

Digital Classics and CLARIN-IT: What Italian Scholars of Ancient Greek Expect from Digital Resources and Technology

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Abstract

This paper presents and discusses the findings of a survey carried out to assess the use of digital resources and digital technologies with respect to work in ancient Greek scholarship, with the aim to identify the factors that are likely to constrain its use as well as to elicit needs and requirements of ancient Greek scholars in Italy. The survey is in line with the principles behind the user engagement strategy developed by CLARIN-ERIC and constitutes one of the national efforts undertaken by CLARIN-IT to contribute to the wider impact of CLARIN on Digital Classicists. The survey, as well as other surveys carried out in the sector in the last decade, points out that most of the available resources do not respond to users' requirements. This motivated us to develop a mock-up of a digital editor of Archilochus, which, mostly grounded on previous studies by Nicolosi, draws on the outcomes of the survey. The experiment includes a sample prototype to submit for evaluation by end-users. The final aim is to identify good practices and new models to enable new approaches to the study of classical texts and profile a new workbench for scholarly digital edition.

1 Introduction

Interest for the humanities and social sciences in language technologies has never been as strong as it is now. The main conferences in the Digital Humanities are seeing an increase in participation by computational linguists while at Computational Linguistics' conferences the humanities and social sciences represent an important line of research. The necessity of meeting the needs of an audience of different users opens up new challenges for language technologies: easily usable tools, adaptable to different types of content become crucial. The quality of resources, in particular the quality of digital editions of texts, is receiving increasing attention. For this reason, it is crucial to identify user requirements in relation to textual (and linguistic) analysis tools, in view of contributing to the advancement of this specific field of science. Attention to a new or different approach to a traditional discipline determines, not unsurprisingly, the development of new learning habits and, on the basis of the good practices inherited from the previous tradition, allows the development of a different and more modern research methodology and of new practices in didactics.

Scholars and scientists require modern, well-established research infrastructures to conduct internationally competitive research. Researchers in science and engineering have witnessed the potential offered by infrastructures and already use them for their work. The humanities already have a tradition of data and knowledge aggregators, with archives and libraries that contain texts and can be regarded as the research infrastructures of the past. When it comes to the adoption and expansion of digital research infrastructures, however, the humanities still lag behind other scientific fields. Research in that field, of course, also depends on the

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opportunities offered by modern digital technologies, with the foundation for research being based on the amount of data digitally available around the world, ready to be processed by computers. Scholars of the sectors, however, were rather slow to adopt them.

CLARIN-ERIC (www.clarin.eu), the European research infrastructure, was created to make digital language resources available to scholars, researchers, students from all disciplines, especially in the humanities and social sciences. This involves providing digital repositories where data, corpora, lexicons, tools are catalogued, stored and retrieved in a simple way as well as developing technological solutions that can be intuitively used by users. CLARIN represents the perfect framework for bringing together producers of language technology with its users. CLARIN considers it essential to find out from users what resources and tools they (would like to) use, what solutions they prefer and what training support they need.

The idea that user needs should be a central part of the design and development process of any ICT infrastructure is not necessarily new, and pointing out that the CLARIN audience are humanists and social scientists is not enough. There is a wide range of people working within the academic sector: some may be more proficient in one area but less so in another, so there are different needs and different ways of engaging with users. Accordingly, CLARIN defines different methodologies and approaches to user engagement. Surveys are deemed to be suitable for making deeper analyses of landscapes, opportunities, barriers, etc.; they are useful for identifying previously unnoticed problems or areas of dissatisfaction and are especially helpful if we are not sure where to start or what to prioritize, or if we need to show evidence to support our decisions. Surveys can be crucial not only to elicit information about users' requirements and barriers to uptake, but also to reach and inform people about what we are doing. They might find that CLARIN already has solutions for them that they did not know about.

2 Motivations for a CLARIN-IT Survey of Digital Classics

In order to study the current interest in the use of digital resources and related tools in one specific context of the Humanities, Ancient Greek scholarship, we launched a survey based on a questionnaire to ascertain the current practice and the related needs within a group of practitioners in the field. On larger scale, the work represents one of the first attempts undertaken within the context of CLARIN-IT (Monachini and Frontini, 2016) to contribute to the wider impact of CLARIN on the specific Italian community of those interested in the application of Digital Humanities to the field of Classics and to ancient world studies. During the last decade, similar surveys were sporadically carried out. They pertain to the fields that do not strictly concern Digital Classics (DC) although the general outcome of their remarks is relevant, and it is evident that they may also be applied to DC resource design.

These studies concern a wide spectrum of scientific interests within the digital humanities realm and involve scholars from several countries, mostly English native speakers (USA, UK, CDN etc.). Our study, instead, focuses on the specific scientific community dealing with Digital Classics; it collects the views of a restricted sample of Italian digital humanists with focus on ancient Greek philology.

2.1 Previous Surveys

(Babeu, 2011) provides a summary of several surveys on the subject. For our purposes it is enough to quote the key outcomes of the studies by (Toms and O'Brien, 2008), (Audenaert and Furuta, 2010) and (Warwick et al., 2008).

Toms and O'Brien's study is of a behavioral nature and was, similarly to our own, conducted on a small sample of digital humanists who responded to a questionnaire published on the web. The main conclusion of the study is that "the digital humanist (...) gives value to primary and secondary materials (books) and uses more browsing than searching on the internet". His/her preferred research strategy is based on linking rather than on searching

and concatenating works, usually by referring to the material of interest through the bibliography quoted in the single article. Toms and O'Brien's study draws the figure of a lonely scholar, with a few joint publications, more interested to communicating than collaborating with colleagues. Digital humanists' priorities are to have access to primary sources and to integrate lessons with material from web searches; under this profile, they are interested in text presentation, i.e. having "multiple views" of the material or text being analyzed. Their interest particularly goes to tools for granular analysis of texts, at various levels, and in the most sophisticated text analysis and annotation tools with a variety of mark-up languages.

The study by Audenart and Furuta mainly concerns the relationship of digital humanists with the primary source, analogically or digitally reproduced, and results in a list of recommendations for the design of digital libraries¹. The authors argue that the existing resources essentially aim to disseminate material, while in general, there is a lack, in their opinion, of environments to support text analysis and understanding². The authors reiterate an argument already raised by Toms and O'Brien, namely that the available environments are aimed at finding information rather than using it. In a series of semi-structured interviews with a panel of eight researchers, they looked for answers to three key questions: *1. Why are scholars interested in examining the original textual material? 2. What kind of information do they search for? 3. How and when they use ICT and for what purpose?* The answers are that scholars aim to make use of the original material because either it is not readily available or no reliable transcripts are readily available. In many cases, even when transcripts available are deemed appropriate, the specialist considers essential to access the original, by direct visual inspection. Usually, scholars want to have access to any documents that deliver a certain interpretation and to information about everyone who contributed to them (author, public, publisher, illustrators, and scribes). The process of transmission of the text is usually the primary interest of the scholar. This led the authors to identify a model called SCAD consisting of four components: primary sources or Sources (including original drafts or copies); Context (cultural, socio-political and economic), Authors / actors, and Derived forms, or works that re-use the text in question as a source. The authors conclude with major final recommendations for the CSE: its ultimate goal is the usability of the resource extended over time; it, therefore must provide extensive documentation and a clear understanding of the users' needs. This involves a programmatic consultation with users, constant maintenance and update of the interface, content and functionality of the resource.

The study by Audenaert and Furuta may to some extent be compared with that conducted in the LAIRAH (Log Analysis of Internet Resources in Digital Humanities) project by Warwick, Galina, Terras, Huntington, and Pappa aimed, on the one hand, to identify twenty broadly used resources with Log Analysis techniques and, on the other hand, to interview their creators in order to understand the reason behind their popularity. In short, the authors, draw general still valid conclusions: who uses digital technology tends to prefer general to specialized resource; in particular, humanists have sophisticated mental models and high specialized skills in their field, but find it difficult to apply these skills in a digital environment. They need a wide spectrum of resources in order to discover new ways of thinking about what is already known, since discovering new data or facts is quite a complicated process; they use digital resources, only if they match their mental models and their research methods, thus refusing unfriendly interfaces or confused data and abhorring resources that require specialized training. They are worried

¹This study is part of a larger project to design a creativity support environment (CSE) for in-depth analysis and study of paper-based materials.

²The available environments, they claim, have developed resources that address the individual research needs of their developers or they are modeled on theoretical definitions of what the research practice should be in the digital environment. Many times this results in the recommendation of practices that have been intimidating to many scholars, such as the claim that they manually encode documents into XML

about the accuracy of the data, i.e. want "high quality content", that means having detailed information about the sources of digital resources. While many of the above considerations may seem obvious in that they correspond to the general usability criteria of a web resource, it is interesting to see how they are reiterated by a detailed analysis. Some points emphasize the importance of having high quality digitization and accurate information on data and processes adopted. It may also be noted that the results of this study are consistent with the findings of Audenaert and Furuta 2010. While none of the resources selected by the study concern Digital Classics, the overall relevance of these findings is clear for DCs as well. The authors emphasize the importance for users to play an active role in determining the design criteria of a digital project (designers as users) and insist that resource planners should never infer user requirements from their own behavior. Many of the projects have shown that their users were much more varied than they thought. Another criterion that determines the success of a digital resource is its sustainability. Data that are not deposited in institutional archives, which guarantee their conservation, easy access and documentation, soon fall into disuse.

Only the survey by (Toms and O'Brien, 2008) encompasses a broader spectrum of literary interests, with Latin prevailing – 17%: most of the interviewees are working on modern and contemporary literature, with only 13% interested in the classical and post-classical period.

3 The CLARIN-IT Consultation

For the reasons above, our study was carried out on a restricted sample of Italian digital humanists, interested in ancient Greek philology. It is a relatively small field (the number of scholars in Italy is about 130 people) but this area of study is traditionally of great interest in Italy and also includes university students and schoolteachers. Moreover, Italian Ancient Greek scholars are an active part of an international community (spreading especially in Europe, North and South America) and this field of studies has great potential: it is worth remembering that Ancient Greek studies are an essential part of our Western Cultural Heritage, and it is crucial to spread the knowledge of these studies. For these reasons, the Italian Ancient Greek community is a small but excellent sector where to test the new opportunities offered by Digital Humanities. The scope now is national and therefore narrow, but, thanks to CLARIN, it would be interesting to extend the analysis across borders and to other fields. This research sector, indeed, clearly characterized by international cooperation, requires an international and well-coordinated effort.

The survey (supplementary to a master degree thesis discussed at the University of Parma (Stefanini, Nicolosi and Monachini, 2017)) was carried out from May to September 2016 and is now available on-line through the CLARIN-IT channels³. In a questionnaire-based survey, the sample should be statistically representative of the target population. The questionnaire was sent to selected Italian researchers whose main focus of study is ancient Greek language, although their interests span over a broader area, encompassing Greek and Latin literature. The sample shows different professional roles: full professor, associate, researcher, and other (mainly Italian researchers working abroad and schoolteachers). The survey aims to evaluate the impact of digital techniques within the specific reference community of ancient Greek scholars in Italy. At this research stage, the sample is numerically consistent with the survey target because of its specific expertise (Ancient Greek): it is about 10 percent with respect to the initial potential target population (see Figure 1).

3.1 Questionnaire key points

The survey focuses on the digital resources and tools needed to support an excellent and usable digital edition of an ancient text. For this reason, first, we ask applicants to specify their field of expertise and evaluate the tools they use and know.

³at <http://www.clarin-it.it/it/content/sondaggio-current-practice-digital-classics-tools>.

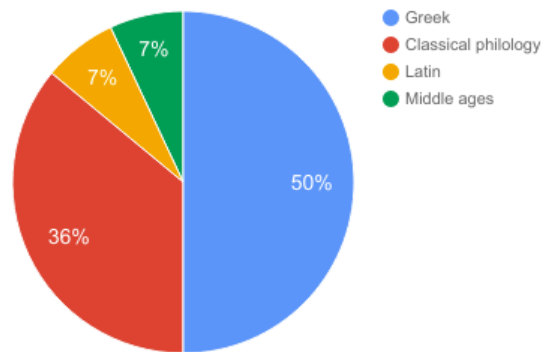


Figure 1: Interests of the respondents

The questionnaire has four sections (see Figure 2 below):

The screenshot displays a questionnaire interface with the following sections:

- CURRENT PRACTICE with Digital Classics tools:** Includes questions about tool usage, evaluation of textual data base extension, and consideration of tool functionalities.
- ADVANCED FUNCTIONALITIES for Digital Classics:** Includes a list of functionalities with checkboxes, where 'linguistic analysis' is checked.
- UTILITY of digital resources and tools for philological studies:** Includes a list of digital resource functions with checkboxes and a question about the usefulness of experimentation.
- FUNCTIONALITY EVALUATION:** A table for rating the relevance of various functionalities from 1 to 5.

Functionality	1	2	3	4	5
syntactic analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
metric text analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
text variants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
set of conjectures or readings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
interactive support to reviewing text variants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
several critical editions of the same text	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make available digital copy of the primary source (code, papyrus, epigraph etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
translation into contemporary languages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hypotheses and make them available to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 2: The questionnaire

- Current practice:** which Digital Classics tools researchers use in their studies;
- Advanced functions:** which available/unavailable function is/would be more useful;
- Usefulness** of digital resources and tools for philology, through ranking of four key functionalities:
 - match the different versions of a text – mentioning the sources – and provide critical apparatuses
 - make available diverse interpretations supported by computer-based linguistic/stylistic analysis

- make available a digital copy of the primary source (code, papyrus, epigraph etc.)
- provide one or more translations of a text in contemporary languages

An evaluation of the usefulness of one or more of these functions is required.

4. **Quantitative evaluation:** a 1-5 scale allows the respondents to assess the usefulness of a set of functions considered crucial for digital editions dealing with classical studies. Table 1 below summarizes the results.

Function	Average score
primary sources	4.00
variants	3.57
critical editions	3.57
collaborative hypotheses	3.36
logical and syntactic analysis	3.36
conjectures	3.29
metric analysis	3.14
translation	3.00
reviewing variants	3.00

Table 1: Quantitative Evaluation

3.2 Overview of replies

All the answers were timely and accurate. All the respondents showed interest in the topic and consensus emerged with respect to the need to develop and improve this research field.

The key outcomes of the survey may be summarized as follows.

1. Current Practice with Digital Libraries. All the respondents are familiar with the most important tools in the field (mainly Perseus DL and TLG), but also other available resources are mentioned (i.e. Trismegistos, Perseids and Alpheios, Musisque Deoque and PHI). They are generally considered good tools, but all these resources receive some criticism concerning their coverage and/or their usability and/or their availability.

2. Advanced Functions. They received particular attention by all respondents who insisted on functions such as, syntactic analysis, text search, digital copies of the primary source, bibliography, and translation in contemporary languages. Search by lemma, morphologic analysis paired with the availability of on-line dictionaries, are deemed the most useful functions, although they are not always available.

3. Usefulness of Digital Resources and Tools. There is a common requirement to improve the *syntactic analysis*, improve and refine *search mechanisms*, such as syntax-based searches, and make Application Programming Interfaces (API) available for several functions. Some users ask for hypertext links, with syntactic and grammatical analysis (e.g. tree) of the texts. In general, it is considered crucial to have annotated, searchable and interoperable, interlinked data.

There is agreement among respondents about the importance of text *variants* and of apparatuses as complete and comprehensible as possible. One of the replies says rather optimistically that those are current practice already, but admits that they are not available at the same time or linked to each other.

Some replies highlight the need to provide *primary sources*. As well as previous surveys have highlighted, it is important but it is not enough alone.

Translations in contemporary languages obtained a rather low score. This might be due to the bearing of the sample towards research rather than teaching. Collaborative hypotheses

functions did not receive a high score: this could be due to the need for a scientific board that guarantees the output or due to the habits of classics scholar who often works alone. It is worth noting that the result is to some extent contradicted by qualitative replies (see Table 1, above).

All the respondents highlighted the importance of carrying out experimentations in the field and insisted on the need to develop and/or make tools more reliable and usable. They found several inadequacies or unsatisfied desiderata: in particular, they complain about the absence of linguistic analysis and the lack of a complete and reliable critical apparatus. Some of them ask for lemmatization and annotation of texts and would expect far greater interoperability of data. They highlight the need to increase the material available in some fields of study, i.e. ancient Greek poetry, and ask for better usability of tools; they would welcome more attractive tools, equipped with user-friendly interfaces; they also point out that there are no tools able to integrate textual data and bibliography links, or hypertext links with other texts or resources available. (Table 2 shows the main deficiencies of available DH tools).

R1	<i>Relational syntax analysis functions are still missing. There are no tools that integrate textual data and bibliography links.</i>
R2	<i>Alignment with translation and syntactic and semantic analysis.</i>
R3	<i>Some tools need the addition of texts and the improvement of existing ones; others require the addition of several editions for the same Greek source.</i>
R4	<i>Some tools lack APIs (possibly Restful).</i>
R5	<i>Metric analysis may be useful, for lyrical sections, in particular.</i>
R6	<i>Even advanced tools offer poor - or nil - statistical disambiguation of morphological analysis and lemmatization. Other instruments of undoubted value are practically unusable due to the strong license restrictions. The tool's usefulness is very much tied to the quality of the reference editions.</i>
R7	<i>Failure to digitize the critical apparatus makes the tool unreliable. Research is conducted on the basis of the edition taken as a reference for each author, without the possibility to consult the variants.</i>
R8	<i>The possibility to combine word search and search of syntactic constructions.</i>
R9	<i>Lack of critical apparatus.</i>
R10	<i>Difficulty in understanding the reference source; when information about the source is found, it is often not so clearly identified.</i>
R11	<i>Advanced search, searching for co-occurrence of terms, creating concordances, selecting texts (single texts or groups of texts).</i>
R12	—
R13	<i>The visualization of the results is unsatisfactory.</i>
R14	<i>Hypertext links.</i>

Table 2: Main inadequacies

Finally, many respondents pointed out that models and software for authoring, editing, indexing and presenting a digital edition are important research directions. Digital editions may provide scholars with copious, very complete materials to ease their research and their studies, with a deeper insight into useful research methods.

As part of the overall strategy, the survey outcome is currently made public on CLARIN-IT (Nicolosi, Monachini and Stefanini, 2017) at <http://hdl.handle.net/20.500.11752/OPEN-86>, together with its questionnaire, so as to open our consultation to anyone willing to contribute (Figure 3).

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Survey Data: Current practice of digital resources and tools for studies on Digital Classics

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Nicolosi, Anika; Monachini, Monica and Stefanini, Alberto, 2017, *Survey Data: Current practice of digital resources and tools for studies on Digital Classics*, Digital Repository for the CLARIN Research Infrastructure provided by ILC-CNR, <http://hdl.handle.net/20.500.11752/OPEN-86>.

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Demo URL https://docs.google.com/forms/d/e/1FAIpQLSepPWryzL0fvmD8mx6Qdy-S30Vjr_jpSCdKvO_fGtVmGvNOWw/viewform?c=0&w=1

Date issued 2017-10-31

Type corpus

Language(s) Ancient Greek (to 1453) , English Italian ,

Description This dataset contains the original responses to a questionnaire run from May to September 2016 on a sample of Italian digital humanists with focus of interest on ancient Greek philology about Current practice of digital resources and tools for studies on Digital Classics: namely Ancient Greek. The survey is now available on-line at <http://www.clarin-it.it/it/content/sondaggio-current-practice-digital-classics-tools>.

The majority of questions were closed questions where respondents had to tick a box, occasionally multiple choice was allowed. A few questions required free text provision. The questionnaire was designed using 'Google Forms' and was run on the same platform in the autumn 2016.

The results of the survey are briefly presented to the CLARIN Annual Conference 2017 (18-21 September 2017, Budapest). Abstracts available here: https://www.clarin.eu/sites/default/files/Monachini-Nicolosi-Stefanini-CLARIN2017_paper_3.pdf.

Publisher Università di Parma

Subject(s) [survey data](#) [digital classics](#) [users' needs](#)

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Figure 3: Access to the Survey in the CLARIN-IT Repository

4 Action Plan: Implementing the Outcomes of the Survey

The outcomes of the survey motivated us to develop a mock-up of a scholarly digital editor for the ancient Greek poetry and to test its suitability and usefulness. These are the main steps of our action plan.

Existing on-the-shelf solutions, despite being often excellent products, provide an interface that reproduces the printed page of a commentary book⁴. We believe that a far more flexible and user-friendly solution may be envisaged⁵. For these reasons, we developed a mock-up of a scholarly digital editor of Archilochus, which draws on texts, translations and commentaries edited by (Nicolosi, 2013), while being mostly based on the survey. The mock-up provides, through an extensive use of windows and hyperlinks, a set of digital resources and other facilities, which allow the users to inspect the ancient text at many levels, thus easing its critical assessment. The experiment concerns a few fragments of the Greek poet to provide a prototype for evaluation by its intended end-users, in view of developing a full scholarly digital edition.

⁴For example 'The Classical Text Editor was designed to enable scholars to work on a critical edition or on a text with commentary or translation to prepare a camera-ready copy or an electronic publication without bothering much about making up and page proofs' (<http://cte.oeaw.ac.at/>). It also provides features oriented to a digital publication, i.e. the ability to export the publication in XML format according to the TEI standard, including formatting and styles adopted, graphic objects included in the publication, and references to external graphic representations

⁵For digital editions see (Pierazzo, 2014), (Sahle, 2008) and (Ruecker, 2008)

The final aim is to set a good practice, identify new models and new typologies of approach to the study of classical texts and profile a new workbench for scholarly digital edition. The intended audience for this tools is twofold, university students and scholars.

4.1 The Genette Model

The first recommendations made in the survey have been implemented on the basis of the model presented in (Genette, 1982) which allows a text to relate to other texts in several ways: *intertextual*, for quotation, plagiarism, allusion, *metatextual*, i.e. through a critic, reflexive relationship, *architextual*, as belonging to a literary genre, *paratextual*, i.e. with its textual periphery or *hypertextual*, for parody, spoof, sequel, and translation. These relationships may also include references to existing databases – where ancient texts’ witnesses are digitized – to imagery (objects, landscapes and tools referred by the poet) and to geographical databases, where places referred by the text are described. They may also refer to linguistic resources such as dictionaries, syntactic analysers and automatic translators.

4.2 The Mock-up

It is necessary to make a distinction between mock-ups and prototypes. A mock-up, still offering a detailed design of the final tool, is an intermediate step that only preludes to full software implementation and it represents obviously a rather low-cost operation. When adapting an existing text to a digital format, the key concern is the best user profit, i.e. how to exploit the ample repertoire of solutions and resources that digitalization may offer. The presented mock-up still doesn’t follow standards and design patterns; now it is envisaged only for a test and it is a standalone application. It will be revised, according to the evaluation, and it will become a network-based system. The mock-up (Nicolosi, Monachini and Stefanini, 2017) - which is mostly based on text, translations and commentary edited by (Nicolosi, 2013) - is now available at <http://hdl.handle.net/20.500.11752/OPEN-83> (Figure 4).

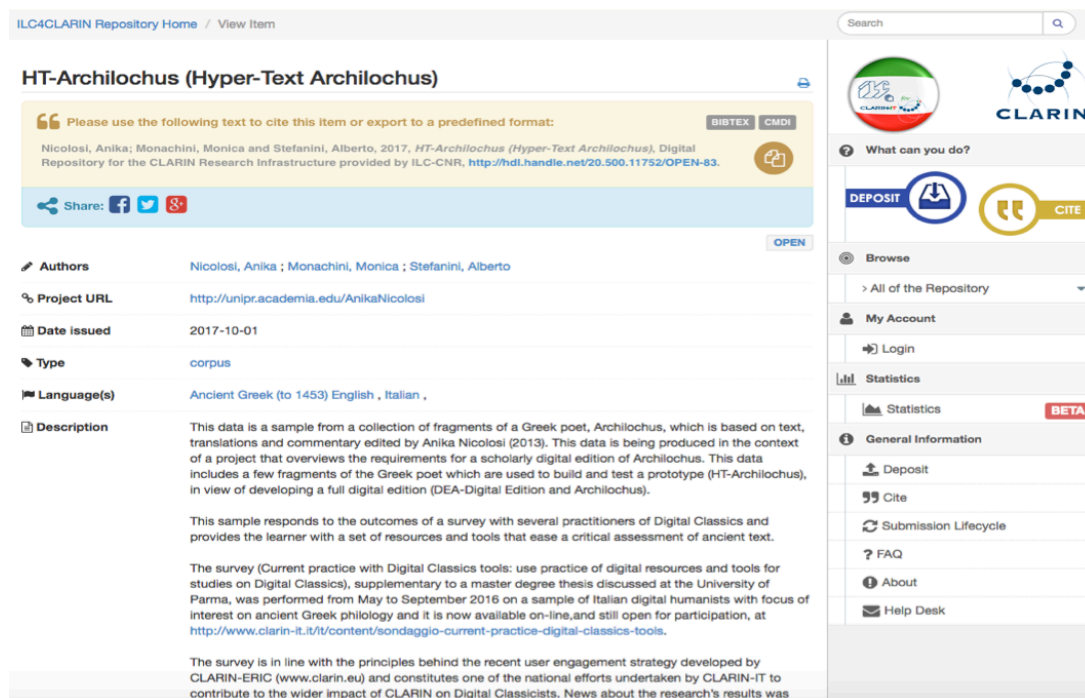


Figure 4: Access to the mock-up in the CLARIN-IT repository

It may be considered as an augmented scholarly and born digital editor compared to a simple digitization of a paper text, as it has a set of features that a simple digital edition does not present such as:

- a basic hypertext structure
- multimedia integration of text, images and graphics
- integration of material from multiple sources
- textual search tools
- reading support tools such as online translation, vocabulary, syntactic tree consultation

The mock-up view (Figure 5) shows a screen-shot of the set of the general functions, encompassing Italian translation, grammatical and metric analysis, and bibliography, the syntactic tree of the fragment⁶, the sources, loci similes, and some linguistic peculiarities and geographic information through invocation of the geographic database *Pleiades*. It is also possible to link the fragment to other relevant resources.

The screenshot displays a web interface titled "Funzioni generali" (General Functions). It features several panels and a navigation bar. The main content area includes:

- Fr. 2 W.²**: The Greek text "ἐν δορί μὲν μοι μᾶζα μεμαγμένη, ἐν δορί δ' οἶνος Ἴσμαρικός· πίνω δ' ἐν δορί κεκλιμένος." with hyperlinks for "more" and "less".
- TRADUZIONE:** "Nella lancia è per me la focaccia impastata, nella lancia il vino d'Ismaro, nella lancia bevo reclinato."
- Loci similes:** "μᾶζα μεμαγμένη, simile locuzione è usata da Aristofane *Equites* 55." with a "more" button.
- Grammatica:** "δορί w. 1s. è forma Ionica" with a "less" button.
- Luoghi e fatti:** "Ἴσμαρικός, 'Pleiades' ([https://pleiades.stoa.org/@@search?searchname=text=ism](https://pleiades.stoa.org/@@search?searchname=text&text=ism)); Ismaros: an ancient place unlocated" with a "less" button.
- Testimoni:** A detailed list of references including Athen. I 30f, Archilochos, Syn. Epist. 130 Hercher, and Dio Cass. LXXII 8,4.

At the bottom, a navigation bar contains buttons for "Traduzione", "Bibliografia", "Treebank", "Introduzione generale", "Metrica", "Grammatica", "Testimoni", "Immagini", "Loci similes", "Luoghi e fatti", and "Altro". A "Next slide" button with a red arrow is located at the bottom right. The date "05/30/2017" is visible in the bottom left corner.

Figure 5: General Functionalities

Each button corresponds to a different function. The buttons 'introduzione generale' and 'bibliografia' switch to full pages where a general introduction to the fragment and its bibliography are given. It is also worth noticing that the Greek text is hyperlinked in order to access to Greek word study tools and on-line dictionaries.

The set of textual analysis functions (Figure 6) provides the textual analysis with the full commentary and critical apparatus. The former window shows the first sentence of the comment only by clicking on the 'more' button it switches to a separate slide where the complete text is given; the notes function is open by clicking on the relevant button on the text. Finally, a comparison between the numbering of fragments in different editions is provided.

4.3 TEI Compatibility

In view of preserving interoperability through TEI compatibility, fragments uploaded in the mock-up will be provided in the TEI format. This allows texts to be interoperable and linkable with other resources of interest. It enables links to vocabularies, ontologies and terminologies

⁶The use of tree-banks can improve didactic aspects and can improve the portfolio of competencies in relation to skill about language knowledge of the student.

30: Isolata la proposta di Giangrande 1972, 37-40, che, sulla base del confronto con Anacr. fr. 43 (PMG 338), 7 P. (= 82,7 Gent.), interpreta ἐν δοῦνι come ἐν τῷ κύρῳνι, relegando il poeta giambico nel solito cliché del trickster emarginato e sovversivo. Ad un inverosimile jeu d'esprit che adombrì in generale oggetti riconducibili ad una manifattura lignea pensa invece Pocock 1961, 179s. [Less](#)

Fr. 2 W.²
 ἐν δοῦνι μὲν μοι μάζα μεμαγμένη, ἐν δοῦνι
 δ' οἶνος Ἰσμαρικὸς· πίνω δ' ἐν δοῦνι κεκλιμένος

Apparato, Varianti e Congetture:
 δ' ἐν δοῦνι κεκλιμένος; δ' om. Syn. [Less](#)

Commento (Nicolosi, pp. 64-65):
 ἐν δοῦνι κεκλιμένος: ammesso che la triplice
 occorrenza debba avere ogni volta lo stesso
 significato, diviene lecito domandarsi come
 sciogliere la contestata durezza del presunto
 nesso ἐν δοῦνι κεκλιμένος [More](#) [Less](#)

62-64):
 le principali ipotesi
 oscillano tra il
 significato tradizionale di 'lancia'
 (cf., ad es., Hom. *Il.* II 382, V 40 *al.*,
 VIII 95 *al.*, X 31 *al.*, XI 96 *al.*, XIII
 130, XIV 494, XV 473 *al.*, XVI 114
al., XVII 7 *al.*, XX 423 *al.*, XXI 17 *al.*,
 XXII 112 *al.*, XXIII 893 *al.* e *Od.* X
 162 *al.*, XI 532, XIV 277, XIX 448)³¹
 – talora anche attribuendo al nesso
 il valore metaforico 'in armi', 'sotto
 le armi'³² – e quello ugualmente
 attestato, pur se meno frequente,
 di 'legno della nave' e quindi, per
 metonimia, 'nave' (cf., ad es., Hom.
Il. XV 410, XVII 744 e *Od.* IX 384)³³.
 Quest'esegesi, sostenuta –
praeunte Davison 1960,3 – da
 Bruno Gentili (1965, 129-134) e poi
 ribadita dallo studioso in contributi
 successivi³⁴, muove da una
 peculiare lettura di uno dei due
 principali testimoni, Syn. *Epist.* 130
 Hercher (= Garzya; Garzya-
 Roques)³⁵ ... [More](#) [Less](#)

fr.	W. ^{1,2}	A. ^{1,4}	Tard.	L.-B.	D. ^{1,3}	Crö.	B. ¹	B. ²	B. ³	B. ⁴	H.-C.	Schn.	Gaisf.	L.	Br.
2	2	2	2	7	2	3	2	2	3	2	2	2	45	56	-

Edizioni critiche:
 Br. = Brunck; L. = Liebel; Gaisf. = Gaisford; Schn. = Schneidewin; H.-C. = Hiller-Crusius; B.^{1,4} = Bergk^{1,4}; Crö. = Crönert; D.^{1,3} = Diehl^{1,3}; L.-B. = Lasserre-Bonnard; Tard. = Tarditi; A.^{1,4} = Adrados^{1,4}; W.^{1,2} = West^{1,2}

23/11/2017

Figure 6: Textual Analysis Functions

which are published as Linguistic Linked Open Data (LLOD), available in the semantic web world, and guarantees that data are searchable, augmentable, shareable, navigable, connectable⁷.

4.4 Evaluation

The mock-up allowed us to carry out an overall evaluation in view of designing a full digital edition. This was done with semi-quantitative criteria, by developing an appropriate metric and a questionnaire to evaluate users satisfaction with the mock-up. An extensive bibliography on methodologies for evaluating websites may be consulted: a recent work by (Fogli and Guida, 2015) provides a review of this bibliography together with a way to assess the quality of use of a website, encompassing a balanced set of features of the site, so as to mediate between the site owner's point of view (which obviously would like to save on implementation costs) and end-users requirements (they may require expensive developments in terms of ease of use).

The mock-up was submitted to an evaluation by a sample of prospective users in view of future developments, to better focus on the requirements from the product's perspective. Evaluation followed a proper protocol to collect feedback from a small sample of learners. This experimentation involved a group of university students, attending an MS-level Greek Philology course at the Parma University. Each student in the group was asked to write a small essay:

- using traditional bibliographic tools (task A)
- using the support of the mock-up (task B).

The student group was informed of the purpose of the experiment and was shown how to use the mock-up in advance. At the end of the test, each student filled in a questionnaire. The data collected through the questionnaire were analysed in order to highlight:

- the individual students' basic skills (through individual examination);

⁷(<https://www.w3.org/2005/Incubator/lld/wiki/Benefits>).

- the quality of the essay they produced (insufficient, satisfactory, good, excellent).

The final evaluation of the results is expected to be available at the end of 2018. A first evaluation was performed between September and December 2017. Results are positive and may be summarized as follows:

- the mock-up cannot fully substitute the book (neither it was intended to do it);
- however, it was judged to be a good complement of the book.

The majority of the interviewees considers the use of the mock up either useful or very useful, no one judge it to be not useful at all; a small percentage only (10%) considers it scarcely useful. Almost all the interviewees judge the mock-up easy and intuitive; two students only consider it too elaborate and un-natural or difficult to use. The mock-up at this stage is considered a good support to traditional study performed on the textbook, but not a substitute. Interviewees appreciate the availability of much more material with respect to the book (in form of text, apparatus, translations, witnesses, commentary, bibliography but also textual analysis, images and links to relevant sites). However, respondents also note some shortcomings: in particular, compared to the textbook, some overlapping layered windows prevent the simultaneous consultation of the relevant information and there is no way to insert commentary or study notes. Moreover, there are some difficulties similar to those in the printed book, such as, for example, the explanation of abbreviations in quotations. Finally, it is worth considering the replies about the difficulty of the tasks. Half of the interviewees judge the tasks A and B of the same difficulty. However, the majority of the remaining half of the respondents believe that performing task B (solved using mock-up support) was more complex than task A (solved using traditional bibliographic tools). In conclusion, at least half of the respondents consider the mock-up a useful study support.

The evaluation of the mock-up provides insight about usability of a full prototype, and then we will perform a cognitive walkthrough and a co-operative usability evaluation with 2-3 users. As the first evaluation step showed, we can already expect that it may be necessary to partly re-design the mock-up, at least from the point of view of the expected cognitive simplicity of the User Interface (i.e. about the screens that do not have clear visual structure, or that are unnecessarily complex), and the User Interface aesthetics, like Symmetry, Predictability, Economy, Proportion, and Simplicity, cfr. (Bhaskar et al., 2011), which are not fully implemented. User interface aesthetics, among other design considerations, are considered to be one of the determinants of user satisfaction. Once the design team has revised the mock-up accordingly, we plan to make it available through CLARIN-IT, together with the consultation questionnaire, in order to gather a broader outcome by the practitioners' community.

5 Conclusions

This paper presents and discusses the results of a survey carried out within the framework of CLARIN-IT in order to assess the actual use of digital resources and language technologies for Digital Humanities with respect to work in Ancient Greek scholarship. We concentrated, firstly, on the needs and requirements of Greek scholars, a large community manifesting complexity and an enormous level of heterogeneity. Our study, however, may also help in identifying gaps and drive the development of new technologies for ancient studies, thus addressing a set of R/D priorities that could be the base for establishing a consistent research and innovation agenda for Digital Classics, at large.

The focus is on the users; their feedback is paramount for identifying concrete factors that are likely to limit the uptake of new technology. Researchers must be primary actors in describing their expectations from digital data, tools and services in support of their studies, in view of enhancing existing resources and creating new resources and tools. The main message of the

Data Management Plan of PARTHENOS – one of the most important projects dealing with data science and aiming to build bridges and consolidating shared practices among the various domains of the humanities – states that: “the collection of user requirements and needs ... is based on the indications of a wide research community for the implementation of common policies and strategies” for managing data⁸.

The survey, as well as other surveys of digital methods in the sector carried out in the last decade, pointed out that most of the tools available do not pay enough attention to the criterion of usability. In some cases, there are researchers that either have not yet started using technology, or are in an early stage of doing so; some have difficulties in implementing them. To be successful, tools and services must be not only compatible with researchers’ workflows but, above all, must be reliable and easy to use (cf. also (Drude, 2016))⁹, combining the accuracy of traditional philology with a new, more intuitive and dynamic, still rigorous, approach.

A concrete action plan, emerging from the results of the survey, should lead to a workbench equipped with functionalities for inputting Greek lyrical text fragments in a simple and intuitive way and visualizing their encoding with specific TEI transcription; provide apparatus, literature and translation; link together primary sources and lexica; provide textual (and metrical) analysis and commentary, and offer search tools. To sum up, it is crucial to improve ancient studies by developing a common platform that responds to the desiderata of the scholars themselves.

CLARIN, the research infrastructure for the humanities and social sciences, can facilitate the take off of digital methods and solutions in various sectors and disciplines outside linguistics (insofar they have language as their object of study), such as philology. CLARIN, indeed, provides users with a variety of tools to analyse the data and delivers language services that, once integrated at an earlier stage of the process, may facilitate research tasks¹⁰. In addition, besides offering the opportunity to access and share data and tools, CLARIN represents the perfect framework from which to spread knowledge about the good practices related to a discipline (also with attention to possible educational aspects). Concluding, CLARIN is able to support and improve classical studies thanks to the application of concepts, methods and tools from the Digital Humanities to the field of Classics and of the study of the ancient languages.

⁸www.parthenos-project.eu

⁹This is in line with the PARTHENOS User Requirements report.

¹⁰We may remember, for instance, some VLO tools: “Lingua Interset” that is an universal set of morphosyntactic features, which all tagsets of all corpora/languages can be mapped to; The “TuTeAM corpus” that contains about 2800 entries from Ancient Greek and other modern languages; “Philostei” that is a system allows you to convert your book pages’ images into editable text (in TEI XML format); “Universal Dependencies” that is a project that seeks to develop cross-linguistically consistent tree-bank annotation for many languages, with the goal of facilitating multilingual parser development, cross-lingual learning, and parsing research from a language typology perspective; “The PROIEL Tree-bank” that is a dependency tree-bank with morphosyntactic and information-structure annotation.

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