consensus-building critical to project success. The Project Bamboo (2008-2012) arts and humanities network technology infrastructure project failed to build a service- and community-oriented system due to insufficient close contact with humanities scholars.

2.6.3 Data Preservation Issues The sustainability of digital humanities projects is closely tied to data preservation and maintenance. C. Barats et al. surveyed all stages from data collection to dissemination, arguing that long-term preservation must consider not only software, tools, and technical factors but also environmental factors in humanities research and practice, exploring contradictions in data access, corpus establishment, and data analysis dissemination [46].

3 Analysis and Reflection on Award-Winning Projects

The Digital Humanities Awards can be characterized by three features: (1) broad participation—nominations are unrestricted by language or geography, actively encouraging minority language regions, with participating countries spanning the globe, making it the most widely disseminated award; it has been held continuously since 2012, representing one of the longest-running awards in digital humanities. (2) Transparency—the list of competing works and vote counts are published on the website, with the entire selection process open to public scrutiny, ensuring fairness and reflecting popular opinion. From nomination to winning, selection is entirely through public email voting, with the sole criterion being vote count, while the committee screens valid votes to prevent duplicates. (3) Flexible and comprehensive categories—covering tools, projects, articles, and other digital humanities aspects, with adjustments made annually based on the quantity and content of competing resources, such as the 2020 "Special Category: Best DH Response to COVID-19," demonstrating both innovation and reflection of annual hotspots.

However, without monetary incentives or support from professional societies, "academic" recognition remains limited. Influential tools like Markus, the China Biographical Database (CBDB), and the Text Encoding Initiative (TEI) have not achieved ideal rankings, while some winning projects or tools have ceased updates or development due to various reasons, such as Textal (runner-up for Best Use for Fun in 2013), last updated in 2014, and Checklist for Digital Humanities Projects (champion for Best Tool in 2017), now inaccessible due to resource

migration. The evaluation standard is singular—online votes—making the dimension relatively one-dimensional, with voting only possible through Google Forms, creating barriers for regions outside Europe and America, particularly China. Consequently, results lack certain professionalism and objectivity; inconsistent category settings also compromise the award's authority and stability.

Examining winning projects' content and construction models reveals several features: (1) many winning projects feature small yet novel perspectives with strong professionalism, such as the 2019 Best Visualization winner "Visualization Map of Scottish Witches," which created an interactive map linking witch residences and execution sites using linked data. This "small but refined" approach has gained favor among scholars, particularly individual scholars lacking team support or at project initiation stages, as it improves success rates. (2) Social issues and resource construction projects increasingly leverage public power, with society, experts, technicians, and university faculty and students jointly participating in digital humanities project construction, operation, and dissemination, from data collection and cleaning to funding support and sharing. (3) Sustainable development of digital humanities projects has become a critical issue. Many winning projects have ceased operation and maintenance, such as Project Bamboo (selected in 2012 and 2014), which ended due to lack of humanities scholar participation and funding shortages. Digital humanities projects fail for numerous reasons, including funding shortages, outdated technology, and personnel turnover [47], with some early datasets and projects becoming inaccessible due to resource migration or incorrect data format choices. Therefore, sustainability issues, lifecycle management, and subsequent maintenance must be considered during project planning and construction.

4 Summary and Recommendations

4.1 Digital Humanities Technology Summary

Information technology is the most important driver of paradigm innovation in humanities research. The digital humanities technology system can be divided into digitization technology, data management technology, data analysis technology, visualization technology, VR technology, and machine learning technology. lists core technologies from some award-winning resources. RDF, ontologies, linked data, and the International Image Interoperability Framework (IIIF) are primarily used for data organization; text analysis and mining technology, spectral imaging technology, natural language processing, social network analysis algorithms, and machine learning AI technologies are mainly used for data processing; GIS, VR, AR, and MR technologies are primarily used for data presentation and display. Some scholars consider RDF, linked data, IIIF, big data, and AI as universal technical frameworks for digital humanities project construction. Universal standards such as RDF, TEI, SGML, and IIIF define standards for describing, organizing, and presenting data, documents, and images, enabling unified integration of underlying digital humanities resources. AI technology, algorithm models, social analysis, and machine learning are used

for text mining and image processing to reshape and transform humanities resources. Increasingly, scholars use GIS, AR, and other technologies to visualize research results, promoting knowledge dissemination, understanding, and innovation. Technology is not static, and digital humanities technical frameworks continue to develop and update, with no inherently good or bad technologies—only appropriate choices based on project characteristics and application requirements.

4.2 Digital Humanities Tool Development Recommendations

Humanities scholars often embrace digital humanities through using digital tools, which to some extent represent the fundamental attribute of digital humanities, influencing research paradigms and approaches in traditional humanities. Despite substantial investment in digital humanities infrastructure and tools, only 6% of humanities scholars use digital resources and tools in their research [33]. Some argue that digital tools require more advanced technology and powerful functions to attract humanities scholars. However, award results show that the most acclaimed tools do not necessarily integrate the most advanced technology or complex functions. Based on commonalities among winning tools, the following recommendations are offered for tool developers:

4.2.1 Lightweight, Open-Source, and Community-Supported Whether content management tools like Omeka, visualization tools like EVT, or annotation platforms like Recogito, these tools are open-source and free, representing lightweight applications with convenient deployment and low technical barriers. Although digital humanities curricula intentionally cultivate humanities scholars' digital literacy and basic programming abilities, most humanities scholars have zero programming background. Therefore, tools must have low thresholds, enabling researchers to operate them without technical knowledge. Active user communities represent another critical factor for successful tools, serving as platforms for system development exchange (e.g., GitHub, Trello) and user interaction. Open-source communities not only ensure tool version updates and functional improvements but also provide technical support for humanities scholars.

4.2.2 User-Friendly Interface and Easy Functionality Some tools have simple interfaces but offer exactly what users need. The Online Coptic Dictionary, for example, has a clean interface with intuitive functionality that humanities scholars can use by intuition alone. In recent years, tools have trended toward integration and platformization, requiring builders to consider interface flexibility and clarity in design and development, hiding infrequently used functions to create efficient user interaction. As one historian commented, easy-to-use tools allow scholars to focus on research questions themselves rather than wasting time exploring functions and operations [48].

4.2.3 Enhanced Tool Training and Documentation Many humanities scholars lack understanding of digital tools, including their principles, operations, and case studies, creating a sense of "distrust." Scholars therefore call for greater emphasis on tool promotion, such as cultivating skills in data analysis, manipulation, and interpretation. Gale's Digital Scholar Lab has gained favor among humanities scholars through training lectures at universities. F. Gibbs's practical survey [49] revealed that many humanities scholars cannot fully understand how tools help their research after reading documentation, recommending that user documentation include basic tool knowledge, specific examples, and research methodologies. The text annotation tool Markus exemplifies this well, offering detailed operation steps, demonstration animations, and case studies on its platform.

4.2.4 Humanities Scholar-Oriented and Closely Connected to Scholar Needs Taking history as an example, historical geography was an early adopter of digital technology, introducing statistical analysis software and establishing databases early on. However, specific research problems require "tailor-made" tools, such as ancient-modern map overlay, unit conversion, and statistical data processing. Establishing close connections with humanities scholars drives thinking about how to develop targeted digital humanities tools that combine research object and thematic characteristics.

4.2.5 Open Data Interfaces and Integrated Tool Platforms for One-Stop Services As digital infrastructure improves, data standardization becomes increasingly important. Tool developers should collaborate with data storage institutions and other tools, encouraging compatibility across different formats and standards to support data interoperability. Markus evolved from a text annotation tool into a multi-functional reading and text analysis platform integrating multiple reference tools and editors, supporting data sharing with GIS and CBDB.

4.3 Digital Humanities Project Development Recommendations

Digital humanities is a multidisciplinary collaborative research field characterized by heavy workloads, limited funding, and cross-disciplinary cooperation. Crowdsourcing models utilize open participation and collective intelligence for humanities data collection, processing, and analysis, representing an optimal solution for data shortages in digital humanities projects. Current digital humanities project front-end construction increasingly adopts crowdsourcing to promote infrastructure development.

Examining failed projects reveals two major challenges for digital humanities projects: sustainability and data accessibility. Most projects suffer from funding shortages, with some becoming inaccessible without subsequent funding support. For small-scale digital humanities projects with limited funds or resources, A. Gil proposes a "minimum computing" practice model that con-

structs projects with "optimal configuration," "minimum maintenance," and "minimum consumption" under hardware, software, and network capacity constraints [50]. Specific guidelines include: building project frameworks with discrete, lightweight components such as microservices architecture, component encapsulation, and modular code to enhance program flexibility and extensibility; using universal standards like W3C standards and linked data for data publishing to increase resource content access and data reusability; reducing dependence on tools, databases, and software to minimize resource requirements and processing time; and reducing professional jargon in favor of common language to increase participation in shared culture, such as domain experts and developers creating common language together to clearly communicate business rules through team exchange and enhance project maintainability.

Longitudinal comparison of Digital Humanities Awards resources reveals the evolution of digital humanities applications: (1) From a tool perspective, early applications focused on text content management and text encoding, with deepening interdisciplinary integration adding geographic and spatiotemporal annotation dimensions. As digital humanities methodologies and academic communities mature, software like Transkribus has evolved beyond a tool into a virtual and open research environment or even a knowledge production system. (2) From disciplinary application perspectives, digital humanities applications have deepened over time, with linguistics and history remaining primary fields while applications in art, religious studies, feminism, postcolonialism, and other social humanities disciplines have gradually increased, featuring more obvious interdisciplinary cross-fertilization and enhanced cross-boundary communication and cooperation, particularly evident in blog articles. (3) From digital resource perspectives, distinctive resources and "unpopular but excellent" studies are more likely to gain favor, such as research on rainbow communities, resources in minority languages or cultures, and postcolonialism reflections, demonstrating that "small projects" can win awards with appropriate topics and positioning and cultural heritage value.

Through research on Digital Humanities Awards-winning resources, this study systematically analyzes digital humanities tools and projects, offering recommendations for tool development and project construction. Future research should conduct broader collection and analysis of digital humanities practices to explore specific development trends.

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Abstract: *[Purpose/Significance]* In the field of international digital humanities, the Digital Humanities Award is one of the most authoritative honors. By systematically analyzing award-winning projects, this study identifies commonalities between "excellent projects" and "practical tools" while summarizing shortcomings of failed initiatives. *[Method/Process]* This paper employs literature research, content analysis, and informetric methods to examine award-winning projects from the Digital Humanities Awards across years, summarizing their characteristics and deficiencies. *[Result/Conclusion]* The analysis proposes that digital humanities tool development should prioritize open-source code and user needs; project practices should adopt linked data, International Image Interoperability Framework (IIIF), Resource Description Framework (RDF), and artificial intelligence (AI) as primary technical frameworks; and projects with limited funds or resources may select "minimum computing" as a practical model.

Keywords: Digital Humanities Awards; tool development; technology realization; minimal computing

Note: Figure translations are in progress. See original paper for figures.