Further Details Webpage

Registered Reports for Replication Studies

We are delighted to announce a special issue of the Computer Science Education journal which is open to Registered Reports on replication studies in any area of computer science education (link to original call). This page contains additional details on the requirements for submissions. If you have any questions, please do not hesitate to get in touch with the special issue editors.

Requirements for Registered Report Submissions

An effective stage 1 manuscript for this special issue will consist of:

- **a structured abstract (250 word max).** The journal requires a structured abstract for papers; for the stage 1 submission you will supply background, objective and method, but leave the findings and implications blank.
- **an introduction**, in which the authors clearly justify the replication of the original study and the specific aspects they will add or modify to shed more light on the phenomenon studied. This section should also include hypotheses about how the outcomes of the replication will compare to the original study.
- **a literature review**, containing a summary of the relevant literature, especially the literature which has been published since the publication of the original paper.
- **a method section**, defining the type of replication that will be used (see below), clearly distinguishing between the materials/approaches of the original study and the additions of the replication study.
- **a plan of analyses**, outlining the original analyses and the newly planned analyses. Quantitative replications should also include a power analysis in this section.
- **risks to the study**, including:
  - whether the funding/means to conduct the study is already secured or is pending
  - the current status of the ethics application
  - any likely barriers to completing the study before the end of 2021 (see timeline below).

Ideally, the submitting authors will contact the authors of the original paper to request sharing the materials, coding schemes, analysis scripts and other useful information to support the replication. We do not require nor recommend including the authors of the original paper as co-authors, and instead include them in the acknowledgements. See below for our comments on co-authorship.

We encourage authors to upload their adjusted stage 1 submission (incorporating reviewers' comments) as a PDF on the OSF website, for the benefit of later readers.

Replication Studies: Types and Examples

The special issue will accept exact, empirical or conceptual replications of quantitative, qualitative or mixed methods studies. *Exact replications* examine the same (or highly equivalent) participants/artifacts using the same procedures as the original study. *Empirical*

replications examine different populations using the same materials and procedures as in the original study. *Conceptual replications* examine the same phenomenon/hypothesis using different procedures than the original study.   Exact or empirical replications will be preferred to conceptual replications, but if the authors can justify their choice of replication then all three will be considered.

Below we provide a few examples of possible replication studies, inspired by studies from the computing education community. This list is not exhaustive, but meant to illustrate the forms a replication might take:

Original Study	Replication Study
Secondary students participating in an informal learning program are interviewed about their interest in computing before and after the 6-week program	*Exact:* Researchers set up the same program with an equivalent population with a larger number of students to see if the effect replicates. *Empirical:* Researchers connect with an equivalent informal learning program in a different country. They use the same interview protocol and analytic approach to see if similar results are found in another culture. *Conceptual:* Researchers run the same learning program but use different measures to investigate interest in computing.
Several studies have proposed ways to improve student performance on the Rainfall Problem (a programming task originated by Soloway https://dl.acm.org/doi/10.1145/6592.6594).	*Exact:* Researchers use one of the suggested approaches in a classroom with a similar population to see if the performance improvement does occur. *Empirical:* Researchers use several of the techniques in a randomised control trial to see which offers the most improvement *Conceptual:* Researchers use one of the suggested approaches and apply it to a lesson on another topic many students find difficult to see if performance improvements occur
The most common textbooks used in introductory computing courses were examined using a content analysis approach to categorize the nature of their programming examples	*Exact:* Researchers re-examine the same textbooks using the same content analysis approach to see if content analysis is a replicable method.

	Empirical: Researchers apply the same approach to textbooks aimed at introductory high school computing. *Conceptual:* Researchers apply a machine learning model to categorize the textbooks.

Going beyond the original study

To enable direct comparisons between the original and replication studies we ask the authors to explain in the introduction how their replication will add further information to the claims and outcomes of the original study. It is, however, encouraged to add additional aspects to improve the design and highlight potential confounds in the original studies. For both exact and empirical replications, this should be done in an embedded way, to allow for an - as close as possible - replication of the original study before examining the improvements or additions. Examples of improvements/additions are: a larger sample size (as justified by a power analysis or theoretically-driven rationale), an additional training condition, an additional participant group, additional scoring categories or additional tests to assess the skills of the participants. Corresponding additional analyses are expected to be outlined in the analysis plan - together with the replication analyses, these additional analyses are referred to as the 'planned analyses'. The authors are free to conduct more analyses after data has been collected, however, these should be labeled as 'exploratory analyses' in the final manuscript.

Frequently Asked Questions

What if I have already begun data collection?
This issue is only for Registered Reports. If you have begun data collection, it will be too late to respond to reviewers' comments on the planned study. We instead encourage you to make a standard submission to the CSE journal.

What if something unexpected happens during data collection, or if I find a mistake or omission in my analysis plan?
Registered reports do not preclude changes to the study, if necessary. If you do need to make a change, you must document it in the paper and justify it. Provided it is reasonable, your paper will still be accepted.

Can I replicate my own study?
We do not support replicating your own work for this issue; we instead suggest making a standard submission to the CSE journal. In line with this, we suggest you add the original authors in the acknowledgements instead of adding them as co-authors. If you believe there is a strong reason to include an author of the original study as a co-author, please contact the special issue editors.

What if I want to do a registered report that is not really a replication?
This special issue is only for replication studies. The CSE journal does not currently accept registered reports, but you can voluntarily pre-register your study, for instance on the Open Science Framework (www.osf.io).

Additional Resources

- Resources on Registered Reports from the Center for Open Science https://www.cos.io/our-services/registered-reports

Timeline

November 1st 2020: Submission of the stage 1 manuscript due, containing the introduction, methods and analysis plan (no data at this stage, and thus no results, or discussion).
February 1st 2021: Decisions returned to authors with individualised deadlines for each accepted paper (based on data collection schedule)
Late 2021/Early 2022: Full papers submitted to editors for approval and publication.

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