The Road Ahead
ALA Publishing Committee Recommends CRediT as a Best Practice
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Contributions to scholarly work are mostly recognized by means of assigning authorship credit, which can later be used in academic evaluations and for career progression. Sociologists of science describe authorship as a *commodity* that is bartered among scholarly contributors as well as with resources such as research samples.[1] On the flip side, authorship also functions as a mechanism for holding contributors responsible for their work.[2] Despite its significance as means of attributing credit and responsibilities, when beginning a collaboration, researchers might feel uneasy about discussing authorship—specifically, who will be an author and in what order—or about openly communicating expectations regarding commitments and extent of contributions that ultimately determine authorship. These challenges are particularly more pronounced for junior researchers who are inexperienced in authorship negotiations and are at an inherent disadvantage in terms of power disparity with more senior researchers.[3] Consequently, tensions and disagreements may arise and provide the impetus for discussions about authorship, but this is often too late and is more likely to be emotionally charged.

One can reasonably conclude that a proactive approach along with early conversations are more likely to yield ethical attribution of credit and responsibilities.[4] Indeed, best practices for ethical authorship suggest early discussions and frequent follow ups. Nevertheless, frequent disputes and misattributions suggest that this advice is not always followed.[5] One reason why authorship is not discussed early and frequently might be that context-specific discussions about methods or expected results are considered more urgent. For example, in a conversation about design or data collection strategies, it may appear awkward to shift the focus to authorship or set conditions and note something along the lines of "I'll only collect or analyze data if I get a first authorship position." Furthermore, in cases when early discussions of authorship are not properly managed, they could get in the way of doing the actual work by having team members' emotions bruised, erode their trust and good faith in each other, or cause distractions. All of these could compromise the quality of the work and collaboration dynamics, making the team prefer to delay conversations about authorship.

What may exacerbate these human/social factors is the lack of appropriate tools and frameworks to *discuss* authorship as opposed to *assign* authorship. In debates about the ethics of authorship, definitions of authorship are sometimes seen as a panacea, with some believing that if all researchers

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know what constitutes authorship and learn how to apply it, disputes and tensions will disappear.[6] Nevertheless, the plurality of definitions with different requirements, context specific challenges related to the meaning of "significant/substantial contribution," and obscurity related to the notions of intellectual versus technical contributions, constrain the effectiveness of authorship definitions.[7] Furthermore, authorship definitions are a means of demarcation—only specifying who is an author— and cannot always facilitate *discussions* about authorship. These challenges have been known for a long time, and various suggestions have been proposed to address them. Among suggested solutions, one pertains to articulation of individual contributions, and a move to *contributorship* instead of authorship. Advocacy for this idea started in the 1990s when experts suggested that scholarly manuscripts should clarify who did what.[8] This idea later evolved and morphed into a more systematic and machine-readable solution called contributor roles: Standard vocabularies to describe what each researcher did in relation to a publication.[9] Thus far, the Contributor Role Taxonomy (CRediT) is the most widely used contributor role schema.

While contributor roles like CRediT are not designed to specify who should be an author, and are used in parallel with authorship bylines, they can alleviate tensions of authorship attribution by enabling teams to discuss specific and standard contributions. In the context of early conversations around authorship, using contributor roles allows teams to discuss and document specific tasks instead of and/or in addition to authorship. As will be mentioned shortly, specific tools that complement contributor roles have been developed for this purpose and can play a significant role in facilitating dialogue and keeping track of conducted and expected contributions.

Contributor Role Taxonomy (CRediT)

In 2012, a group of researchers explored and synthesized contributions that were described in scholarly papers, and subsequently compiled a standard list to describe individual contributions to publications. This list of roles included a unique definition for each role and was called CRediT. Released in 2014, CRediT has fourteen roles including conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing (original draft preparation), writing (review and editing), visualization, supervision, project administration, and funding acquisition.[10] Since CRediT's introduction, it has been adopted by hundreds of journals, and has been formalized as a standard by the National Information Standards Organization.[11] Although CRediT was not developed to address authorship disputes, because it provides a framework to describe contributions in a transparent and user-friendly manner, it facilitates a consistent and systematic documentation of contributions.[12] Complementary tools such as the web-based application and R package called "Tenzing" also facilitate this process when the work is being planned and caried out.[13]

Librarians, Libraries, Authorship, and Contributor Roles

Librarians are frequently involved in collaborative research projects as co-authors, including systematic or scoping reviews or studies that require bibliometric analyses. The specific role conducted by

librarians might vary significantly. A survey (N = 60) conducted by Borrego and Pinfield showed that, when using CRediT roles, librarians describe their contributions to co-authored publications with Writing—review and editing (78 percent), Methodology (63 percent), Investigation (63 percent), Conceptualization (55 percent), and Writing—original draft (50 percent) roles. Other reported roles include Data curation (37 percent), Visualization (33 percent), Formal analysis (28 percent), Project administration (27 percent), Resources (27 percent), Supervision (22 percent), Software (20 percent), Validation (18 percent), and Funding acquisition (8 percent).[14]

Besides co-authorship with researchers, many librarians also publish original research across a wide range of topics, including library management and operations, information literacy, user experience, digital preservation, diversity and inclusion in library services and collections, scholarly communication, data management, collection development, the impact of technology on libraries, and the evolving role of libraries in education and society, to name a few. Accordingly, like many other academic communities, librarians who frequently publish have likely dealt with authorship and its quandaries.

The concept of authorship has historically mattered to libraries and to readers of *Library Resources & Technical Services* for a wide range of technical and social reasons beyond individual authorship, including acquiring, indexing, cataloguing, preserving, and ultimately discovering collections and making them available for use. Due to this specific vantage point, librarians' engagement with authorship and attribution issues is wide-ranging. For example, a librarian may be interested in ensuring that the resource they are ordering is not a duplicate of a resource already owned by the library. Furthermore, through authority control work librarians standardize and maintain information about authors, their works, and subject matter, ensuring organization, consistency, and accuracy in information systems. Beyond the technical and practical aspects of authorship in library systems, there is a social component to the concept of authorship for librarians as they interact with patrons. Libraries work closely with their campus communities to support authors with a range of issues through resources, consultation services, and training on authorship concepts such as ghost authorship, gift authorship, group authorship, and contributor roles, to name a few. For these services, libraries can take advantage of guidelines such as those provided by the International Committee of Medical Journal Editors or the Council of Science Editors.[15]

When it comes to adopting contributor roles, some librarians quickly identified the value of this new concept, because it offers abundant, machine-accessible and interoperable metadata that supports team science through enhancing the recognition of individual contributions.[16] In fact, since librarians have been among under-credited groups in team science, they saw value in acknowledging more specific tasks.[17] Some libraries have leveraged knowledge and experience about scholarly infrastructure, team science, cataloging, and ethics to improve contributor roles in ways that recognize a larger swath of contributions and better convey the concept of contributorship, including work by our team.[18]

Despite librarians' involvement in various team science projects, some of their contributions cannot be captured by widely-used contributor roles such as CRediT.[19] For example, using CRediT one cannot

recognize the role played by librarians who provide educational support or trainings to research teams. It should be noted that this limitation does not only affect librarians and has been raised about roles in other contexts (e.g., community engagement, legal support), which cannot be specifically recognized by CRediT.[20] There may be many more contribution types specific to librarians that are currently not recognized by CRediT, but the only way to identify these would be to have more librarians use CRediT. Indeed, it is by implementing and using contributor roles that other communities have been able to provide suggestions on how to improve the list of roles in contexts such as randomized clinical trials,[21] and software development.[22]

ALA Publishing Committee's Recommendation

As libraries evolve, so does the role of librarians, along with their research and educational endeavors.[23] These changes and transitions necessitate adopting new ways of thinking and embracing innovative strategies to meet the shifting needs of the communities they serve. The decision made by the ALA Publishing Committee to introduce CRediT as a best practice is certainly one step in the right direction and will encourage the library community to use contributor roles, and gain familiarity with this concept. We consider the librarian community's engagement with CRediT as a process, which might involve some trial and error to find the most suitable format and implementation strategy. For example, some journals (e.g., *PLOS One*) have incorporated CRediT into their submission workflow and collect individual contributions as metadata, but others only require/suggest disclosure as a declaration at the end of manuscripts (e.g., *Learned Publishing*). Sometimes specifying contributions using CRediT is mandatory (e.g., in *PLOS One*), but other times it remains at authors' discretion (e.g., in *Learned Publishing*). These nuances will impact the implementation at a journal level in terms of costs and could result in (dis)satisfaction of certain users. Furthermore, some librarians may find specifying contributions in the context of library sciences/management superfluous. This is particularly true for projects or manuscripts with only one or two authors, where a detailed breakdown of individual roles might seem unnecessary and create additional administrative burden. This resistance has existed elsewhere too but looking at non-STEM contexts where contributor roles have been successfully implemented shows that in the long run, an accurate description of roles and contributions results in further specification of tasks and enhances recognition. For example, in digital humanities, the Taxonomy of Digital Research Activities in the Humanities (TaDiRAH) was introduced in 2014 and after being used by the community and receiving feedback, was revised in 2021.[24] It seems likely that CRediT will also evolve to reflect the needs of the community, including roles played by library-based authors.

We commend the American Library Association Publishing Committee for the endorsement of CRediT to better reflect the wide range of contributions necessary for the success of the work that is published in ALA journals.

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Notes

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