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RESEARCH IN SPECIAL EDUCATION

ALETHEIA SOCIETY

NON-EMPIRICAL PAPER

Sharing Materials to Heighten the Impact of Publications

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ABSTRACT

Sharing materials related to publications has potential benefits for both research and practice in special education and related fields. For research, sharing materials such as researcher-created outcome measures and interview protocols increases the transparency of research reports, enables other researchers to use and adapt the materials efficiently, facilitates replication, and ensures that materials are maintained. For practice, sharing research-validated materials such as intervention protocols and fidelity checklists can help to reduce the research-to-practice gap by providing practitioners with the materials needed to implement research-based practices. In this paper, we discuss the benefits of sharing materials, describe challenges to and provide recommendations for sharing materials, and share our personal experiences and perspectives related to sharing materials.

Keywords: shared materials; supplemental materials; open access; research to practice

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In this article, we provide a rationale and guidance for researchers in special education and related fields to engage in the open-science practice of sharing materials. Open science is "a set of principles and practices that aim to make scientific research from all fields accessible to everyone for the benefits of scientists and society as a whole" (UNESCO, 2022; p. 2), with six guiding principles (see Figure 1). Shared or open materials are a core open-science practice that involve authors providing free access to materials related to a publication and incorporating the open-science principles of transparency, reproducibility, equality of opportunity, and sustainability in their work. Many types of materials can be shared, including materials used in research studies and needed to implement a practice described in practitioner articles (e.g., assessments and evaluations, intervention protocols, interview protocols, observation forms, fidelity checklists) as well as supplemental details related to study methods and/or results (e.g., supplemental tables and figures). Indeed, perusal of the method section of most research reports will identify an array of materials that, if shared, would increase the transparency of the research and facilitate replication (Bowman & Spence, 2020).

Figure 1: UNESCO's (2023) Six Guiding Principles of Open Science.

Note: Six Guiding Principles is from UNESCO (2022, p. 9), made available under the AttributionShareAlike 3.0 IGO (CC-BY-SA 3.0 IGO) license.

As reflected in the Center for Open Science's electronic-badge classifications (Call, 2022), open materials involve sharing components of the research methods needed to reproduce a study (e.g., survey instrument, intervention protocol). We also consider shared resources (beside data and analytic code; e.g., detailed findings, supplemental tables and figures) as shared materials, which the Center for Open Science recognizes with a Supplement badge. Although open data and code might be considered types of open material, because of unique issues related to sharing data (e.g., ethical considerations regarding protecting the identities of human subjects) and analytic code we do not consider them as shared materials or discuss them in this paper (interested readers should see guidelines for sharing data and analytic code in this special series and elsewhere; Abdill et al., 2024; White et al., 2024). The distinction between open data, open code, and open material is supported by the Center for Open Science, which awards separate badges to recognize these three different open practices (Call, 2024).

Sharing materials has many potential benefits, such as (a) improving the efficiency of future research by allowing other researchers to use a validated instrument in their own research rather than having to create their own instrument, and (b) helping practitioners to implement research-based practices with fidelity. However, sharing materials is not commonplace in special education scholarship. Cook and colleagues (2023) found that only 11% of the empirical articles in a random selection of 250 articles published in special education journals in 2020 included shared materials. Moreover, most of those materials were shared as tables and figures within the articles and were not licensed for reuse, provided in formats that can be edited, or easily identified or accessed by practitioners (as most journal articles lie behind a paywall; see Cook et al., 2023). Only 5% of articles included materials shared as separate files. Similarly, in reviews of 250 publications in the social sciences (Hardwicke et al., 2020) and psychology (Hardwicke et al., 2022), authors found only 11% and 14% of publications included shared materials. The scarcity of shared materials may be due to a lack of knowledge and training as well as concerns with sharing one's work (Logan et al., 2021). To increase knowledge of why and how to share materials, in this article we highlight benefits of sharing materials, characterize different approaches for sharing materials, discuss challenges and make recommendations for sharing materials, and briefly describe some of our own experiences and perspectives.

BENEFITS OF SHARING MATERIALS

Consistent with other open-science practices (e.g., open data, open-access publishing, preregistration), sharing materials in published articles has a variety of benefits that include enhanced transparency, accessibility, equity, reproducibility, impact, and efficiency of scholarship (see Cook et al., 2018; Fleming et al., 2021; van Dijk, 2021). In this section, we discuss the benefits of sharing materials for research and practice, as well as how it addresses some of the limitations of traditional publishing (e.g., page limits). Given that virtually any use of research materials in the digital age will entail copying and distributing copies, even within a single research team, sharing materials with open licenses will help to ensure that copyright is not a barrier to any beneficial downstream uses of shared materials.

Benefits for Research

Sharing materials in papers that report empirical research can help to increase the transparency of research reports, facilitate replication studies, increase efficiency in conducting future research, and sustain materials. Authors of empirical papers aim to report the methods and results of their studies transparently and thoroughly to facilitate understanding and interpretation of their study. Sharing materials such as a video example of an assessment protocol, the actual survey used in a study, or detailed findings (e.g., effects for non-significant covariates) not only increases transparency of reporting but also aids readers' understanding of the study. Sharing supplementary materials can be especially helpful for increasing the transparency of systematic literature reviews and meta-analyses. Traditionally, researchers often summarize search

terms, inclusion criteria, and coding processes rather than exhaustively list these study elements, in part to stay within journal page limits. To increase transparency in systematic reviews, Cumming et al. (2023) recommended that authors share their full search terms, detailed inclusion criteria, and potentially their study coding sheets. For example, Nelson et al. (2022) included additional coding documents as well as references of all articles included in the meta-analysis as supplemental materials.

Sharing materials also facilitates the replication of research by independent researchers. Replication is critical for establishing the credibility of research findings as well as for the generalizability of effects (Travers et al., 2016). Most replication studies in special education are conceptual replications (Cook et al., 2024), in which some aspects of a study are reproduced as faithfully as possible but one or more elements are purposefully altered. Sharing materials facilitates faithful reproduction of the elements of a conceptual replication that researchers seek to keep constant. For example, researchers conducting a conceptual replication may want to use the exact same scripted intervention protocol, the exact same intervention materials, the exact same assessment instrument, and/or the exact same checklist to evaluate fidelity as in an original study, but apply the intervention with a novel population of learners. Researchers typically have access to the materials they used in a previous study and can replicate their own work. However, it is important for other researchers to be able to replicate and extend research findings independently (Cook et al., 2024; Makel et al., 2016). Without sharing study materials, independent replication may not be possible, or—at best—would depend upon successful communication with the original authors and, for those authors, on providing the requested materials. Sharing materials is an equitable and efficient approach to support replication.

Other benefits of sharing materials for research include equality of opportunity and efficiency. Researchers frequently need to develop study protocols, student assessments, surveys, and other materials for their research. Oftentimes, other researchers have already created and validated protocols, student assessments, surveys, and other materials in previous research that could be re-used in whole or in part. Sharing one's materials reduces the need for other researchers, especially early-career researchers, to devote significant time, effort, and cost to developing and validating new materials. Moreover, using the same materials across studies facilitates meaningful synthesis and meta-analysis of research by reducing variability in studies associated with differences in materials. Finally, shared materials (a) become citable products, for which researchers can provide citation and download counts in their tenure, promotion, and job applications as evidence of the impact of their work, and (b) reduce the likelihood that materials become unrecoverable (e.g., when a researcher retires).

Benefits for Practice

Special education is an applied field, yet the research-to-practice gap is wide. The Individuals with Disabilities Education Improvement Act (IDEA) asserts that a child's individualized education program provides special education services that are "based on peer-reviewed research to the extent practicable" (IDEA, 2004; 20 U.S.C. § 1414 (d)(1)(A)(i)(IV)). However, as Cook et al. (2022) noted, classroom practices cannot be based on research if research is not accessible to those outside the ivory tower. Unfortunately, educators seldom have access to the materials used and validated in research studies (e.g., protocols for research-validated interventions, materials such as handouts used in research-validated intervention, reliable assessments). Importantly, educators have a limited amount of time, so they are most likely to use information and resources when they are easily accessible and ready to use (Beahm et al., 2021). The lack of access to validated materials used in published research likely contributes to educators seeking materials from sources including other educators, professional development provided by their schools, and internet searches (Lawrence et al., 2023) that frequently are not based on research and can therefore lead to ineffective instruction. Providing full and equal access to research-validated materials can help to bridge the research-to-practice gap and–in turn–improve the quality and

effectiveness of education provided to students with and at risk of disabilities. Most researchers envision the materials they develop being used in classrooms and other instructional settings to help improve the quality of instruction and outcomes of learners with disabilities. Sharing materials in their publications freely and equitably is an important step in realizing that vision.

As an example, self-determination is both an evidence-based predictor (i.e., possessing self-determination) and practice (i.e., specific self-determination curricula) for positive post-school outcomes for individuals with disabilities (Mazzotti et al., 2021; Rowe et al., 2021). Fortunately, researchers have provided free access to reliable and valid self-determination assessments (e.g., *AIR Self-Determination Scale*; Wolman et al., 1994) and research-based curricula (e.g., *Whose Future Is It Anyway?*; Wehmeyer et al., 2011). For instance, the University of Oklahoma's Zarrow Institute on Transition & Self-Determination (2023) website houses the *AIR Self-Determination Scale* and the *Whose Future Is It Anyway?* curriculum, along with other self-determination assessments and curricular materials. These materials can be freely downloaded from the Zarrow Institute's website by anyone for their own use. However, because the materials are not openly licensed (as described subsequently), others cannot re-share them (e.g., post them on their own website, use them in an article) without securing permission from the copyright holders. Nonetheless, teacher educators and providers of professional development can direct practitioners and others to the Zarrow Institute's website to access and use these free, research-based materials to increase and assess the self-determination skills of students with disabilities.

Addresses Limitations of Traditional Publishing

Scholarly journals are a primary means by which scholars in special education and related fields disseminate peer-reviewed scholarship to inform policy and practice. However, many common policies and practices of contemporary journal publishers fall short of UNESCO's (2022) call for scientific knowledge (e.g., materials) to be inclusive, equitable, and sustainable.

Most journals impose page limits on submitted manuscripts that make it difficult for authors to include materials in their papers. For example, when submitting to *Exceptional Children,* often considered the flagship research journal in the field, authors are advised that manuscripts typically should be 28 to 35 pages, inclusive of cover page, abstract, references, tables, and figures (*Exceptional Children*, n.d.). Because papers must adhere to the requirements of American Psychological Association's (APA, 2020) writing style, which requires detailed reporting of study methods and results as well as double spacing, most authors are unable to include materials, especially lengthy protocols and instruments, used in their study and still adhere to the page limit. Although authors of articles published in journals targeting practitioners seldom report detailed study methods, page limits typically are more restrictive in these journals. For example, *Teaching Exceptional Children*, one of the leading practitioner journals in the field, requires submitted manuscripts be between 18 to 22 double-spaced pages, including tables and figures (and presumably title page and references; *Teaching Exceptional Children*, n.d.). It may be particularly challenging to provide sufficient detail within page limits for studies with complex and innovative methods and/or nuanced and rich results, as is the case for many mixed-methods and qualitative studies. Fortunately, as discussed in the next section, there are options for sharing materials outside of the main text of articles that are not included in a paper's page count.

If authors are able to share materials within the page limits of a traditional journal article (e.g., as tables or in figures), the format imposes important limitations that likely inhibit the accessibility and use of the material. For one, individuals without an affiliation to an organization that has contracted with the journal publishers, such as many special education practitioners, cannot freely access many articles in which the materials are published (Lindström et al., 2024). As such, many special educators would be unable to access an intervention protocol, for example, that an author provided in a published article. Furthermore, even when research consumers can access materials provided within published articles,

those materials are typically provided in an uneditable PDF version of the article and therefore cannot be edited or manipulated by others to use in their own research or teaching. Finally, unless otherwise licensed, the journal publisher typically holds copyright to the contents of traditional journal articles, including materials. It is therefore not clear whether and how practitioners and researchers can use materials included within published articles. For these reasons, we do not recommend that scholars share materials by embedding them in traditional journal articles (for which the publisher holds copyright).[1]

Although popularized in relation to sharing data digitally, the FAIR principles (Findability, Accessibility, Interoperability, and Reusability; GO FAIR, n.d.; Wilkinson et al., 2016) also apply when sharing materials electronically. It is important that materials are findable by potential users (e.g., assigned a permanent digital object identifier and identifiable through online searches) and are freely accessible (materials are freely and universally available) to potential users. Interoperability refers to the ability of users to manipulate and integrate the material with other materials. Interoperability requires sharing in a format that permits manipulation. Finally, reusability involves providing clarity for how materials can be reused. Unfortunately, even when researchers share their materials in published articles, those materials typically are not findable, accessible, interoperable, or reusable. However, publishing has entered the digital age (i.e., papers are disseminated online) and, as described in the following section, multiple possibilities now exist to share materials in ways that align with the FAIR principles without adding pages to manuscripts.

APPROACHES FOR SHARING MATERIALS

Materials can be shared in multiple ways. Authors sometimes note in articles that materials are available on request. Although such phrasing signals a potential willingness to share materials, we recommend against it. For one, having to respond to individual requests one at a time is inefficient. Relatedly, this approach puts the onus of maintaining a copy of the material on the researcher. If someone unexpectedly requests a copy of a material from a study conducted many years ago, we suspect that many researchers would have difficulty locating the material. Additionally, when researchers change emails (e.g., after changing jobs or retiring) they can no longer be contacted at the email address provided in the article. For these and other reasons, multiple studies have documented that many researchers who write that raw data for their study are available on request fail to provide that data when requested (see Cook et al., 2023; Tedersoo et al., 2021). We suspect this finding generalizes to materials that are noted as available on request. Indeed, after requesting materials from 10 corresponding authors of studies published in special education journals noting that materials were available on request, Cook and colleagues (2023) reported receiving materials from only three authors.

Authors can also share materials as supplemental files, which are referred to in the paper and can be accessed through the journal website, if the journal provides that option, as many do. For example, Sage Publications uses Figshare, an online repository, for housing supplemental materials to articles published in their journals. Sage Publications includes the Figshare widget on the webpage of articles with supplemental materials that users click on to view and/or download the materials. Even if the full text of the article is behind a paywall, the Figshare widget is not, allowing anyone to access the supplemental materials freely.

Authors can also independently upload shared materials to online repositories such as Figshare or the Open Science Framework (OSF) and include a link to the shared materials in their manuscript. Figshare provides a user guide for researchers to navigate their interface. In our experience, the benefits of Figshare include ease of locating extant projects, flexibility in uploading materials, and the ability to generate a DOI for materials that are not yet ready to be made public. Strengths of OSF include visible recent activity logs on project pages and an easy-to-navigate system for managing,

1 As discussed subsequently, if materials are first shared in an open repository with an open license, they can be incorporated into published articles without these downsides.

storing, and sharing multiple open project components (e.g., shared materials, shared data, pre-registration, preprint) in a single project webpage. LDBase (Learning and Development Base) is a repository that focuses on data sharing and data code sharing but includes options for adding project documents (i.e., shared materials) and preprints as well. Researchers and authors can also store shared materials on their personal, project, or university-center websites. Examples of websites with shared materials include Jessica Toste and colleagues' Word Connections as well as Comprehensive, Integrated, Three-Tiered (Ci3T) Models of Prevention led by Kathleen Lynne Lane and the Ci3T Strategic Leadership Team members. An upside of storing shared materials on repositories and personal and project websites is being able to update the shared materials. However, a downside of using a personal or project website is the potential for broken links and losing materials if websites are not maintained.

For authors of practitioner articles in special education and related fields, there are additional options for sharing research-based educational materials. The Council for Exceptional Children (CEC, 2023) has an online repository for practitioner resources that are vetted by special education content experts. The CEC repository is an option for researchers to upload research-based materials that can be used by educators and other practitioners. However, to upload materials to the CEC repository, one must be a CEC member, as one must be to access the CEC repository in search of materials. Another option for practitioner-shared materials is TeachersPayTeachers (TpT). Although there are many fee-based items on TpT, materials such as research-validated protocols or assessments can be shared on TpT for free. Authors can also share materials through social media. For example, educators have started Facebook groups in which they help each other by providing ideas, advice, and electronic materials. If a researcher is a member of the group, they can share materials with the other members. Sharing materials on TpT or social media has the potential to reach large audiences as many educators already use TpT and various social media platforms. However, a downside is that, because anyone can share virtually anything on these sites, users might be skeptical of the quality and validity of content posted there. Therefore, when researchers share their materials on TpT or social media, we suggest they include a brief description of relevant research support in their description of the materials.

CHALLENGES AND RECOMMENDATIONS FOR SHARING MATERIALS

For those planning to share their materials, there are some challenges to think through and recommendations to consider, including legality and institutional guidelines, licensing materials, attributing materials, facilitating appropriate use by others, and incorporating sharing of materials into planning for future projects. Challenges and recommendations may differ based on the intended end-user of the materials (e.g., researcher or practitioner).

Legal Considerations for Copyright and Intellectual Property

When considering what materials to share, it is important first to determine what can be shared legally. The most important threshold requirement is that one can only share material for which one holds sufficient ownership rights. Even for material created entirely by the authors of a research study, care is needed to ensure the authors have the right to share the materials they created. We follow Cook et al. (2022) in recommending that researchers review institutional and/or funding agency requirements. For instance, the authors' institutions provide a range of policies for copyright and intellectual property (e.g., University of Florida's Intellectual Property Policy). Typically, institutional policy is concerned primarily with identity standards (e.g., university logos and colors) and innovations with the potential to generate revenue via patents rather than researchers' survey questions, interview protocols, intervention timelines, or participant workbooks. Most, if not all, universities consider products generated by their faculty within the scope of their employment (i.e., the kind of work they are expected to do as part of their faculty appointment) to be the intellectual property of the university as an initial matter, with rights typically ceded back to faculty for some subset of works (Gumb & Cross, 2022). This subset of products generally includes research materials, providing an opportunity for

researchers to share their research materials when publishing.[2] As institutional and organizational policies can change, we recommend reviewing updated guidance as it is produced and to consider consulting with licensing offices, librarians with intellectual property expertise, or other copyright experts in situations where guidance is unclear.

Funding agencies such as the Institute of Education Sciences (IES) and the Office of Special Education Programs often focus on ensuring researchers provide open access to manuscripts and data supported by the funding. Indeed, all U.S. federal government agencies have been directed by the Office of Science and Technology Policy to revise their policies on funded research by December 31, 2025, to require free public access to all articles and data resulting from federally funded research, without embargo (see Center for Open Science, 2022). Providing open access to study materials is likely to align with future policies of research funding agencies, as policies such as the IES's (2022) Standards for Excellence in Education Research (SEER) continue to evolve. Thus, not only does providing open materials have all the benefits described previously, it also further behooves researchers seeking external funding to gain fluency in the practice given that we anticipate funding agencies will have an increased pressure for shared materials in the future.

Once an author or research team has determined that they have the right to share materials, they should consider the legal advantages associated with sharing materials *before* they are associated with or incorporated into a published article. Publishers' contracts can result in a transfer of copyrights or an exclusive license to the publisher for any materials that are not already published under an open license. This is especially true for figures and other materials that might be incorporated in the body of an article. If these materials become the property of the publisher, would-be users (including the authors in their future research) may need the publisher's permission, which may require payment of a fee, in order to use them. On the other hand, if research materials are published separately and with an open license (as described subsequently) before they are incorporated into an article and submitted for publication, then the open license will preempt the publisher's contract. The upshot is that the materials are treated as pre-existing works, incorporated into the article under the open license just as the work of a third-party author might be. The authors should be sure to include sufficient information about the material's original publication location (e.g., URL) and the license under which the materials are published to allow readers to find and use the open versions. This also ensures that the publisher is aware that these materials are not part of any license or transfer associated with the article.

A high level of care should be exercised in sharing research materials that members of the research team do not create or that they adapt from preexisting materials. Researchers typically should not share materials that others outside of their team have created unless those materials were licensed by their creators for sharing. Pay close attention to the terms of any licenses for materials found online; as discussed below, if the license associated with a work does not permit commercial uses, then incorporating it into an article published behind a paywall is not within the scope of the license.

Licensing Materials

After confirming what can be shared via institutional and funding agency policies, researchers should consider the different licensing choices available to clarify how they wish the materials to be used and shared by others. See the *Prepare* section of Figure 2 for the types of intellectual property licensing and usage-allowances available via Creative Commons (CC). Options include allowing others to reproduce materials:

2 One notable exception to this rule is that most universities will not cede copyright to faculty in cases where the university provides more than the standard amount of financial support or resourcing (e.g., access to the library, a laptop, etc.) for a research project. This category can include projects with grant funding, as the university's office for sponsored research is involved in the administration of grants. Open publication of the products of research is still possible in such cases (and may even be required by the terms of the grant); it just may require additional discussion with the institution. A potential upside of these policies for researchers is that they may enable open sharing in situations where a publisher might otherwise forbid it, because the license required by the university or the funder will pre-empt the publisher's demand for copyright transfer or exclusive copyright license.

1. In any way, without attribution (CC Public Domain or CC0)
2. Requiring attribution (i.e., citation[3]; CC attribution or CC BY)
3. Requiring attribution and without changing the material (CC BY no derivatives[4] or CC BY-ND)
4. Requiring attribution and without generating revenue from it (CC BY non-commercial[5] or CC BY-NC)
5. Requiring attribution and sharing with the same open license (CC BY sharealike[6] or CC BY-SA)

The ND, NC, and SA license types are always paired with attribution but can also be combined with one another. For example, an author who wanted to ensure that they would be cited when others used their shared material, the materials would not be used for commercial purposes, and the materials would always be shared without adaptations could choose a CC BY-NC-SA license. Figure 2 is an original figure for which we chose a CC BY-NC-ND license, meaning that reusers must provide attribution, cannot use it commercially, and cannot publish adaptations of it. Creative Commons (n.d.) provides a license chooser to support choosing a license.

Authors whose reason for sharing materials includes the desire to foster wide reuse by educators, parents, and others should think carefully before choosing a license that places restrictions on reuse, such as CC BY-NC (non-commercial uses only) or CC BY-ND (no adaptations allowed). If you expect that some potential reusers may be engaged in commercial activity (private tutors, private schools, consultants, or any educator or service provider that charges a fee), use of an NC license will likely discourage such uses. Consider, also, that the definition of non-commercial is imprecise and your own understanding of what counts as commercial may be narrower than that of your intended users. One use that is certainly not permitted by the non-commercial license is the inclusion of licensed materials in an article that is published behind a paywall; charging money for access is a paradigm case of a commercial use as that term is used in the license, even when the publishing entity or the association it represents is a "non-profit." Similarly, before using an ND license, consider whether adaptation of your materials may be helpful to some users. Educators working in particular communities may find it helpful to modify materials to make them more relatable to students, teachers, parents, or others in the community. Translations can help to ensure that materials are useful across language barriers.

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3 Users have some discretion to choose where and how they include attribution in connection with their uses, within reason, but the license requires users to retain certain elements if they are included in the original work—the author's name, copyright notice, the license used, any disclaimer of warranties in the work, and a link to the source for the work. Good practices for attribution (the "TASL" elements) are described in the next section.

4 "Derivative work" is a term of art in copyright, and it refers to "a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which a work may be recast, transformed, or adapted." 17 U.S.C. § 101. So, not every alteration of a work necessarily triggers the license's ban on the creation of derivative works. Simply converting a work from one digital file format to another, for example, would not create a new copyrighted work, only a new copy, so that would be permitted under an "ND" license. Notably, the license only bars the publication of derivative versions; the private creation of derivatives is still permitted.

5 The scope of the "non-commercial" condition is notoriously uncertain. The legal deed for the license defines non-commercial as "not primarily intended for or directed towards commercial advantage or monetary compensation." A 2009 study by Creative Commons, *Defining Noncommercial*, https://wiki.creativecommons.org/wiki/Defining_Noncommercial, used market research to explore how ordinary people understood the term to apply. It concluded, "Perceptions of the many use cases studied suggest that with the exception of uses that earn users money or involve advertising…there is more uncertainty than clarity around whether specific uses of online content are commercial or noncommercial."

6 A nuance worth noting here is that the "sharealike" requirement is only triggered for the creation of derivative works. An extremely common example of a use that does not trigger the sharealike requirement is the inclusion of an SA-licensed image as an illustration in a larger work, such as an article or book chapter. The larger work is not a derivative work of the image, so there is no need to publish the larger work under the same license as the incorporated image.

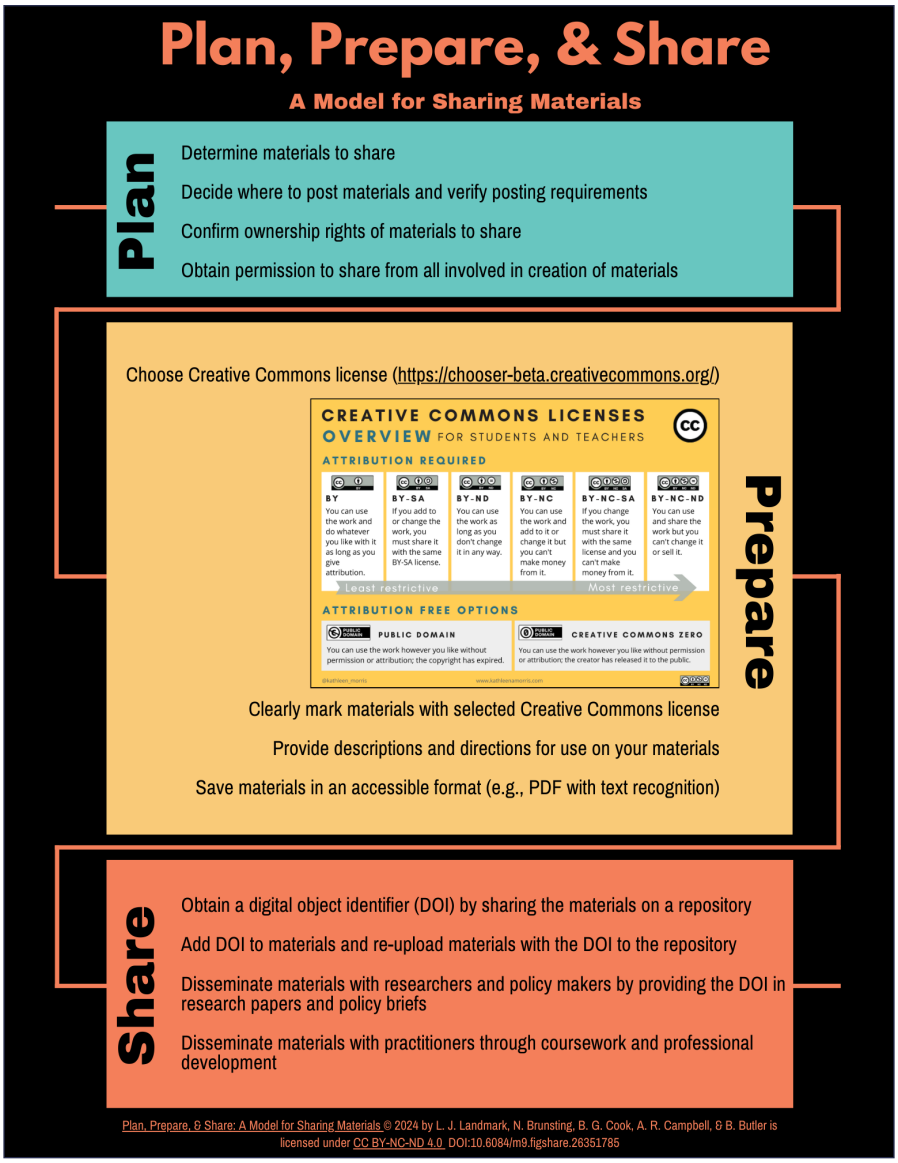

Figure 2: Plan, Prepare, & Share: A Model for Sharing Materials.

Plan, Prepare, & Share: A Model for Sharing Materials is shared under a Creative Commons license (CC BY-NC-ND). Image in the "Prepare" section: Creative Commons Licenses Overview for Teachers and Students by Kathleen Morris (2020) is shared under a Creative Commons license (CC BY-NC-ND) and can be downloaded from her linked website for magnification.

Attributing Shared Materials

When reusing shared materials that require attribution (e.g., with a CC BY license), use the TASL acronym when providing attribution to the creator: Title, Author (or owner), Source, and License (including a link to the license to inform users how they can and cannot re-use the material; "Recommended practices for attribution," 2022). For example, Figure 1 in this paper is from a document published by UNESCO (2022) with a CC BY-SA license, indicating that the figure and other paper contents can be reused so long as the source is attributed and it is shared with the same license. We therefore noted the figure's title, author, source (e.g., digital object identifier or DOI), and both the original license of the figure and a link to that license in the figure note. Although created for this paper, we posted an accessible version of Figure 2 on Figshare where it was assigned a DOI. Technically, then, we are resharing that material in this paper and therefore included an attribution to the accessible version of the licensed figure in a note to

Figure 2. It is worth noting that the figure embedded in the *Prepare* section of Figure 2 is shared under a CC0 license, making it public domain. Although not legally required, we followed recommendations ("Recommended practices for attribution," 2022) to provide attribution for any reused material when possible by also providing the source to that figure in the note to Figure 2.

Facilitating Appropriate Use of Shared Materials

It is reasonable for authors to consider how their materials may be used (or potentially misused) by others before making them publicly available. Because we believe that concerns over unauthorized use (e.g., editing without permission, using without attribution, benefiting financially) are largely covered by licensing, here we focus on potential challenges with authorized use. One concern that authors may have is that others will use their materials inappropriately or in ways they had not intended. For instance, consider a qualitative researcher who developed a focus-group interview protocol to explore special educators' feelings related to professional matters and was concerned that if they shared the protocol that other researchers could use it with general educators or with other groups for whom the protocol was not designed. Additionally, a researcher who developed an intervention that required considerable training and expertise to implement might be concerned about sharing materials related to the intervention because practitioners may try to implement the intervention without sufficient training, thereby reducing its effectiveness.

Ultimately, authors must determine if the risks of misuse outweigh the potential benefits of others re-using their materials. We encourage authors to consider the unintended cost of *not* sharing materials (i.e., limiting the benefits of the materials to those with whom the author directly works) when making this decision. Importantly, the risks of misuse can be reduced by authors proactively taking steps such as (a) noting a willingness to collaborate or consult with other researchers wishing to replicate their work, and (b) providing detailed directions and scoring guidelines, as appropriate, on shared materials that are used in instructional settings, and/or providing a detailed description of the shared material and its application in a practitioner-focused paper. Generally, we believe the risks of inappropriate use of shared materials are outweighed by the benefits of sharing, especially when steps to minimize misuse are taken. After all, most of us develop materials in the hope that they will be used widely and benefit many.

A Three-Step Model for Sharing Materials

van Dijk et al. (2021) provided a model for sharing research materials, including (a) selecting a repository and checking requirements, (b) posting materials used to collect data, and (c) posting a detailed workflow of the process and procedures for using the materials such that replication is possible. We suggest a similar process, composed of three steps–*Plan*, *Prepare*, and *Share*–as shown in Figure 2 and described in following paragraphs. When planning, preparing, and sharing materials, we recommend authors consider Lawrence et al.'s (2023) findings about the importance of resources (i.e., shared materials) being readily available through a simple electronic search, being well-organized, and minimizing jargon to prevent users being confused or overwhelmed.

In the first step, *Plan*, we concur with Cook and colleagues (2022) that researchers determine in advance whether and which materials will be shared so that they can be developed, formatted, and shared in ways that facilitate use by others. It is important to obtain agreement to openly share from all authors and, as previously discussed, to ensure one has ownership rights to the material. It is also important to consider which approach for sharing is the best fit for the intended audience of the materials. For example, the CEC repository mentioned previously might be a good fit for instructional material to be used in a special education classroom, whereas the Figshare repository might be more appropriate for research material.

The second step, *Prepare*, involves preparing the materials for accessibility and use by others. In addition to selecting an appropriate open license (see previous discussion), we recommend authors (a) provide detailed directions for using the

materials appropriately and effectively, as relevant, and (b) mark the open license clearly on their figure (see "Marking your work with a CC license," 2019, for guidelines). In the spirit of universal design, we suggest developing and saving materials in accessible formats for ease of use by people with disabilities. Common computer applications for creating documents and graphics (e.g., Adobe Illustrator, Canva, Google Docs, Microsoft PowerPoint) have built-in accessibility checkers. However, developing the material using accessibility checkers is only part of the process. Authors should consider the file type for saving their materials, too. To illustrate, after creating the Figure 2 graphic in Canva and addressing issues identified by Canva's accessibility checker, we had to decide in what format and file type we wanted to share the graphic. We settled on sharing the graphic as an image (i.e., PNG) and a document (i.e., PDF) on Figshare. Users who download the image will need to add their own alt text when using the image online. However, users who download the PDF will be able to access the alt text of the embedded graphic in the *Prepare* section.

In the last step, *Share*, authors disseminate their materials. To persistently identify the materials, we recommend acquiring a DOI by posting the material on a repository such as Figshare. Once a DOI is assigned, the authors can edit their materials to include the DOI and repost on the repository. This is the process we used to obtain the DOI for the Figure 2 graphic. Finally, authors should share the material (with the CC license and DOI clearly indicated) with researchers, policymakers, and educators, as applicable.

PERSONAL EXPERIENCES SHARING MATERIALS

In this section, each of the authors briefly describe some of the experiences of and personal recommendations for sharing materials.

Aaron R. Campbell

As the first Black female tenure-line assistant professor in the Department of Special Education at the University of Missouri, my journey has been profoundly shaped by my commitment to culturally responsive practices and equitable intervention delivery. Through my experiences, I have identified key strategies that have been effective in heightening the impact of educational materials. A significant portion of my research has focused on culturally adapted social-emotional and behavioral supports for Black learners. For instance, my work on culturally adapted social-emotional learning interventions has shown improved outcomes for students at risk of emotional and behavioral disorders (Campbell, Sallese, Thompson, Fournier, & Allen, 2023; Campbell, Sallese, Thompson, Burke, & Allen, 2023). This underscores the importance of ensuring that materials resonate with the cultural backgrounds of the students. Engaging with stakeholders, including families, educators, and community members, has been critical. In my projects, such as the culturally responsive positive behavior support for African American learners, collaboration has been a cornerstone (Campbell, 2023). This collaborative approach ensures that materials are not only relevant but are also supported by the community, enhancing their impact. In all my intervention publications I demonstrate this by linking supplemental materials and files that provide access to all materials for the interventions and data collection tools. For example, I have shared the use of the Strong Start Curriculum with cultural adaptations, which was shown to cause significant improvements in student behavior, social/emotional competence, and engagement (Campbell, Sallese, Thompson, Fournier, & Allen, 2023; Campbell, Sallese, Thompson, Burke, & Allen, 2023). My work on interventions for diverse learners has consistently emphasized the need for materials that are not only inclusive but also adaptable to various needs. The field of special education is dynamic, requiring continuous learning and adaptation. In summary, the materials I share are rooted in cultural relevance, collaborative engagement, evidence-based practices, accessibility, and a commitment to continuous improvement. These principles have guided my work and have been instrumental in promoting positive outcomes for diverse learners.

Nelson Brunsting

As part of a research team with colleagues Kristen O'Brien, Elizabeth Bettini, and Michelle Cumming, I supported our open sharing of the survey used in a study funded by the Spencer Foundation (PIs: Bettini, Cumming, O'Brien). Upon publishing initial descriptive findings in *Exceptional Children*, we–led by Dr. O'Brien–posted the survey, titled *Special Education Teachers' Working Conditions in Self-Contained Settings for Students with EBD: A Survey* (Bettini et al., 2019), on OSF and provided the link to the survey in the manuscript, earning an Open Materials badge during publication (O'Brien et al., 2019). Our team was quite junior in the field at the time, and we had been reading calls, such as Cook et al. (2018), for educational research to be more transparent to enhance trust and replicability. Given both the calls and *Exceptional Children*'s attention to open practices as evidenced by its use of the Open Science badges, we felt confident that both providing our survey as an open material would further research transparency and be supported by the journal in which we sought to publish.

Although I have pre-registered and registered other studies I have led on OSF, I have not published the surveys used as open materials as each has included restricted-access measures generated by other author teams. However, in response to conversations with the authorship team of the current article, I plan to share surveys and other materials moving forward as frequently as possible. For surveys that include multiple measures, some of which are research team-generated measures and some are extant published measures, I plan to share the research team-generated measures and then replace the extant published measures with text in their space (e.g., "all 22 of the Maslach Burnout Inventory-Educators' Scale items were included here, using the recommended 0–6 Likert-type anchors; Maslach et al., 1996; https://www.mindgarden.com/316-mbi-educators-survey").

Leena Jo Landmark

My university has a strong emphasis on teaching, so practitioner articles are as valued as empirical articles. Additionally, I pursued a doctorate because I wanted to improve special education transition services for youths with disabilities, which means I need to get evidence-based information and materials into the hands (and minds!) of educators. Colleagues and I recently published a practitioner article about using vertical transitions (e.g., early childhood intervention to early childhood special education, middle school to high school) as a reminder for educators to engage in evidence-based practices that support positive post-school outcomes (Landmark et al., 2022). The publication was a description of how to use an evidence-based practices checklist when meeting with families prior to individualized education program meetings at one of the more substantial vertical transitions. Portions of the checklist were included in the article as figures, and the entire checklist with sample text was included as a supplemental file housed on Figshare. The process of putting the checklist on Figshare was simple. When I uploaded the manuscript and checklist on the journal's manuscript submission website, there was an option to designate that the checklist was a supplemental file. Because of the integration of Figshare with Sage Publications, the supplemental file (i.e., the checklist) was published on Figshare when the manuscript was published online in the journal. As of July 2024, the checklist has 123 views and 25 downloads. To further assist teachers, I wanted to post a blank version of the checklist on my personal website for educators. Because I was unsure if I had that right, I contacted Sage Publications. They responded that although Sage Publications had exclusive right to material in the article, I retained rights to the supplemental material. While writing this article, I decided to license the blank version of the tool using the online Creative Commons license chooser. I now have the appropriate license and attribution text on the tool.

Brandon Butler

I am a lawyer who has worked with, for, and in university libraries for most of my career, helping libraries and their users understand how the law can empower them to conduct research, teach, and learn. Until recently, I worked at the

University of Virginia Library in a position that has become increasingly common at research institutions, sometimes designated "copyright librarian" or "director of information policy." These positions make copyright expertise available to campus communities that are regulated comprehensively by copyright law and yet typically lack access to good information about how the law impacts their work. My own research and writing thus has a practical bent to it, and my goals include identifying opportunities and strategies in the law to advance the interests of libraries and their users, and making those opportunities and strategies accessible and useful to all. To me it seems natural, then, to use open licenses for almost everything I create, whether they be articles, infographics, book chapters, presentation slides, or blog posts. I do this for entirely practical reasons: open licenses offer huge upside for me because they make it easy for the people I'm trying to reach to access and reuse my work, and there's no downside because my job has never been paid for by subscription fees or royalties. My employers (universities, libraries, and library associations) share my goals, they pay me for the time I spend creating these materials, and they share my conviction that once I'm done, making my work as accessible and reusable as possible will help advance our shared goals.

Accordingly, I can point to examples of openly licensed work from throughout my career and across all the genres of work I've done. The entire run of the blog I wrote while at UVA, The Taper, was published subject to a CC0 license. I used the same license for slides I created to support a presentation on author rights that I gave each year to students at the university. An open work I'm especially proud of is The Law and Accessible Texts: Reconciling Civil Rights and Copyrights, a white paper I co-authored with Prue Adler and Krista Cox that explains how, contrary to the assumptions of many university disabilities services offices, the copyright law actually protects their right to provide accessible texts to people with disabilities. Our primary goal in developing that white paper was to support the creation of a collaborative effort known as EMMA (made possible by funding from the Andrew W. Mellon Foundation) to collect and reuse accessible texts created by universities to serve their qualified users. But a crucial secondary purpose was to raise awareness in the disability services community of the rights they possess under the law. Since its original publication by the Association of Research Libraries, the white paper has been collected in several open repositories and shared widely.

Bryan Cook

As an advocate of open practices, I have begun to share materials in recent years in different ways. For example, in a paper providing guidance to special education researchers on applying open-science practices in their research and scholarship (Cook et al., 2022), my co-authors and I developed a flowchart on steps before, during, and after conducting a study for adopting open practices. To allow others to use the flowchart in the ways we felt comfortable with it being shared, we decided to license the figure before submitting to the journal so we would retain copyright for the figure. After creating the flowchart, the team of co-authors communicated and agreed that we were all comfortable with others using and modifying the figure so long as they credited us when sharing and did not profit from using the figure. So we decided to use the CC BY-NC license. We then created a project page for the paper on the OSF and uploaded a Word document of the figure along with other material we wanted to share. At the bottom of the figure, we included phrasing to indicate the license so that others will know that they can reuse the materials; how they can reuse the material; and where to find a downloadable, editable version of the figure ("© by Cook, Fleming, Hart, Lane, Therrien, & Wilson (2021) under a Creative Commons Attribution-Noncommercial 4.0 International License (CC BY-NC). Publicly available at (DOI 10.17605/OSF.IO/N35ZY)").

CONCLUSION

Although we all had some experiences with and were proponents of sharing materials previous to researching and writing this paper, we learned a great deal about how to share materials and the benefits of doing so. If we had known years ago what we know now, we would have shared materials more frequently and effectively. We are excited to apply what

we learned about sharing materials in our future work. In an applied field like special education, a primary purpose of research is to inform and improve special education practice and policy. One way to reduce the gap between research and practice in the field is to openly share research-validated materials. Additionally, sharing materials can help make research more transparent, reproducible, equitable, and sustainable. Although sharing materials does take time and may involve some risks (e.g., inappropriate use of one's materials), we believe the benefits to research and practice considerably outweigh the costs and risks.

COMPETING INTERESTS

The authors have no competing interests to declare.

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