The Journal of Accounting Education (JAEd) is a refereed journal dedicated to promoting and publishing research on accounting education issues and to improving the quality of accounting education worldwide.

The Journal provides a vehicle for making results of empirical studies available to educators and for exchanging ideas, instructional resources, and best practices that help improve accounting education. The Journal includes four sections: a Main Articles Section, a Teaching and Educational Notes Section, an Educational Case Section, and a Best Practices Section. Manuscripts published in the Main Articles Section generally present results of empirical studies, although non-empirical papers (such as policy-related or essay papers) are sometimes published in this section. Papers published in the Teaching and Educational Notes Section include short empirical pieces (e.g., replications) as well as instructional resources that are not properly categorized as cases, which are published in a separate Case Section. Note: as part of the Teaching Note accompany educational cases, authors must include implementation guidance (based on actual case usage) and evidence regarding the efficacy of the case vis-a-vis a listing of educational objectives associated with the case. To meet the efficacy requirement, authors must include direct assessment (e.g., grades by case requirement/objective or pre-post tests). Although interesting and encouraged, student perceptions (surveys) are considered indirect assessment and do not meet the efficacy requirement. The case must have been used more than once in a course to avoid potential anomalies and to vet the case before submission. Authors may be asked to collect additional data, depending on course size/circumstances.

The Best Practices section includes individual and institutional practices related to, for example, student recruitment, student advising, student retention, alumni relations, and efforts to integrate accounting practice and accounting education. These articles are typically shorter in length than Main Section (i.e., research-based) articles. While such papers do not need evidence obtained on the basis of an experimental design (e.g., pre- versus post-test comparison), some evidence regarding the value or benefit of the best practice should be included, along with a discussion of relevant costs (out-of-pocket as well as opportunity costs, such as faculty time, practitioner involvement, etc.). Finally, note that the JAEd publishes manuscripts on all topics that are relevant to accounting education, including uses of technology, learning styles, assessment, curriculum, and faculty-related issues.
AUDIENCE

Teachers, Lecturers, Students of graduate institutions and researchers involved in accounting education.

ABSTRACTING AND INDEXING

RePEc
Scopus
ABI/Inform

EDITORIAL BOARD

Editor-in-Chief
Natalie Tatiana Churyk, Department of Accountancy, College of Business, Northern Illinois University, DeKalb, Illinois, United States

Associate Editors
Joan Ballantine, Ulster University - Jordanstown Campus, Newtownabbey, United Kingdom
Dennis Bline, Bryant University, Smithfield, Rhode Island, United States
Dale Flesher, University of Mississippi Patterson School of Accountancy, Oxford, Mississippi, United States
Timothy J. Fogarty, Case Western Reserve University, Cleveland, Ohio, United States
Mahendra Gujarathi, Bentley University, Waltham, Massachusetts, United States
Philip Hancock, University of Western Australia, School of Business, Crawley, Western Australia, Australia
Bonnie K. Klamm, North Dakota State University, Fargo, North Dakota, United States
Claire Kamm Latham, Washington State University - Vancouver, Vancouver, Washington, United States
Alan Reinstein, Wayne State University, Detroit, MI, United States
E. Kent St. Pierre, Saint Joseph’s University, Philadelphia, Pennsylvania, United States

Editorial Board
M. Akers, Marquette University, Milwaukee, Wisconsin, United States
A. Alhadrami, University College of Bahrain Department of Business Administration, Saar, Bahrain
E.D. Almer, Portland State University, Portland, Oregon, United States
S. Anderson, Elon University, Elon, North Carolina, United States
B.A. Apostolou, West Virginia University, Morgantown, West Virginia, United States
J. Arquero Montaño, University of Seville, Sevilla, Spain
N. Beatson, University of Otago, Dunedin, New Zealand
E. Boyas, University of Pittsburgh, Pittsburgh, Pennsylvania, United States
M. Bradley, Massey University School of Accountancy, Palmerston North, New Zealand
C.S. Burns, University of Colorado Boulder, Boulder, Colorado, United States
T. Calderon, University of Akron, Akron, Ohio, United States
D. Caplan, University at Albany State University of New York, New York, New York, United States
A.L. Christensen, Montana State University Bozeman, Bozeman, Montana, United States
J. Cote, Washington State University - Vancouver, Vancouver, Washington, United States
D.L. Crumbley, Louisiana State University, Baton Rouge, Louisiana, United States
S.M. Curtis, University of Illinois at Urbana-Champaign, Champaign, Illinois, United States
J. Dorminey, West Virginia University, Morgantown, West Virginia, United States
A. Duff, University of the West of Scotland - Ayr Campus, Ayr, United Kingdom
A.C. Dzuranin, Northern Illinois University, DeKalb, Illinois, United States
T. Eaton, Miami University, Oxford, Ohio, United States
D. Elhanathan, College of Management Academic Studies, Rishon LeZion, Israel
E. Evans, Macquarie University, Sydney, Australia
M. Fischer, The University of Texas at Tyler, Tyler, Texas, United States
B. Flood, Dublin City University, Dublin, Ireland
E. Gammie, Robert Gordon University, Aberdeen, United Kingdom
D. Gasbarro, Murdoch University, Murdoch, Australia
M.A. Geiger, University of Richmond, Richmond, Virginia, United States
J. L. Gissel, University of Wisconsin Whitewater, Whitewater, Wisconsin, United States
P.P. Gupta, Lehigh University, Bethlehem, Pennsylvania, United States
J.M. Hassell, Indiana University Bloomington Kelley School of Business, Bloomington, Indiana, United States
E. G. Henry, Southeast Missouri State University, Cape Girardeau, Missouri, United States
J. Hepp, University of Illinois at Urbana-Champaign College of Business, Champaign, Illinois, United States
A.W. Hickey, West Virginia University, Morgantown, West Virginia, United States
J. Higgs, Florida Atlantic University, Boca Raton, Florida, United States
M. Holtzblatt, Cleveland State University, Cleveland, Ohio, United States
D. Honore-Morris, Deakin University - Melbourne Burwood Campus, Melbourne, Victoria, Australia
B. Hora, University of Central Oklahoma, Edmond, Oklahoma, United States
B. Howieson, The University of Adelaide, Balhannah, South Australia, Australia
M. Huber, Youngstown State University, Youngstown, Ohio, United States
A. Igou, University of Northern Iowa, Cedar Falls, Iowa, United States
D.J. Janvrin, Iowa State University, Ames, Iowa, United States
P. Jennings, University of Winchester, Winchester, United Kingdom
C.M. Joynt, University of Pretoria, Department of Accounting, Pretoria, South Africa
G. Kaciuba, Saint Mary's University, San Antonio, Texas, United States
B. Kern, Indiana University South Bend, South Bend, Indiana, United States
S. Kern, Gonzaga University, Spokane, Washington, United States
J.L. Krogstad, Creighton University, Omaha, Nebraska, United States
C. Andrew Lafond, La Salle University, Philadelphia, PA, United States
R. Lillie, California State University San Bernardino, San Bernardino, California, United States
S. Lowensohn, University of Vermont, Burlington, Vermont, United States
S. Mason, DePaul University, Chicago, Illinois, United States
E.M. Matsumura, University of Wisconsin Madison, Madison, Wisconsin, United States
L. Matuszewski, Northern Illinois University, Dekalb, Illinois, United States
N. McGuigan, Monash University Department of Accounting, Clayton, Victoria, Australia
C. McKnight
A. McClelland, Auburn University, Auburn, Alabama, United States
F. Miley, University of Sussex, Brighton, United Kingdom
M. Nurunnabi, Prince Sultan University, Riyadh, Saudi Arabia
B. O'Connell, RMIT University, Melbourne, Victoria, Australia
E. Opdecam, Ghent University, Gent, Belgium
J. Porter, Washington State University, Washington, Washington, United States
L.M. Prober, Rider University, Lawrenceville, New Jersey, United States
R. Raschke, University of Nevada Las Vegas Lee Business School, Las Vegas, Nevada, United States
C. Reisch, University of Nevada Las Vegas Lee Business School, Las Vegas, Nevada, United States
J.T. Reisch, East Carolina University, Greenville, North Carolina, United States
I. Sandu, Erasmus University Rotterdam, Rotterdam, Netherlands
A. Sangster, University of Aberdeen, Aberdeen, United Kingdom
A. Savage, University of Alabama at Birmingham, Birmingham, Alabama, United States
R. Sawyers, North Carolina State University, Raleigh, North Carolina, United States
M. Sheets, University of Central Oklahoma, Edmond, Oklahoma, United States
D. Sinason, Northern Illinois University, Dekalb, Illinois, United States
J. Stanfield, Ball State University, Muncie, Indiana, United States
S. Stephenson, Kennesaw State University, Kennesaw, Georgia, United States
T. Stephenson, University of Alaska Anchorage, Anchorage, Alaska, United States
L. Stevenson, University of St Andrews School of Management, St. Andrews, United Kingdom
I.C. Stuart, Norwegian School of Economic and Business Administration Department of Accounting Auditing and Law, Bergen, Norway
M. Stuebs, Baylor University, Waco, Texas, United States
S. Summers, Brigham Young University, Provo, Utah, United States
M. Tharapos, RMIT University, Melbourne, Victoria, Australia
L. Thorne, York University, Toronto, Ontario, Canada
N. Tschakert, Salem State University, Salem, Massachusetts, United States
K. Watty, Deakin University, Burwood, Australia
T.R. Waymire, Middle Tennessee State University, Murfreesboro, Tennessee, United States
J. Weber, University of Northern Colorado, Greeley, Colorado, United States
M. Weidenmier Watson, University of North Carolina at Charlotte Belk College of Business, Charlotte, North Carolina, United States
G. Weinstein, John Carroll University Boler College of Business, Cleveland, Ohio, United States
P. Wells, Auckland University of Technology, Auckland, New Zealand
J. Wong, University of Nevada Reno, Reno, Nevada, United States
GUIDE FOR AUTHORS

Your Paper Your Way
We now differentiate between the requirements for new and revised submissions. You may choose to submit your manuscript as a single Word or PDF file to be used in the refereeing process. Only when your paper is at the revision stage, will you be requested to put your paper in to a 'correct format' for acceptance and provide the items required for the publication of your article. Although you may submit in any format, it is advisable to attempt to format the manuscript similarly to other published Journal manuscripts.
To find out more, please visit the Preparation section below.

Submission checklist
You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

All necessary files have been uploaded:
Manuscript:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
• Indicate clearly if color should be used for any figures in print
Graphical Abstracts / Highlights files (where applicable)
Supplemental files (where applicable)

Further considerations
• Manuscript has been ‘spell checked’ and ‘grammar checked’
• All references mentioned in the Reference List are cited in the text, and vice versa
• Permission has been obtained for use of copyrighted material from other sources (including the Internet)
• A competing interests statement is provided, even if the authors have no competing interests to declare
• Journal policies detailed in this guide have been reviewed
• Referee suggestions and contact details provided, based on journal requirements

For further information, visit our Support Center.

BEFORE YOU BEGIN

Ethics in publishing
Please see our information pages on Ethics in publishing and Ethical guidelines for journal publication.

Declaration of interest
All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double-blind) or the manuscript file (if single-blind). If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. More information.
Submission declaration and verification
Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check.

Use of inclusive language
Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Articles should make no assumptions about the beliefs or commitments of any reader, should contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic, and should use inclusive language throughout. Authors should ensure that writing is free from bias, for instance by using 'he or she', 'his/her' instead of 'he' or 'his', and by making use of job titles that are free of stereotyping (e.g. 'chairperson' instead of 'chairman' and 'flight attendant' instead of 'stewardess').

Changes to authorship
Authors are expected to consider carefully the list and order of authors before submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only before the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the corresponding author: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed. Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors after the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

Copyright
Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see more information on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases.

For gold open access articles: Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' (more information). Permitted third party reuse of gold open access articles is determined by the author's choice of user license.

Author rights
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

Elsevier supports responsible sharing
Find out how you can share your research published in Elsevier journals.
Role of the funding source
You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

Funding body agreements and policies
Elsevier has established a number of agreements with funding bodies which allow authors to comply with their funder's open access policies. Some funding bodies will reimburse the author for the gold open access publication fee. Details of existing agreements are available online.

Open access
This journal offers authors a choice in publishing their research:

Subscription
• Articles are made available to subscribers as well as developing countries and patient groups through our universal access programs.
• No open access publication fee payable by authors.
• The Author is entitled to post the accepted manuscript in their institution's repository and make this public after an embargo period (known as green Open Access). The published journal article cannot be shared publicly, for example on ResearchGate or Academia.edu, to ensure the sustainability of peer-reviewed research in journal publications. The embargo period for this journal can be found below.

Gold open access
• Articles are freely available to both subscribers and the wider public with permitted reuse.
• A gold open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.

Regardless of how you choose to publish your article, the journal will apply the same peer review criteria and acceptance standards.

For gold open access articles, permitted third party (re)use is defined by the following Creative Commons user licenses:

Creative Commons Attribution (CC BY)
Lets others distribute and copy the article, create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), include in a collective work (such as an anthology), text or data mine the article, even for commercial purposes, as long as they credit the author(s), do not represent the author as endorsing their adaptation of the article, and do not modify the article in such a way as to damage the author's honor or reputation.

Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)
For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

The gold open access publication fee for this journal is USD 1800, excluding taxes. Learn more about Elsevier's pricing policy: https://www.elsevier.com/openaccesspricing.

Green open access
Authors can share their research in a variety of different ways and Elsevier has a number of green open access options available. We recommend authors see our open access page for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications. Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. Find out more.

This journal has an embargo period of 24 months.
Elsevier Researcher Academy

Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

Language (usage and editing services)
Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's Author Services.

Submission
Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

PREPARATION

NEW SUBMISSIONS
Submission to this journal proceeds totally online and you will be guided stepwise through the creation and uploading of your files. The system automatically converts your files to a single PDF file, which is used in the peer-review process.

As part of the Your Paper Your Way service, you may choose to submit your manuscript as a single file to be used in the refereeing process. This can be a PDF file or a Word document, in any format or layout that can be used by referees to evaluate your manuscript. It should contain high enough quality figures for refereeing. If you prefer to do so, you may still provide all or some of the source files at the initial submission. Please note that individual figure files larger than 10 MB must be uploaded separately.

References
There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the article number or pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct.

Formatting requirements
There are no strict formatting requirements at submission but all manuscripts must contain the essential elements needed to convey your manuscript, for example Abstract, Keywords, Introduction, Materials and Methods, Results, Conclusions, Artwork and Tables with Captions.

If your article includes any Videos and/or other Supplementary material, this should be included in your initial submission for peer review purposes. Journal formatting is required if the manuscript is accepted for publication. Based upon reviewer feedback, it is advisable for authors to attempt to format similarly to published Journal manuscripts.

Divide the article into clearly defined sections.

Figures and tables embedded in text
Please ensure the figures and the tables included in the single file are placed next to the relevant text in the manuscript, rather than at the bottom or the top of the file. The corresponding caption should be placed directly below the figure or table.

Peer review
This journal operates a double blind review process. All contributions will be initially assessed by the editor for suitability for the journal. Each manuscript is reviewed by two editorial review board subject matter experts, one associate editor, and finally the Editor-in-Chief. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. More information on types of peer review.
**Double-blind review**
This journal uses double-blind review, which means the identities of the authors are concealed from the reviewers, and vice versa. More information is available on our website. To facilitate this, please include the following separately:

*Title page (with author details)*: This should include the title, authors' names, affiliations, acknowledgements and any Declaration of Interest statement, and a complete address for the corresponding author including an e-mail address.

*Blinded manuscript (no author details)*: The main body of the paper (including the references, figures, tables and any acknowledgements) should not include any identifying information, such as the authors' names or affiliations.

**REVISED SUBMISSIONS**

*Use of word processing software*
Regardless of the file format of the original submission, at revision you must provide us with an editable file of the entire article. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). See also the section on Electronic artwork.

To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

**Article structure**

*Educational Case submissions*
Submit such cases in one file but labeled as two major parts—the case (including the abstract and a set of Keywords as page 1), and a Teaching Note (TN). Write the case with the student in mind as the reader. The last part of the case is a set of case questions or requirements. The TN typically contains four parts:

- **Educational Objectives** (i.e., what it is that the case user is trying to accomplish): this set of objectives is the focus of the information reported in the following section. Authors should review the literature and provide a summary of how the submitted case differs from other published cases/exercises.

- **Evidence Regarding Case Efficacy** (i.e., evidentiary support for using the case vis-a-vis the set of specified educational objectives): what evidence is there that the case in fact is effective in terms of accomplishing pre-specified educational objectives? To meet the efficacy requirement, authors must include direct assessment (e.g. grades by case requirement/objective or pre-post tests). Although interesting and encouraged, student perceptions (surveys) are considered indirect assessment and do not meet the efficacy requirement. The case must have been used more than once in a course to avoid potential anomalies and to vet the case before submission. Authors may be asked to collect additional data, depending on course size/circumstances.

- **Implementation Guidance** (based on actual class testing of the case): the authors should provide recommendations for successful use of the case; this discussion is enhanced to the extent that the case writer also addresses potential pitfalls in case usage, along with strategies to deal successfully with these issues; authors should discuss the assumed context for the case (for example: What is the required student background for successful case usage? Where in the curriculum can or should the case be used? Where and how has the case been implemented [staged] within a given course?)

- **Recommended Solutions** (to the case assignments/requirements): Although not published, authors must include solutions with the submission. It is helpful to point out areas of potential disagreement or areas of potential difficulty by students. It is sometimes helpful, depending on the nature of the case, to provide alternative answers or viewpoints.

The overall intention of the above requirements is two-fold: one, to improve the quality of the cases published in the journal; two, to increase the probability that other accounting educators will use these cases successfully.
Teaching and Educational Notes
Evidence of teaching effectiveness (if applicable), though not required as a condition for publication, would increase the likelihood of acceptance of these submissions. If the submission relates to an instructional exercise, see efficacy requirements and parts for educational cases.

Subdivision - numbered sections
Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

Introduction
State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

Material and methods
Provide sufficient details to allow the work to be reproduced by an independent researcher. Methods that are already published should be summarized, and indicated by a reference. If quoting directly from a previously published method, use quotation marks and also cite the source. Any modifications to existing methods should also be described.

Theory/calculation
A Theory section should extend, not repeat, the background to the article already dealt with in the Introduction and lay the foundation for further work. In contrast, a Calculation section represents a practical development from a theoretical basis.

Results
Results should be clear and concise.

Discussion
This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Conclusions
The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

Appendices
If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Vitae
Submit a short (maximum 100 words) biography of each author, along with a passport-type photograph accompanying the other figures. Please provide the biography in an editable format (e.g. Word), not in PDF format.

Essential title page information
- **Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
- **Author names and affiliations.** Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.
- **Corresponding author.** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. **Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.**
• **Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

**Highlights**

Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: example Highlights.

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

**Abstract**

A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

**Keywords**

Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

**Abbreviations**

Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

**Acknowledgements**

Place acknowledgements, if any, at the bottom of the title page (that is, do not include them at the end of the article, as a footnote, or otherwise in the body of the manuscript).

**Formatting of funding sources**

List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Math formulae**

Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (/) instead of a horizontal line for small fractional terms, e.g., X/Y. In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).
Footnotes
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors build footnotes into the text, and this feature may be used. Should this not be the case, indicate the position of footnotes in the text and present the footnotes themselves separately at the end of the article.

Artwork
Electronic artwork
General points
• Make sure you use uniform lettering and sizing of your original artwork.
• Preferred fonts: Arial (or Helvetica), Times New Roman (or Times), Symbol, Courier.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Indicate per figure if it is a single, 1.5 or 2-column fitting image.
• For Word submissions only, you may still provide figures and their captions, and tables within a single file at the revision stage.
• Please note that individual figure files larger than 10 MB must be provided in separate source files.
A detailed guide on electronic artwork is available.
You are urged to visit this site; some excerpts from the detailed information are given here.
Formats
Regardless of the application used, when your electronic artwork is finalized, please 'save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):
EPS (or PDF): Vector drawings. Embed the font or save the text as 'graphics'.
TIFF (or JPG): Color or grayscale photographs (halftones): always use a minimum of 300 dpi.
TIFF (or JPG): Bitmapped line drawings: use a minimum of 1000 dpi.
TIFF (or JPG): Combinations bitmapped line/half-tone (color or grayscale): a minimum of 500 dpi is required.
Please do not:
• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); the resolution is too low.
• Supply files that are too low in resolution.
• Submit graphics that are disproportionately large for the content.
Color artwork
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article. Please indicate your preference for color: in print or online only. Further information on the preparation of electronic artwork.

Figure captions
Ensure that each illustration has a caption. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

Tables
Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

References
Citation in text
Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the
journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

**Web references**
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

**Data references**
This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

**References in a special issue**
Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

**Reference management software**
Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link:


When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

**Reference formatting**
There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the article number or pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct. If you do wish to format the references yourself they should be arranged according to the following examples:

**Reference style**
Text: Citations may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically. All citations in the text should refer to:

1. Single author: the author's name (without initials, unless there is ambiguity) followed by a comma and the year of publication; 2. Two authors: both authors' names with an ampersand ('&') between each if the citation is given parenthetically followed by a comma and the year of publication (e.g., " (Smith & Jones, 2011)..."); if the citation is within the body of text, rather than made parenthetically, then use the word "and," as in "...according to Smith and Jones (2011, 390) ...". If a page number(s) is (are) given, place after the comma, but without "p." or "pp." 3. Three or more authors: first author's name followed by "et al." and the year of publication and page number after a comma-if applicable;

Examples: "as demonstrated (Allan, 1996a, 1996b, 1999; Allan & Jones, 1995)." "...Kramer et al. (2000, 998) have recently shown ...."
List: References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication. For multiple authors, always use an ampersand ("&") between the name of the last and the next-to-last author's name. Note that the standard format for all authors of a given work is the same: last name, first initial (followed by a period), then middle initial (followed by a period). Place the year of publication in parentheses, after the name of the last author. Use a period after the listed date. Italicize the names of journals and the titles of books. In terms of the latter, capitalize only the first letter of the first word in the title; if a colon ("::") appears in the title of a book, capitalize the first letter of the first word following the colon. Note that the volume of the work cited from a journal should be italicized, with a comma placed both before and after the volume number. Finally, do not use "p." or "pp." before page numbers for a listed article.

Journals and books: When referring to a book or journal in the text, the full title must be written out in italics with the title acronym in round brackets. Thereafter, the acronym may be used when referring to the title, provided the acronym is italicized.

Examples:


Journal abbreviations source
Journal names should be abbreviated according to the List of Title Word Abbreviations.

Video
Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

Supplementary material
Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to
supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

**Research data**

This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

**Data linking**

If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

**Mendeley Data**

This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to Mendeley Data. The datasets will be listed and directly accessible to readers next to your published article online.

For more information, visit the Mendeley Data for journals page.

**Data in Brief**

You have the option of converting any or all parts of your supplementary or additional raw data into one or multiple data articles, a new kind of article that houses and describes your data. Data articles ensure that your data is actively reviewed, curated, formatted, indexed, given a DOI and publicly available to all upon publication. You are encouraged to submit your article for Data in Brief as an additional item directly alongside the revised version of your manuscript. If your research article is accepted, your data article will automatically be transferred over to Data in Brief where it will be editorially reviewed and published in the open access data journal, Data in Brief. Please note an open access fee of 600 USD is payable for publication in Data in Brief. Full details can be found on the Data in Brief website. Please use this template to write your Data in Brief.

**Data statement**

To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

**AFTER ACCEPTANCE**
**Online proof correction**

Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors.

If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF.

We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

**Offprints**

The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Both corresponding and co-authors may order offprints at any time via Elsevier’s Author Services. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

**AUTHOR INQUIRIES**

Visit the Elsevier Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch.

You can also check the status of your submitted article or find out when your accepted article will be published.