JARS Quantitative Template for ACM TOCE

This is Short Title of the paper, used in page headers

This is the subtitle of the paper, this document both explains and embodies the submission format for authors using Word

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**Objectives**. This is the start of the structured abstract, which is encouraged (but not required) for all TOCE papers. State the problem under investigation, including the main hypotheses.

**Participants**. Describe the participants, specifying their pertinent characteristics for the study.

**Study Method**. Describe the study method, including research design (e.g., experiment, observational study), sample size, materials used (e.g., instruments, apparatus), outcome measures, and data-gathering procedures, including a brief description of the source of any secondary data. If the study is a secondary data analysis, so indicate.

**Findings**. Report findings, including effect sizes and confidence intervals or statistical significance levels.

**Conclusions**. State conclusions, beyond just results, and report the implications for, applications for, and/or contributions to computing education research and practice.

CCS CONCEPTS • Insert your first CCS term here • Insert your second CCS term here • Insert your third CCS term here

**Additional Keywords and Phrases:** Insert comma delimited author-supplied keyword list, Keyword number 2, Keyword number 3, Keyword number 4

ACM Reference Format:

First Author’s Name, Initials, and Last Name, Second Author’s Name, Initials, and Last Name, and Third Author’s Name, Initials, and Last Name. 2018. The Title of the Paper: ACM Conference Proceedings Manuscript Submission Template: This is the subtitle of the paper, this document both explains and embodies the submission format for authors using Word. In Woodstock ’18: ACM Symposium on Neural Gaze Detection, June 03–05, 2018, Woodstock, NY. ACM, New York, NY, USA, 10 pages. NOTE: *To maintain anonymity, do not put identifying information in this block! This block will be automatically generated when manuscripts are processed after acceptance*.

1. Introduction

ACM TOCE strongly encourages authors to submit papers that adhere to the [American Psychological Association’s Journal Article Reporting Standards](https://apastyle.apa.org/jars/) (JARS). Some papers that lie within the scope of ACM TOCE are not a good fit for these standards; we welcome such submissions. Whether or not your paper is a good fit for the standards, they can provide useful guidance to help make your paper more accessible to reviewers and the TOCE audience. Here, we provide here a JARS template for [general quantitative research designs](https://apastyle.apa.org/jars/quant-table-1.pdf). Use [this flowchart](https://apastyle.apa.org/jars/jars-quant-participant-flowchart.pdf) to identify the JARS reporting guidelines for your specific quantitative design, including [Experimental Designs](https://apastyle.apa.org/jars/quant-table-2.pdf), [Random Assignment](https://apastyle.apa.org/jars/quant-table-2a.pdf), [Non-Random Assignment](https://apastyle.apa.org/jars/quant-table-2b.pdf), [Clinical Trials](https://apastyle.apa.org/jars/quant-table-2c.pdf), [Non-Experimental Designs](https://apastyle.apa.org/jars/quant-table-3.pdf), Special Designs ([Longitudinal Studies](https://apastyle.apa.org/jars/quant-table-4.pdf), [*N*-of-1 Studies](https://apastyle.apa.org/jars/quant-table-5.pdf), [Replication Studies](https://apastyle.apa.org/jars/quant-table-6.pdf)), Analytic Methods ([Structural Equation Modeling](https://apastyle.apa.org/jars/quant-table-7.pdf), [Bayesian Statistics](https://apastyle.apa.org/jars/quant-table-8.pdf)), and [Meta-Analyses](https://apastyle.apa.org/jars/quant-table-9.pdf). The reporting standards for these more specific quantitative designs can be readily integrated into this template. See also the TOCE JARS templates for [qualitative](https://apastyle.apa.org/jars/qualitative) and [mixed](https://apastyle.apa.org/jars/mixed-methods) research designs.

Note that the ACM provides an [article template for Microsoft Word](https://www.acm.org/binaries/content/assets/publications/taps/acm_submission_template.docx). Please download it and reference it as you write your paper. It contains detailed advice and guidance on a range of specific formatting issues not covered in this template.

* 1. Problem

State the importance of the problem, including theoretical or practical implications.

* 1. Review of Relevant Scholarship

Provide a succinct review of relevant scholarship, including relation to previous work, and differences between the current report and earlier reports if some aspects of this study have been reported on previously.

* 1. Hypothesis, Aims, and Objectives

State specific hypotheses, aims, and objectives, including theories or other means used to derive hypotheses, primary and secondary hypotheses, and other planned analyses. State how hypotheses and research design relate to one another.

1. Method
   1. Inclusion and Exclusion

Report inclusion and exclusion criteria, including any restrictions based on demographic characteristics.

* 1. Participant Characteristics

Report major demographic characteristics (e.g., age, sex, ethnicity, socioeconomic status) and important topic-specific characteristics (e.g., achievement level in studies of educational interventions)

* 1. Sampling Procedures

Describe procedures for selecting participants, including

* sampling method if a systematic sampling plan was implemented
* percentage of sample approached that actually participated
* whether self-selection into the study occurred (either by individuals or by units, such as schools or clinics)

Describe settings and locations where data were collected as well as dates of data collection. Describe agreements and payments made to participants. Describe institutional review board agreements, ethical standards met, and safety monitoring.

* 1. Sampling Size, Power, and Precision

Describe the sample size, power, and precision, including intended sample size, achieved sample size (if different from the intended sample size), and determination of sample size (including power analysis or methods used to determine precision of parameter estimates, explanation of any interim analyses and stopping rules employed)

* 1. Measures and Covariates

Define all primary and secondary measures and covariates, including measures collected but not included in the report.

* 1. Data Collection

Describe methods used to collect data.

* 1. Quality of Measurements

Describe methods used to enhance the quality of measurements, including training and reliability of data collectors and use of multiple observations.

* 1. Instrumentation

Provide information on validated or ad hoc instruments created for individual studies (e.g., psychometric and biometric properties).

* 1. Masking

Report whether participants, those administering the experimental manipulations, and those assessing the outcomes were aware of condition assignments. If masking took place, provide a statement regarding how it was accomplished and whether and how the success of masking was evaluated.

* 1. Psychometrics

Estimate and report values of reliability coefficients for the scores analyzed (i.e., the researcher’s sample), if possible. Provide estimates of convergent and discriminant validity where relevant. Report estimates related to the reliability of measures, including interrater reliability for subjectively scored measures and ratings, test–retest coefficients in longitudinal studies in which the retest interval corresponds to the measurement schedule used in the study, and internal consistency coefficients for composite scales in which these indices are appropriate for understanding the nature of the instruments being used in the study. Report the basic demographic characteristics of other samples if reporting reliability or validity coefficients from those samples, such as those described in test manuals or in norming information for the instrument.

* 1. Conditions and Design

State whether conditions were manipulated or naturally observed. Report the type of design as per the JARS–Quant tables:

* experimental manipulation with participants randomized: Table 2 and Module A
* experimental manipulation without randomization: Table 2 and Module B
* clinical trial with randomization: Table 2 and Modules A and C
* clinical trial without randomization: Table 2 and Modules B and C
* nonexperimental design (i.e., no experimental manipulation): observational design, epidemiological design, natural history, and so forth (single-group designs or multiplegroup comparisons): Table 3
* longitudinal design: Table 4
* N-of-1 studies: Table 5
* Replications: Table 6

Report the common name given to designs not currently covered in JARS–Quant.

* 1. Data Diagnostics

Describe planned data diagnostics, including

* criteria for post-data-collection exclusion of participants, if any
* criteria for deciding when to infer missing data and methods used for imputation of missing data
* definition and processing of statistical outliers
* analyses of data distributions
* data transformations to be used, if any
  1. Analytic Strategy

Describe the analytic strategy for inferential statistics and protection against experiment-wise error for primary hypotheses, secondary hypotheses, and exploratory hypotheses.

1. Results
   1. Participant Flow

Report the flow of participants, including the total number of participants in each group at each stage of the study, and the flow of participants through each stage of the study (include figure depicting flow, when possible; see the [JARS–Quant Participant Flowchart](https://apastyle.apa.org/jars/jars-quant-decision-flowchart.pdf))

* 1. Recruitment

Provide dates defining the periods of recruitment and repeated measures or follow-up

* 1. Statistics and Data Analysis

Provide information detailing the statistical and data-analytic methods used, including

* missing data
  + frequency or percentages of missing data
  + empirical evidence and/or theoretical arguments for the causes of data that are missing—for example, missing completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR)
  + methods actually used for addressing missing data, if any
* descriptions of each primary and secondary outcome, including the total sample and each subgroup, that includes the number of cases, cell means, standard deviations, and other measures that characterize the data used
* inferential statistics, including
  + results of all inferential tests conducted, including exact *p* values if null hypothesis significance testing (NHST) methods were used, and reporting the minimally sufficient set of statistics (e.g., *dfs*, mean square [*MS*] effect, *MS* error) needed to construct the tests
  + effect-size estimates and confidence intervals on estimates that correspond to each inferential test conducted, when possible
  + clear differentiation between primary hypotheses and their tests–estimates, secondary hypotheses and their tests–estimates, and exploratory hypotheses and their test–estimates
* complex data analyses—for example, structural equation modeling analyses (see also Table 7), hierarchical linear models, factor analysis, multivariate analyses, and so forth, including
  + details of the models estimated › associated variance–covariance (or correlation) matrix or matrices
  + identification of the statistical software used to run the analyses (e.g., SAS PROC GLM or the particular R package)
  + estimation problems (e.g., failure to converge, bad solution spaces), regression diagnostics, or analytic anomalies that were detected and solutions to those problems.
  + other data analyses performed, including adjusted analyses, if performed, indicating those that were planned and those that were not planned (though not necessarily in the level of detail of primary analyses)
* Report any problems with statistical assumptions and/or data distributions that could affect the validity of findings

1. Discussion
   1. Support of Original Hypotheses

Provide a statement of support or nonsupport for all hypotheses, whether primary or secondary, including ‒ distinction by primary and secondary hypotheses ‒ discussion of the implications of exploratory analyses in terms of both substantive findings and error rates that may be uncontrolled

* 1. Similarity of Results

Discuss similarities and differences between reported results and work of others.

* 1. Interpretation

Provide an interpretation of the results, taking into account sources of potential bias and threats to internal and statistical validity, imprecision of measurement protocols, overall number of tests or overlap among tests, and adequacy of sample sizes and sampling validity

* 1. Generalizability

Discuss generalizability (external validity) of the findings, taking into account target population (sampling validity) and other contextual issues (setting, measurement, time; ecological validity)

* 1. Implications

Discuss implications for future research, program, or policy.

ACKNOWLEDGMENTS

Acknowledgments are placed before the references. Add information about grants, awards, or other types of funding that you have received to support your research. *This information must be anonymized in the version of the paper you submit for review*. Author can capture the **grant sponsor information**, by selecting the grant sponsor text and apply style ‘GrantSponsor’. After this, select grant no and apply ‘GrantNumber’ from style panel. Example of Grant sponsor: Competitive Research Programme and example of Grant no: CRP 10-2012-03.

REFERENCES

ACM TOCE uses **numbered** citations to reference literature in the text. Here we include samples of journal [5, 15], conference [1, 6, 8, 12, 13], and magazine [3] articles to illustrate how they appear in the references section. We also include books [9, 10], a technical report [7], a Ph.D. dissertation [4], an online reference [14], a software artifact [11], and a dataset [2]. Remember to *anonymize* any self-references, e.g., [16]. We recommend that you group all anonymized references either at the start or the end of the reference list, to obscure their alphabetical placement.

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A  APPENDICES

In the appendix section, three levels of Appendix headings are available.

A.1 Appendix A

A.1.1 Preparing Graphics

1. \* Place the footnote text for the author (if applicable) here. [↑](#footnote-ref-1)