**We need to be cautious about the use of meta-analysis**

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In the last decade the growth of articles submitted to the Journal of Interactive Learning Environments which draw on existing literature has been marked. These reviews of literature tend to take three forms, the systematic literature review, the bibliometric review and the meta-analysis. In a previous editorial we have highlighted the value of the systematic literature review, and what we feel are the limitations of the bibliometric review (Greener, 2022). Of these three the fastest growing category of submission in the last year or two is the meta-analysis, and the increase in such submissions gives rise to this editorial.

The meta-analysis in its ideal form allows the synthesis of data across multiple studies to reveal patterns that might be lost, or less identifiable in individual studies. The meta-analysis has its background in psychology and other fields of medical research, and in these fields, it can generate important value extraction from existing medical research, as highlighted in the Cochrane guidelines, an important source of standardisation and standards in medical research (Cochrane, 2023). A useful meta-analysis can answer questions not explicitly considered by the original authors and revisit conflicting findings. However, these same Cochrane guidelines highlight the risks of within study, and across study biases being amplified. For example, while an individual study will generally reveal details of the population and sample selection these specifics become less clear when merged, increasing the risks that biases become normalised. This will tend to exacerbate an uncritical acceptance of results that are based on those groups most likely to be studied, such as Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies (Henrich, Heine and Norenzayan, 2010). Besides exacerbating biases, the meta-analysis can be invalidated when effect measures are not considered sufficiently critically. The detail of what was measured in any particular study, and how the units of measurement and analysis react when combined with other results is a statistically complex matter. In an enthusiasm to create a useful output, that complexity may be under reviewed, and for the reviewers at Interactive Learning Environments, the subject matter of these combined studies may be of more interest than the nuance of how the numbers add up (or don’t). For these reasons we want to discourage authors as seeing the meta- analysis as an easy route to building on the work of previous studies, rather we encourage a deeply reflective critique of the assumed comparability of results, and ask authors, reviewers and readers to be keenly alive to potential mismatches of findings and their subjects, and look out for who or what may be missed when many studies are combined to make generalisations.

To be clear, unlike a bibliometric review, there is a place for the meta-analysis in the Journal of Interactive Learning Environments, but we ask that all involved treat them with a strong sense of caution and critique – in the hope of finding useful, robust and just results from the combined sources.

**References**

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