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# How to cite this digital edition?

### Abstract

Citing and referencing is an important aspect of scholarship as it makes research processes retraceable and transparent. Over centuries citation practices have been optimized for print publications. However, the digital revolution and the increased scholarly output online provide new challenges. For instance, the physical form of the book which was the basis for citation styles in the past is replaces by different types of online resources of which only some resemble books. Another issue is that digital resources on the internet are not as durable as printed books that are distributed in multiple copies in libraries across the world. For scholarly citation this is a problem as a website referenced today, might not be available tomorrow or might have changed its address which is frequently used for referencing. Editions, in print or digital, are supposed to be stable reference points for scholarly discourse as discussions the scholarly community engages today should still be reproducible in 50 or 100 years - as it is the case with printed scholarly editions from the 19th century. Consequently, assurance of long-term availability of resources and clarity of how and what to cite in a digital edition is vital. That the lack of providing this kind of assurance and information makes online resources less attractive for citation has been shown in a recently published survey using as a case study British History Online and Early English Books Online. The survey assessed if researchers prefer to cite print or digital resources and the results indicate that there is still a very strong "culture of noncitation" of electronic resources among students and researchers in the humanities. The authors of the study suggest that creators of web content can contribute to facilitate the citation of digital resources by providing recommendations on how to cite a resource and by having a solid permalink strategy [Blaney and Siefring 2017, 46-7]. The following study tries to explore this topic further. After a brief introduction and discussion of the key issues of digital citation such as "broken links" and strategies to provide persistent identifiers for the citation and access of online content, the results of a survey of 100 digital scholarly editions will be presented. The survey focuses on citation recommendations provided and permalink strategies used by digital scholarly editions. In this context the paper will look at how permalink/PID strategies and citation recommendations can make digital editions better citable. A closer look will be taken at citation recommendations of selected editions in order to highlight possible solutions.

# Introduction<sup>[1]</sup>

Editions, in print or digital, have a prominent place in humanities research as they make primary sources accessible and are the foundation for scholarly argumentation in many disciplines. Allowing the unambiguous citation of an edited text is an important task of a scholarly edition since it makes research processes retraceable and transparent. This has not changed in the digital age, however, despite the digital medium posing new challenges for editors and users of scholarly digital editions (SDE) alike.

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The Institute for Documentology and Scholarly Editing (IDE) has developed a checklist to evaluate scholarly digital editions. Two items of this catalogue deal with the assessment of the citability of such editions:

• **1.2. Bibliographic identification of the reviewed SDE.** An SDE should be identified in terms similar to traditional bibliographic descriptions: a title, the responsible editors, other responsible persons and institutions, the dates of its publication (initial, versions, last modification), and the address (in terms of web-

URL or other naming conventions like DOI, URN or PURL) should all be evident. Any difficulties extracting such information from the SDE should be remarked upon in the review. [Sahle et al. 2014, 1.2]

4.8. Identification and citation. Are there persistent identifiers for the objects of the SDE? Which level of
the content structure do they address? Which resolving mechanisms and naming systems are used? Does
the SDE supply citation guidelines? [Sahle et al. 2014, 4.8]

The first quote from the catalogue is concerned with the possibility to extract suitable bibliographic data to cite an SDE correctly. It is important that the SDE should be identifiable in the same manner as traditional print publications. However, besides traditional bibliographic data such as the title, editor(s) and date of publication, the version or the date the digital object was last changed is also indicated and the Internet address is important for citation too. Two other crucial aspects of digital editions are mentioned in the second quote: does the SDE use persistent identifiers and does it provide citation guidelines for users? Print editing knew similar concepts: updated versions of a book are published as second, third and further subsequent editions, the ISBN is recognised as a persistent identifier and the title page as the location where all the bibliographic information can be found. When looking at digital editing however, updating an edition, providing persistent identifiers and bibliographic data for citation are not handled in a similar manner and pose new challenges.

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**Persistent names.** URLs are globally unique identifiers that could be used for persistent addressing of online resources [Berners-Lee 1998]. However, as a URL's primary function is to locate resources, they do not guarantee that the information they present to stays the same over time or that the entire web page they point to will still be available in two, five, or ten years. The unreliability of URLs for citation is well known and causes problems for research in different disciplines [Klein et al. 2014]. Permalink and Persistent Identifier (PID) strategies have been developed to ensure resources can be cited using names that are globally unique and stable over time [Arnold and Müller 2017]. However, it must be emphasised that the stability of permalinks and PIDs is primarily an organisational challenge as the assigning institution must put policies in place for assignment, management, and maintenance of identifiers and ensure correct resolving [Shafer et al. 1996] [Brugman, 2009]. Consequently, persistence of online resources cannot be guaranteed without commitment.

**Versioning.** Closely linked to stable addresses is the question of how to deal with changes of digital objects over time. A content provider may change the content of a website at any time and without any explicit indication of the changes [Jones et al. 2016]. From a scholarly citation perspective, this causes several issues, the foremost of these is to the user who needs to cite a specific version of the webpage content as she consulted it. For instance, this is particularly true for users of legal texts the citations of which must refer to a determined version. This is also a relevant issue for scholarly publishing and the recent publication by Broyles has highlighted the relevance of this topic for the digital editing community [Broyles 2020] [Bürgermeister (forthcoming)]. Critical editions are the basis of textual scholarship and constantly changing texts cannot be reliably cited. Wikipedia is an example of a website with constantly changing content, with every editing of an article resulting in a new version with a permalink. Wikipedia deals with this issue in the following way: The most recent authorized revision of an article can be accessed via a canonical URL that always points to the most recent, "accepted" version of an article. However, older versions can still be accessed using their permalink which is also strongly recommended by Wikipedia itself.<sup>[2]</sup> When a user accesses an older version, a warning message appears indicating that newer versions of this article are available.<sup>[3]</sup> In TEI editions, changes and revisions can be documented using the <revisionDesc> in the header section of the TEI document by providing a list of changes made to a document.<sup>[4]</sup> The benefit of this approach is that the editor(s) may provide a descriptive summary of changes, which provide additional information about the people involved, the parts of the documents that were effected, etc. and this can be as detailed as the editor(s) require it to be. However, a disadvantage is that it is very impractical to record all changes to a file in the TEI document and consequently older versions cannot be recovered using the TEI method alone.

**Granular citation.** A citation should be as precise as possible to make it easier for a reader to address and verify the source. In academic papers and scholarly discussion, it is necessary to cite not only entire works but to be precise subentities such as the page numbers of a book or verse and the number of a poem. In the humanities, established granular citation methods are used to cite chapters, paragraphs, pages and lines of a print publication or manuscript. A frequently used example for canonical numbers is that of the books, chapters, and verses of the Bible. These entities can be used to cite passages of the Bible across different editions and translations which ensures, for instance, that John 3:16 ("For God so loved the world, that he gave...") can be found in any Bible version or translation under the same number.<sup>[5]</sup> One must distinguish between semantic numbers, which are content related (e.g. chapters of a book), and visual numbers, which are object related (e.g. folios and lines of a manuscript) [Kalvesmaki 2014]. This requirement has not changed for online resources; however, the implementation of granular citation options is very different in a digital editing context. From a technical perspective, granular referencing means referring to individual resources within a website, using an URI, or to a place within an electronic resource, either by addressing a position (e.g. byte position or pixel in an image) or the relevant markup structure. For a digital edition editor, it is important to evaluate what kind of granular citation strategy is required. It can be argued that traditional forms of citation of a source text, such as canonical numbers, can and should be considered and implemented in a new digital edition.

**Citation practice.** Several publications have pointed out that despite the availability of an increasing number of digital editions these are not being cited by the majority of students and researchers in the humanities who prefer to cite print publications instead [Porter 2013] [Rosselli Del Turco 2016] [Driscoll and Pierazzo 2016, 15] [Blaney and Siefring 2017]. Blaney and Siefring's British History Online and Early English Books Online survey has shown that users are both concerned about the stability of digital resources and that they do not know how to cite digital resources correctly. They suggest that creators of web content can contribute to facilitate the citation of digital resources by providing recommendations on how to cite a resource and by implementing a solid permalink strategy [Blaney and Siefring 2017, 46–7]. The relevance of the topic is also highlighted by an article about a recent survey on the use researchers make of digital editions and their expectations. The authors report that participants indicated that the provision of suitable citation information is still a neglected issue [Franzini et al. 2019]. Consequently, clarity about how and what to cite in an SDE is vital information that should be communicated to a user.

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The following study attempts to explore this topic further. In a survey conducted by the author of this study, the citation recommendations and permalink strategies of 670 digital editions, published between the 1990s and 2020, have been analysed. The primary goal of the survey was to collect data about how digital editions ensure citability of their content by:

- 1. providing citation recommendations
- 2. ensuring the content can be cited with permalinks or PIDs
- 3. implementing a versioning strategy for its data

The quantitative analysis of the collected data will show developments that are, hopefully, not only representative for this sample, but applicable to the wider SDE community. In addition to the quantitative analysis, various citation strategies applied in different editing projects will be illustrated by taking a closer look at some of the editions in the list. The goal is to identify developments/strategies that are frequently used and which also appear to have proven value as effective solutions.

The full list of editions and data on which the analysis, charts and conclusions are based is provided in a Github repository. All charts published in this paper were produced by the author himself and are based on the compiled dataset. The Github repository also contains the Jupyter notebook used to produce the graph visualisations.<sup>[6]</sup>

## Sampling strategy and data collection

Patrick Sahle defines SDE as "scholarly editions that are guided by a digital paradigm in their theory, method and practice" [Sahle 2016]. Following his own definition, Sahle has compiled a catalogue of 670 editions over the last two decades.<sup>[7]</sup> Sahle included several important properties of the catalogued editions and some of them, such as date, subject, language, and the category "Edition source period," were used for analysis purposes in this research. Figure 1 shows the distribution of these categories across Sahle's catalogue. However, at the time of writing this article, the catalogue included only occasional information about the availability of permalinks or citation information (for 85

editions). Therefore, all 670 editions had to be inspected to collect relevant data to assess their citability.



The study of a temporal development was desired as an original assumption of the author was that more recently developed editions show a greater awareness for issues of citation and more frequently use permalinks or PIDs for their resources. However, there are two main problems in trying to assign a date to a digital edition. First, some digital editions do not clearly state a date of publication. In print publishing it is standard to have a date of publication printed either on the title page or on its reverse side. Digital editions do not always provide an official publication date, some provide a period of time when the edition was under development, but already available as alpha or beta version, and a few digital editions do not publish any dates or include only vague information about their development. Second, digital editions may have changed over time (and indeed many did) and their interface and structure might have looked different ten or fifteen years ago. Consequently, a "How to cite?" page or a citation info pop-up may have been added more recently and may not have been present in an earlier release of the edition. To balance these issues and to facilitate a temporal comparison, the author divided the time between the 1990s (the period of development of the earliest edition in our data set) and 2020 into four periods: pre 2006, 2006-2010, 2011-2015, and 2016-2020. Each edition was assigned to one of these four periods depending on the publication date listed in Sahle's catalogue. The Internet Archive's Wayback Machine was consulted for earlier editions (pre 2016) as it stores early snapshots of many editions. The URL of the snapshot that was consulted was recorded in the dataset for reference. By looking at an early snapshot it was often possible to see if a citation recommendation was already present earlier in the edition or if it was added later. For several editions no early snapshot was available, and I had to use a more recent snapshot or create a new one.

Each edition in Sahle's catalogue was inspected and the presence of citation information was evaluated as follows. 13 Data about three categories was collected:

- 1. the presence of a citation recommendation with or without examples of how to cite the edition or parts of it
- 2. the presence of PIDs or permalinks
- 3. the presence of any version information (of individual objects or the entire edition)

What made the assessment slightly difficult, is that digital editions do not yet have an established structure. 14 Consequently, the citation information could be found in different places. However, after looking through several editions, the author identified the most likely places to look for citation information:

- 1. Some editions have bibliographic data or an example of how to cite the edition directly on the start page.
- 2. Some editions have their own citation page which can be accessed through a link in the top navigation.
- Occasionally the footer includes bibliographic data, citation recommendation or a link to a page with citation information.
- 4. The "About (this edition)," "Project," "Copyrights and permissions" pages sometimes contain a section explaining how to cite the edition and parts of it.
- 5. The impressum may contain citation information.
- 6. Some older editions provide an entry on how to cite the edition in the FAQ section.
- 7. Citation information could be available directly with the edited texts, facsimile images, etc.
- 8. And finally, it should be mentioned that some editions use a system of "implicit citation" by providing structural entities within an edition, but no explicit recommendation on how they should be used for citation and consequently they were also not counted as providing citation recommendations.

This variety of options highlights a core problem for users of SDEs. When moving from one SDE to another, one cannot be sure to find the citation information in the same place or implemented in a similar way. As the collected data for this study is based on the observation of the author, it might be possible that hard to find permalinks or citation recommendations were overlooked and are not included in the dataset. However, this does not impact on the results of the study as the goal was to explore the citability of editions. Citation information that is hard to find and uncertainty about the availability of permalinks, reduce the chance that an edition will be cited correctly and, therefore, can be considered as "not present" or "not relevant."

The author looks at a "Citation recommendation" as a statement about how an edition or parts of it should be cited. Most editions that provide such information label it clearly. The dataset records not only the absence or the presence of such recommendations, it also includes a distinction between citation recommendations for the entire edition and recommendations for a more granular level of citation such as individual letters, individual webpages, images, chapters and paragraphs of a text. These categories are in concordance with the data collected in Sahle's catalogue. Citation recommendations can have different levels of detail. Some may only suggest a permalink or an URL to be used, other editions include all necessary bibliographic data (editor, year of publication, etc.) for a citation and provide citation examples. Frequently, these citation examples follow a common citation style like MLA or APA. In addition to citation recommendations is very diverse and ranges from a simple version number for the entire edition (like an edition number in a book) to uniquely citable PIDs or permalink for all older versions of individual resources. The provision of a date of access is frequently found in citation recommendations. While the suggestion to include an access date in a citation shows awareness of the problem of changeability of an online resource, an access date is an indicator of an research process and does usually not correspond with an actual change to an online resource [Broyles 2020, 9]. Consequently, the inclusion of an access date in a citation recommendation has not been counted as versioning strategy.

Finally, the provision of permalinks or PIDs was recorded. In the dataset either the name of the PID system (e.g. URN, DOI) is listed, or if an edition uses permalinks, or if neither was found. Another identifier which is usually used for print publications, the ISBN, is occasionally found in SDEs too, for instance in the *Jane Austen's Fiction Manuscripts' edition* or the *Vespasiano da Bisticci, Lettere*. The use of ISBNs is particularly frequent in earlier editions as they were used, for

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example, for CD-ROM publications. Even if ISBNs are usually not listed among the PID systems, they are globally unique identifiers and I have recorded them in my dataset among PIDs and permalinks. One edition uses ISBN-A which is a DOI based on an ISBN.<sup>[8]</sup> Some editions use unique and persistent project IDs. For instance, the "How to cite" page of the edition *The Diplomatic Correspondence of Thomas Bodley, 1585-1597* recommends that the persistent project IDs of each object should be included in any citation.<sup>[9]</sup> This so-called "Transcript ID" will ensure that a resource can be found also in the future even if "the website is restructured or the URL changes." Persistent project IDs do have their value for internal operations in an edition and can be used like canonical numbers to refer to a resource or parts of it. In the context of a specific domain or edition and combined with an URL (the editions URL) they become globally unique identifiers and therefore I have counted them as permalinks in the dataset.

### Citation recommendations provided by digital editions

The survey data shows a constant increase of editions that provide citation information for the edition or parts of it (see Figure 2). Interestingly, the number of editions that provide citation information for the entire edition has not increased much, from 25.3% (pre 2006) to 29.1% (2006-2010) to 19.7% (2011-2015), and 28.8% (2016-2020). However, the number of editions that provide granular citation options has increased nearly five times over the last 20 years. It seems that providing only a citation option for the entire edition was more common in the early times of digital editing, while in the past decade, editions increasingly provide recommendations for the citation of individual objects and also for sections within an edition. To sum up, more and more SDEs provide citation recommendations and especially editions that provide recommendations for granular citation have increased.





**Figure 3.** The title page of the edition Jacques de Fonteny's Livre d'Enigmes – Manuscript of an Early 17th-Century Para-Emblematic, Illustrated Sonnet Sequence, one of the editions produced by the HAB, http://diglib.hab.de/edoc/ed000166/start.html.

During this research, several strategies for the inclusion of bibliographic information and citation recommendations have been identified. The first strategy is a very traditional approach: a title page. A title page, like the ones found in printed books, is an established means to communicate essential bibliographic information required by common citation styles. The author's initial assumption was that title pages might primarily be relevant in early SDEs that follow the printed book style and, therefore, recorded the presence of a title page only in the "Comments" column of the dataset. After having analysed the data, it seems that title pages feature more prominently in SDEs than originally expected and are present even in more recent editions (see Figure 4). However, it must be noted that a great number of editions with title pages were published series-like by the same organisations, for instance, the Herzog August Bibliothek (HAB), and the Éditions en ligne de l'École des chartes (Élec), and Romantic Circles (RC). These organisations seem to have developed a template for SDEs which includes a title page. The presence of a title page does not exclude the use of other forms of citation recommendations in the same edition. On the contrary, the HAB uses a standardised citation statement and the Romantic Circles provides a citation page.



Another strategy is to provide a brief statement that exemplifies how to cite the edition or parts of it. Such citation examples can look very diverse and may be found in different parts of the SDE. For instance, a citation recommendation for the entire website may be found on the home page, in the footer section, or on some subpage of the website – frequently on either the About, Copyright, Imprint, Permissions, or Project page (see Figure 5). The citation example may follow a common citation style; however, it is important that the necessary bibliographic data is provided to apply to the most common citation styles. Sometimes, however, only a permalink or PID is provided. While this is certainly enough to identify an online resource and link to it from other online publications, it does not provide enough information for citing using a traditional citation style.



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Figure 5. Citation examples of the edition with ISBN under the "About the Project" page of the Jane Austen's Fiction Manuscripts, https://janeausten.ac.uk/edition/citation-policy.html.

In addition to a citation example for the entire SDE, granular citation examples for parts of an edition, for instance, individual web pages, edited objects, images, or even parts of texts, such as chapters and paragraphs, may be provided. These text- and object-related citation examples are in most cases displayed directly below, above, or next to a text or other object, for instance, as a text box, a cite button, or a link that produces a pop-up with the citation example in it. Citation information directly at the citable resource may, for instance, be found in the *Jahrrechnungen der Stadt Basel 1535 bis 1610 – digital* which provides a citation example for each transcription(see Figure 6), or the *Edition Humboldt digital*, and the edition *Alfred Escher-Briefedition* which provide citation statements for their letter transcriptions at the bottom of each page. The *Welsche Gast digital* displays an URN, DOI and a permalink prominently with its online resources and additionally a link that generates a detailed citation example (see Figure 7).

□Alles in den Datenkorb übernehmen « fol. 4r [^] »		Jahrrechnung Stadt Basel 1537/1538 🛋 StABS Finanz H 94.1 , fol. 4r
□ Vom gypszoll □ Prima angaria □ Secunda angaria □ Tertia angaria □ Quarta angaria ↓ Nihil		Rechnungslegungszeitraum: 23.6.1537 bis 29.6.1538* Transkription von: Lukas Meili Jonas Sagelsdorff
<ul> <li>□ Von der winsticherbüchs</li> <li>□ Prima angaria</li> <li>□ Secunda angaria</li> <li>□ Tertia angaria</li> <li>□ Quarta angaria</li> <li>↓ Summa xxxiij Ib vij ß vij d</li> </ul>	ix lb x ß iiij d x lb xvij ß vij d vj lb iij ß viij d vj lb xvj ß	Zitiervorschlag: Jahrrechnung Stadt Basel 1537/1538, bearb. v. Lukas Meili und Jonas Sagelsdorff, in: Die Jahrrechnungen der Stadt Basel 1535-1610 – digitale Edition, hg. v. Susanna Burghartz, Basel/Graz 2015 (zuletzt verändert am 19.5.2020), permalink über DOI/handle: 11471/1010.1.1537, fol. 4r
□Vom wirtenwinungelt □Prima angaria □Secunda angaria □Tertia angaria □Quarta angaria	j¢ j lb iiij ß ij¢ ij lb iiij ß j¢ lxxv lb xij ß ij¢ lxv lb xij ß	Datenkorb   Leeren     Gesamtsumme:   0,00 lb.

Figure 6. Citation examples provided directly with the transcription in the edition Jahrrechnungen der Stadt Basel 1535 bis 1610 – digital.

	STARTSEITE   HANDSCHRIFTEN   TEXTE   ILLUSTRATIONEN   PROJEKT			
Anzeigen im Kontext von 👻	Zitierhinweis zu Edition Welscher Gast ×			welfcher gait
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Cod. Pal. germ. 389 Thomasin von Zerklaere <b>0</b> Welscher Gast (A) — Bayern	Thomasin von Zerklaere: Welscher Gast. Text-Bild-Edition ·Welscher Gast digital·. Hrsg. von Jakub Šimek unter Mitwirkung von Peter Schmidt und Christian Schneider, Heidelberg: Universitätsbibliothek, 2015ff. (https://doi.org/10.11588/edition.wgd)		U	
(Regensburg?), um 1256 Seite: 3r	Wenn Sie sich auf diese Seite beziehen, verwenden Sie bitte zusätzlich folgende Adresse:			DE   EN
DOI Seite: https://doi.org/10.11588/diglit.192#0 017	https://doi.org/10.11588/diglit.192#0017t	3*4		
https://digi.ub.uni-heidelberg.de/digi it/cpg389/0017?template=wgd	Schließen			
Zitierhinweis zu -Welscher Gast digital ● ■ Bibliographische Information ■ Startseite des Bandes ■ Bidlerschießeng in HeidICON ■ Verzeichnis abgekurzt ztierter Literatur ■ Handschriftenübersicht zum -Welschen Gast ■ Bibliotera Palatina ■ Bibliotera Palatina ■ Bibliotera Palatina ■ Bibliotera Palatina ■ Bibliotera Palatina	O er gar an wandel fei. S wer va vnflææ ut nibt fir. O en folt dvæ nibt läzzen feben. A tn boete man pblegt æfteben. A un gøre rede av vnbe meie. Da æreveriverte den bout bælere. hte fol mein vor rede ende han. Ich ger dar an von gor finne. O med buches tch alfo begenne. Ci HE ban geboert vnde geleien.			

Figure 7. The edition Welsche Gast digital provides permalinks and citation examples directly with individual objects, https://doi.org/10.11588/diglit.192#0017t.

Some SDE citation examples are placed within a more elaborate citation statement or citation page. Citation statements or citation pages discuss the rule that should be applied when citing an edition or parts of it. This can be a brief statement in the "About" or "User Guide" section of the website, or an elaborate citation page. A good example of the first type can be found in the edition *Wilhelmine von Bayreuth: Briefe über ihre Reise nach Frankreich und Italien 1754/1755.* The edition provides a "Benutzerhinweis" (user guide) page that contains a section explaining how the bibliographic information found on the home page (title page) and the URL should be used to cite the edition.<sup>[10]</sup> The following section is then dedicated to the use of fragment identifiers to cite and address paragraphs within a text. The

above mentioned edition *The Diplomatic Correspondence of Thomas Bodley, 1585-1597* has an "Editorial" section containing a link to a citation page. This page contains basic bibliographic data for citation and a brief description on how to cite the edition. Instead of giving an example, it is recommended that the user consults citation guidelines such as MLA for more information on how to cite electronic resources.<sup>[11]</sup> An example of a different "How to cite" page can be found in the *Samuel Beckett Digital Manuscript Project*.<sup>[12]</sup> The page is under the "About" section of the website and it contains a list of citation examples for the genetic editions provided by the project (see Figure 8).



Figure 8. Citation examples of individual texts on the "How to cite" page of the Samuel Beckett Digital Manuscript Project, https://www.beckettarchive.org/cite.jsp.

Editions that provide citation pages often have a link in the main navigation page of the website or they include them in the footer. If citation pages are designed for a specific edition, they can become very detailed with instructions and/or examples that illustrate how to cite the edition and its different resources using popular citation styles. The *Theodor Fontane: Notizbücher*<sup>[13]</sup>and the *Willa Cather Archive* are examples of such websites. The Fontane notebooks' citation page lists examples for the citation of the entire edition, individual notebooks, and parts of the notebooks. For the Willa Cather Archive are provided in different citation styles (MLA, APA Style and Chicago/Turabian Style).<sup>[14]</sup>

Another type of citation page is used by some publishers that maintain several digital editions, such as Huygens ING and RC. In this case a generic citation page is used to communicate basic information on how to cite editions and resources produced by these publishers. The benefit is that this approach is much easier to maintain than to maintain a citation page for each edition. It is also a sustainable means to provide citation information as long as the page is not moved. For instance, RC editions have the link to the citation page in the footer either under "Electronic Citation," or under "About Romantic Circles" and the citation page was already in place in 2005.<sup>[15]</sup>

An additional way that shows how a SDE may provide guidance for referencing is by embedding metadata that can be used by reference management tools such as Zotero, Citavi or Endnote. For instance, by using an embedded metadata strategy, standardised metadata (e.g. Dublin Core) can be included in the head section of the HTML document via so-called "meta-tags." A better strategy is to include bibliographic metadata as COinS (ContextObjects in Spans) in the HTML page. COinS is a citation microformat based on the OpenURL standard which allows the inclusion of metadata in URLs. As the name COinS suggests, bibliographic metadata is included in an empty <span> Element directly in the HTML page [Fenner et al. 2014]. This strategy is successfully used in online catalogue platforms such as WorldCat. While the use of COinS and similar strategies is still the exception in SDEs, the provision of an edition's bibliographic metadata in a machine-readable way for reference management tools will become increasingly important in the future

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## Granular referencing strategies

The survey had a very wide understanding of granular addressing strategies: if editions provide recommendations on how to cite anything beyond the edition as a whole, it has been considered as "granular addressing." The collected data shows that before 2010 only few editions provided the option for granular citation, while in the last 10 years editions are increasingly providing recommendation on how to cite their individual parts (see Figure 2 and 3). However, occasionally SDEs go even further and provide addresses for smaller citable entities. The "addressing markup" strategy for addressing parts of an XML or HTML document using an URI and a *fragment identifier* or standards such as XPath and XPointer [Simpson 2009] is most frequently used by content providers to create citable entities within texts in scholarly digital editions and we will look at different examples such as CTS further below. However, it has to be pointed out that the other strategies for granular referencing are also used; an example would be the addressing of regions within an image using the Image Interoperability Framework (IIIF) [Witt 2018, 229–33] [van Zundert 2018].<sup>[16]</sup> This strategy is still not widely present in SDEs, but holds great potential for future research with images in editions.



Citable entities in SDEs are usually HTML fragments that have an attribute "id" and can be addressed using a *fragment identifier* attached to a URL. The publication platform of the Max Weber Stiftung Perspectivia.net provides a detailed citation recommendation for its editions including a section on how to cite granular entities such as paragraphs using fragment identifier (see Figure 9). The traditional workflow is to generate the fragment identifier during the transformation process from TEI to HTML. The *Text Encoding for Interchange* (TEI) standard has become the main standard used for digital scholarly editing projects worldwide. The traditional workflow in TEI editions is that edited texts are semantically marked up and stored in a TEI document for long-term preservation and exchange, but the primary access point for a user is an HTML, CSS and JavaScript-based user interface generated using XSLT, XQuery or other technologies that translate between data (storage) and publication. From the perspective of citability it is important to note that the structure of the TEI document and the HTML web presentation can be fundamentally different. In fact, during the transformation process from TEI to HTML, content may be removed, added, or reorganised [Flanders et al. 2016, 264]. Text, metadata, markup and fragment identifiers in the TEI document or the presentation of the text by the edition's

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user interface are two different things. For the sake of citability both should be possible. However, as TEI is the format for long-term preservation of data; it could be argued that ideally a citation should point to identifiers in the TEI source file. Furthermore, the mapping between TEI and HTML structures and identifiers for citation needs to be clearly documented and communicated. This can be done using the element *references declaration* (<refsDec1>) in the TEI header. However, documentation should also be present on the website of the edition. Lastly, another option to reduce divergence between the TEI and the user interface would be to create a user interface that reproduces the TEI source document (or parts of it) in HTML. This is, for instance, realised by the CETEIcean project [Cayless 2018, 258–62].<sup>[17]</sup>

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In a digital editing context attempts have also been made to use semantically structured PIDs for granular addressing of sections of a text. One such attempt is the protocol Canonical Text Services (CTS) which was originally developed for the referencing of ancient texts. Ancient texts, such as Homer's hymns, often have established canonical numbers that were used for citation for decades or even centuries [Bleier 2021]. CTS provides a means to translate these citations into digital form and makes them human and machine-readable [Blackwell and Smith 2016] [Kalvesmaki 2014, 15–6] [Smith 2009]. The CTS understands a text as a number of hierarchically structured entities that can each be addressed by established canonical citation rules. To identify these entities URNs are used to follow a syntax containing canonical names and numbers. Undoubtedly, this is an elegant and practical solution to create abstract and human-readable persistent identifiers for texts. However, as Kalvesmaki already pointed out, a fundamental problem is that the "cts" namespace is not registered with the global namespace authority IANA [Kalvesmaki 2014, 20] and, therefore, anybody could register and use the namespace for other purposes. Consequently, Perseus<sup>[18]</sup> and other projects must be aware that their URNs are currently not sustainable in the long run. Perseus itself translates its URNs into URLs. The provision of permalinks based on the URN syntax would be a suitable workaround until the URN namespace issue is resolved.

A project that has a similar strategy is *The Classical Latin Texts* online collection by *The Packard Humanities Institute* (PHI). This project makes numerous classical texts available and citable using canonical numbers in their humanreadable URLs that follow a similar logic as the CTS URNs.<sup>[19]</sup> Other projects also implemented solutions to represent traditional canonical citations as digital citations. The following are only a sample of projects that succeeded in this process. The *dMGH* project makes the monumental edition series *Monumenta Germaniae Historica* (MGH) available in digital form. The project uses human-readable permalinks containing the known abbreviations for volumes of the MGH and individual page numbers can be included in the URL for citation. This is an interesting example for the use of object-related visual numbers for citation.<sup>[20]</sup> The final example is Peter Robinson's suggested solution to the citation of electronic texts which is also based on URNs. He calls it the "documents, entities and texts" (DET) scheme and demonstrates the applicability of the system through an implementation into the Textual Communities environment using the Canterbury Tales as an example [Robinson 2017].

Two final points concerning "granular citation" need to be discussed in brief. The first is the bibliographic data for the paratextual pages of an SDE that is frequently missing. Some editions provide recommendations on how to cite the edition or parts of it, but it is sometimes not clear how to cite the introductions, commentaries, bibliographies, technical documentation, the documentation of the encoding model etc. These are fundamental resources of an edition and it should be possible for a user to cite them correctly. The second point is important in digital editing projects that were produced in teams. The TEI <respStmt> (statement of responsibility) allows recording of the individuals responsible for the editing of a TEI document and also their roles. Frequently, the main editor(s) only are mentioned in a citation statement. Many people apart from the editor(s), however, are often involved in compiling the transcriptions or collations, while xml developer(s) are responsible for the data modelling and web developer(s) are responsible for the editor's website. The question arises whose name should appear besides that of the main editor(s) in a citation statement? When individual resources, such as a transcription, are cited, at least the person(s) who did the main editorial work should have a prominent place in the citation statement. Similarly, the xml and web developer should be cited when referring to the data model (as ODD or a prose documentation) or the source code of the website. To list every project member in a citation is not practical as this will always result in an "et al" mention and the essential information about responsibilities gets lost.

## PIDs and permalinks in digital scholarly editions

PIDs and permalinks are central for citation of SDEs as they are persistent names for web content and consequently imperative for reference texts that are used for citation by the scientific community. However, the survey results are slightly disillusioning (see Figure 10). It is a positive development that the use of permalinks and PIDs has increased in the last two decades. Yet over 75% of SDEs still do not provide PIDs or permalinks – or at least do not communicate this information to their users.



While URNs and DOIs are well known PIDs and their use is already a sign to the informed user that these identifiers can be used for citation, URLs have a bad reputation for being unreliable and have to be explicitly labelled as being permalinks. Some editions might use their URLs as permalinks, but do not explicitly state this, or if they do the statement is difficult to find. As mentioned in the introduction, the maintenance of PIDs and permalinks is key to their function as persistent names for online resources. Ideally, an institution with suitable infrastructure and a commitment to preserve and maintain its online resources should oversee the hosting of a SDE. The same is valid for the management and maintenance of PIDs and permalinks. Long-term preservation and the permalink strategy are important information for a user as they may increase trust in the stability of an online resource. Therefore, such a statement should be placed in a prominent position.

The HAB provides "persistent URLs" (permalinks) for its online resources and has a brief, but clear commitment published on its website that ensures the persistent availability of its online content via the persistent URLs.<sup>[21]</sup> The *edition humboldt digital*, developed and maintained by BBAW, is another good example of the use of permalinks in SDEs. The edition includes a permalink statement that specifies what permalinks in the edition are and a commitment by the Berlin-Brandenburg Academy of Sciences and Humanities (BBAW), which is committed to making published

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resources available.<sup>[22]</sup> The statement is brief, but it also mentions that the persistent availability of versions will be ensured via the indicated permalinks. This is a functionality that is unfortunately rarely seen in SDEs. The edition *Welscher Gast digital* is an interesting case in this context, since for some of its resources the edition provides a DOI and a "Zitierlink" (citation link), a permalink, and for other resources an additional URN. A user may ask, should all these options be used for citation or only the "Zitierlink?" A clear answer comes from the developers of the edition who solved this issue elegantly by providing information about the stability of the permalink in an info lightbox and additionally a "Zitierlinweis" (citation recommendation with an example) indicating that the DOI should be used for citation (see Figure 7).

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Closely related to the use of permalinks and PIDs is the question of long-term availability of online resources. Sahle's catalogue includes several editions that were available 10 or 20 years ago, but are gone today or have been moved and their original URL is no longer functional.<sup>[23]</sup> Various reasons may explain why an edition cannot be found at the present time or why it was taken down. In any case, finding out that links are not working can be very frustrating experience for readers. One cannot be sure whether the editon no longer exists or if it has simply been moved to a different location and no redirect was set up. If an edition is withdrawn fully from the web, a good solution is to set up a tombstone page, <sup>[24]</sup> a special type of landing page, at the original URL providing at least basic information about the whereabouts of the edition. The Shakespeare Quartos Archive was taken down recently, on 15. April 2020, "as the technologies which it is built with have reached end-of-life." The Bodleian Libraries set up a tombstone page, but call it a "holding page," at the original URL of the SDE (see Figure 11) with basic bibliographic information with a screenshot of the edition, a brief description of the project, a brief statement why it is not available anymore and when it was taken down, and a link to a 2019 version of it preserved in the Wayback Machine.<sup>[25]</sup> Even if it is regrettable that the edition could not be maintained, the provision of the tombstone page and the link to an archived version is an excellent service. Ideally one would also expect to have a download option for the editions data. Even if the interface and functionalities are no longer functional, the TEI data is still a valuable resource for research that can be used independently from the outdated software for the edition.



#### Preface from the original site

The Shakespeare Quartos Archive is a digital collection of pre-1642 editions of William Shakespeare's plays. A cross-Atlantic collaboration has also produced an interactive interface for the detailed study of these geographically distant quartos, with full functionality for all thirty-two quarto copies of Hamlet held by participating institutions.

#### About the Shakespeare Quartos Archive

#### History of the quartos

The earliest Shakespeare quartos are over four hundred years old and constitute the rarest, most fragile body of printed literature available to Shakespeare scholars. Sold unbound and often read to pieces, they are among the most ephemeral books of the age and survive in relatively low numbers. In the absence of surviving manuscripts, the quartos offer the earliest known evidence of what Shakespeare might actually have written, and what appeared on the early modern English stage. Only about half of Shakespeare's plays were printed in quarto during his lifetime (1564–1616), and before the first printed collection of his plays, the First Folio of 1623. They are living artifacts telling the story of how Shakespeare's Hamitet, Henry V, King Lear, A Midsummer Night's Dream, and Romeo and Juliet, to name just a few, first circulated in print. Scholars, teachers, editors, and theater directors, therefore, seek to examine these books for historical evidence and for significant variations in text. Over the centuries, generations of collectors have held these unassuming treasures in private collections, then donated or sold them to public institutions, rare book bibraries, or other individuals. This pattern of trade over four centuries has dispersed the body of Shakespeare quartos all over the workl. Due to their rarity and

Figure 11. Holding page of the Shakespeare Quartos Archive, http://www.quartos.org.

### Versioning strategies in SDEs

As pointed out in the introduction, a versioning strategy is important for SDEs as their content can be changed as easily as the content of any other website. Following strategies from software design, digital editions are also frequently released at an early stage of development and resources are revised or added at a later stage. Therefore, resources in digital editions might change over time and it is important to make those changes transparent to a user. For scholarly discourse, editions need to provide resources that can be reliably cited not when they are finished, but as soon as they are released to the public. For citation and later retrieval, it is imperative that users know what version they are dealing with. Different strategies are used to indicate versions.

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The results of the study have shown that over the past decade editions with a versioning strategy have substantially increased (see Figure 12). Unfortunately, however, most SDEs still do not have a versioning strategy implemented. The reasons for this cannot be of a technical nature alone, as the provision of version information in its most basic form only requires adding a version number or a version date. Deeper reasons are to be found for the problem rather in the way editors perceive their online editions. These are often considered as being "final" and "static," scarcely affected by the changes that may occur once they have been released. Additionally, editors may believe that minor changes applied to online edition's website. Another possible explanation for the lack of a solid versioning strategy, might be that there is still too little awareness of both the topic itself and the importance of transparency and retractability for changes in a digital editing context. Scholarly arguments and citations cannot be based on texts that may be modified overnight. The following examples have been selected for briefly highlighting the different strategies used by editions listed in Sahle's catalogue to indicate for users what version they are dealing with. The already mentioned study by Broyles analyses the versioning strategies of about 30 digital editions [Broyles 2020]. While this study is primarily concerned with strategies to indicate versions to the user as part of a citation recommendation, Broyles study also explored logged changes in data files and other forms of content versioning.



- Examples of early editions with a versioning strategy and declaration are *The Electronic Beowulf*,<sup>[26]</sup> *The Auchinleck Manuscript* <sup>[27]</sup> and *The Old Bailey Proceedings Online*. <sup>[28]</sup> In these cases, the editions have a version number and not individual web resources. This is the same approach used in traditional print editing: the author or editor of a book or an edition decides when the release of a revised version is necessary. Citation recommendations provided by these editions suggest adding the current version number or the date to any citation. Previous versions may be available in an archive, but neither of the three editions provide permalinks for older versions. *The Online Froissart* is a more recent edition which also employs this strategy, and it provides a very useful detailed list of changes made between the different versions.<sup>[29]</sup>
- Another versioning strategy is that in which it is not the edition itself that receives a new version with every update, but the versions of individual web resources which are stored and made accessible for citation using permalinks or PIDs. Version control systems (VCS) can be used for this purpose. Every little change to a resource is recorded and generates a new version. In contrast to the above-mentioned system, the creation of a new version is not triggered by the author or editor. Every change, no matter how small, generates a new version. The benefit of this system is that parts of an SDE can be updated without the need to create a new version of the entire edition. Furthermore, every old and new version is stored and can be referenced and retrieved from an archive. A downside, however, is that if badly executed, this strategy can lead to the creation of an enormous number of unnecessary versions, for instance of irrelevant changes, which might be confusing to a user, require more storage space, and maintenance.

The Edition Humboldt digital is an example of an edition which has an archive of older text versions citable via 39

permalinks.<sup>[30]</sup> Moreover, if one accesses one of its old versions, a warning message indicates that a newer version of this transcription is available and points the user to it. The most recent authorized revision of a resource can be then accessed via a *canonical URL*. There is a significant difference between canonical URLs and the before mentioned canonical numbers. Canonical URLs were introduced out of a practical need to optimise search engine results. They are implemented using an HTML *canonical tag* the purpose of which is to specify what URL should be listed in the search results.<sup>[31]</sup> A canonical URL should always point to the newest, accepted version of an online resource. As the canonical URL does not in any way reflect the change of the online resource, it should not be used for citation. While this versioning approach is relatively new to the digital editing community, it has been in use for projects such as Wikipedia for quite a while. Wikipedia is an example of a website where content is constantly changing and where a new version with a permalink results each time an article is edited. The project provides canonical URLs for the most recent, accepted version of an article and permalinks for permanent addressing. Wiki as an editing platform is also being used by digital edition projects. For instance, the *Social Edition of the Devonshire* MS (BL Add. MS 17492) is published via *Wikibooks* and uses the same system as Wikipedia for the visibility of permalinks and versioning information.<sup>[32]</sup>

# Conclusion

Scholarly editions – both in print and in digital form – are reference works for scholarly discourse. Consequently, resources provided by scholarly digital editions (SDE) should be clearly citable and persistently available. This is, however, not always the case as SDEs are often complex websites with different resources and traditional citation style guides do not sufficiently cover this type of website. Furthermore, developers of SDEs often do not provide the necessary bibliographic data and guidance to cite an edition and its resources correctly. Apart from the bibliographic data that is also required for the citation of editions in print, crucial information specific to SDEs has been identified and discussed including permalink, PID, versioning strategies, and granular citation options for digital resources.

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As in the digital realm there is no stable physical representative of the edition, the provision of permalinks or PIDs for the scholarly digital edition and its resources is crucial. If online resources are updated and changed, it is necessary to provide stable identifiers for older versions and, ideally, to make them accessible for users. Furthermore, the possibilities and potential for granular citation in scholarly digital editions have been addressed by briefly discussing the strategies used by IIIF, fragment identifiers and the CTS protocol. In this context, it is important to note that a substantial number of texts used in the humanities have established titles and numbers for citation. CTS, DET, dMGH, PHI and similar projects try to translate the logic of traditional into a digital format. By this means not only the edition, but fragments and objects within the edition may be cited in the digital realm using existing and widely used logical structures of a text.

The survey conducted as part of this research has shown that over the past two decades, the awareness of these topics has increased among SDE developers. However, most digital editions still do not sufficiently communicate to the user what can be cited in an SDE and how to do so safely. Citation information is, nevertheless, imperative as each edition may have a different structure, it may also provide a different set of online resources, or use diverse granular citation strategies. Therefore, not providing clear information on how to cite the edition or partial resources may decrease the trust in and the citability of a digital edition. Furthermore, digital editions are produced by teams rather than individuals and the acknowledgement of the individual responsibilities of team members can and should be emphasised by citing these persons alongside the main editor(s) when appropriate. This information needs to be communicated to a user.

A further important point of consideration is the provision of all necessary bibliographic data for citation. The most practical approach for this would appear to be the placing of a citation statement for the entire edition in a prominent position on the home page, and additional citation statements referring to the individual resources provided by the edition. Permalinks and PIDs should be clearly highlighted and it must be communicated to the user that these can and should be used for persistent citation. As the persistent availability of online resources always depends strongly on the institution maintaining them, a digital edition should outline its PID/permalink strategy and policy on the website. Furthermore, users should be informed on how an edition deals with updates and revisions of its resources. A good

place for such a statement would be a citation page or the "about" page. How changes are logged and how old and new versions can be cited is vital information. As a matter of fact, very few online editions will remain unchanged over time. Ideally, a new permalink or PID should be created for every version.

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Currently, there is no standardised way to provide citation information in an SDE. Various strategies were discussed in this article and it was occasionally pointed out that some solutions seem to be more frequently used. This might be the first step towards the standardisation of this very important feature of an SDE. However, as there are too many different types of editions covering various subjects, further research is necessary to analyse what kind of citation recommendation fits to different types of editions. Currently, the best advice for editors and developers alike is to provide essential bibliographic data for the citation of an edition easily accessible to the user (ideally in human- and machine-readable form). It is essential for a user to know how to cite the individual resources of the edition and to easily find permalinks/PIDs and information on the versioning strategy of an SDE. Following these basic rules will increase the citability of an edition and help move towards more stability for scholarly online resources.

### Notes

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[2] For more details see Wikipedia's permalink strategy: https://en.wikipedia.org/w/index.php?title=Permalink&oldid=877394616. Accessed: 01.02.2019.

[3] For the Wikipedia permalink strategy see: https://en.wikipedia.org/w/index.php?title=Help:Permanent\_link&oldid=852665483 [1. March 2019]; for "canonical URL" see Bleier (2021).

[4] https://tei-c.org/release/doc/tei-p5-doc/en/html/ref-revisionDesc.html and https://tei-c.org/release/doc/tei-p5-doc/en/html/ref-listChange.html [20. July 2020]. See also Broyles (2020), 10.

[5] As an example, see the website bibleserver.com which aligns more than 40 bible versions using the canonical verses. https://www.bibleserver.com [12.10.2020] For a detailed introduction to the problem with a focus on canonical citation in digital scholarly editions see: Bleier (2021).

[6] The collected data and the Jupyter notebook used for analysis are made available here: https://github.com/bleierr/How\_to\_cite\_this\_edition (6. August 2021)."

[7] I received a copy of the catalogue in XML on 11.5.2020. I am grateful to Patrick Sahle und Jana Klinger for sharing the latest version of the catalogue with me.

[8] See the footer of the edition Edizione digitale dell'Epistolario di Alcide De Gasperi. Available under: https://www.epistolariodegasperi.it/#/ [20.07.2020].

[9] See the citation page of the edition *The Diplomatic Correspondence of Thomas Bodley, 1585-1597*. Available under: http://www.livesandletters.ac.uk/bodley/citation.html [11. April 2019].

[10] https://quellen.perspectivia.net/en/portal/user\_guide#citation [20. July 2020].

[11] http://www.livesandletters.ac.uk/bodley/citation.html [11. April 2019].

[12] See the "How to cite" page: http://www.beckettarchive.org/cite.jsp [2. February 2020].

[13] See the "Zitation" page: https://fontane-nb.dariah.eu/zitationshinweise.html [20. July 2020].

[14] http://cather.unl.edu/about.citing.html [11. April 2020].

[15] IA has an early version of this page from 2005 stored:

https://web.archive.org/web/20051118151656/http://www.rc.umd.edu/pubinfo/citation\_po.html [20. July 2020]

[16] See also the projects e-codices (http://www.e-codices.unifr.ch/en) and Fragmentarium (https://fragmentarium.ms/) as examples.

[17] See also: https://www.npmjs.com/package/CETEIcean and https://github.com/TEIC/CETEIcean (accessed 13.9.2017).

[18] The Homer Multitext Project was the first big test case for CTS and since then it has been used most prominently by Perseus which recently launched its CTS implementation, the CapiTainS environment. Accessible under: https://cts.perseids.org/ [10. April 2018].

[19] A typical URL would be the following to a line in Livy's *Ab Urbe Condita*:http://latin.packhum.org/cit/Liv/AUC/23.45.4.2 [10. April 2018].A user is navigated to the passage in Livy and the cited line is highlighted in the editions interface. However, the URL logic is not adequately documented, and there is no visible commitment or permalink policy available on the site.

[20] Besides the canonical naming of the volumes, the edited texts in the MGH have internal naming conventions and canonical numbers, but their use as permalinks is limited. This has already been pointed out by Assmann and Sahle (2008).

[21] http://www.hab.de/en/home/library/wolfenbuettel-digital-library/guarantee-declaration.html [1. February 2020].

[22] https://edition-humboldt.de/about/ [20. July 2020].

[23] For instance, *Con2: An Edition of The Anglo-Saxon Chronicles*, 924-983 or *Die Urkunden der Arnulfinger*. A more recent example is the *Alcalá Account Book* which was originally hosted at Maynooth University. Sahle notes in his catalogue: "As of 09/2018 the edition, once at http://archives.forasfeasa.ie seems to be gone. The wayback-machine has a snapshop of the start page from 23.09.2010. What's left is an article about the project, published in *Jahrbuch für Computerphilologie* 10 (2010)." http://www.digitale-edition.de/vlet\_a-z.html [19. December 2019].

[24] DataCite describes useful best practice rules for tombstone pages. Such pages should "provide a full bibliographic citation," the DOI in human- and machine-readable format and a "statement of unavailability" to outline why the online resource is not available anymore. See https://support.datacite.org/docs/tombstone-pages [19. July 2021].

[25] http://quartos.org/ [30. July 2020].

[26] http://ebeowulf.uky.edu/# [11. April 2019].

[27] https://auchinleck.nls.uk/editorial/refer\_site.html [11. April 2019].

[28] https://www.oldbaileyonline.org/static/Legal-info.jsp#citationguide [11. April 2019].

[29] See: https://www.dhi.ac.uk/onlinefroissart/apparatus.jsp?type=context&context=citing\_this\_resource and https://www.dhi.ac.uk/onlinefroissart/apparatus.jsp?type=context&context=versions [11. April 2019].

[30] See also: Dumont (2018).

- [31] https://moz.com/learn/seo/canonicalization. Accessed: 01.02.2019.
- [32] https://en.wikibooks.org/w/index.php?title=The\_Devonshire\_Manuscript&oldid=3204273 [11. April 2019].

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