Proposing a manuscript peer-review checklist.

Simon Duchesne, Pierre Jannin

Proposing a manuscript peer-review checklist

Simon Duchesne [1], Ph.D., Pierre Jannin [1], Ph.D.

[1] INSERM, U746, Faculté de Médecine CS 34317, F-35043 Rennes Cedex, France
INRIA, VisAGeS Unité/Projet, F-35042 Rennes, France
Univ. Rennes I, CNRS, UMR 6074, IRISA, F-35042 Rennes, France

Corresponding author:

Simon Duchesne, Ph.D.

Unite / Equipe U746 VISAGES
IRISA
Campus de Beaulieu
35042 Rennes CEDEX

Tel: +33 (2) 99 84 71 07
Fax: +33 (2) 99 84 71 71
Email: duchesne@ieee.org

Keywords

Manuscripts, peer-review, productivity

Word count: 1472
Line count: 138
Abstract word count: 103
Tables: 1
Figures: 1
References: 11

Abstract

Background - In the Internet-able era reviewers are faced with an increased number of manuscripts and decreased time to review. In order to maintain the same, if not higher level of quality in the peer-review process, a net gain in productivity is required. Our goal is to present a manuscript peer-review checklist to help reviewers achieve this secondary yet critical task in a more systematic fashion.

Methods - To this end, we have compiled, structured and processed information from nine reference standards, guidelines or directives, resulting in a 70 criterias checklist. We ensured that criterias were assessable based on the verification, validation and evaluation paradigm.

Results - The checklist is presented in the manuscript, along with a description of a review workflow.

Findings

It is hoped that the checklist will be widely disseminated, and we are looking for feedback on validation and improvements in order to perform a quantitative study on productivity gains using this tool.

Introduction

There are two growing trends that conspire to make peer reviews an increasingly demanding task. The first is the increase in the number of reviews. It has been reported that the number of scientific journals linearly increases year after year (Hook, 1999). Journal size also increases – both by the number of articles published, and the number of pages

per article (Tenopir and King, 2000). While exact growth rates are subject to debate, the net cause (assuming that higher acceptance rates are not the sole justification) is that the number of submitted manuscripts has increased, and thus so did the number of reviews.

The second issue is the decrease in review time asked by Editors. The paradigm shift caused by the World Wide Web and the advent of electronic submissions will not be discussed here, other than to state that months-long reviews are a thing of the past. In order for journals to remain competitive, authors and readers demand that articles be reviewed and published faster, in part to make information circulate faster. It is routine now for editors to ask that reviews be completed in few weeks.

At the same time, publications reporting results from studies – clinical, methodological or otherwise – are increasingly being referred to in the context of evidence-based medicine. Thus, readers expect, and rely on, the published articles to be objective and of increasingly higher quality. Editors and reviewers alike are faced with a trade-off between decreasing review times vs. increasing article quality.

Both of these issues are very well exemplified by the current changes in editorial policy for peer-review in *NeuroImage*, where the net effect is a call for more reviews, to be done in less time. We expect this trend to grow and include most scientific journals; when generalized, this will complicate even further the task of reviewers, called upon by multiple editors from different publications to perform at a quicker turnaround rate.

Reviewing remains an experience-driven process, not taught nor necessarily transmitted in the same fashion as field-specific knowledge (Benos et al., 2003). It is somewhat puzzling that the manuscript peer-review process, which is often hotly debated, has not received much attention or been the subject of much formalization in the literature.

Reviewing is an important but secondary task. In order to be successful in the face of increased demand, reviewers will need a net gain in productivity. Otherwise, either the quality of the reviews will diminish, or, in order to maintain an equal quality level, it will become a primary task. These situations are to be avoided.

We hypothesize that if the review process is formalized, review quality and reviewer productivity will increase. To address this situation, we suggest a tool to improve reviewer's productivity, the manuscript peer-review checklist. Thought of as a guide, it is not meant to be a categorical tool to arrive at a deterministic assessment of the quality of a manuscript, but rather, as an aide-memoire to help reviewers in their task.

The goal of this article is to present this checklist. For the present purposes, we have chosen to limit ourselves to the domain of medical imaging, even though these issues are not solely confined to this field. It would be difficult at this point to synthesize a list of questions that could fit all scientific journals. In fact, it must be stated that this article is intended as a *presentation* of the checklist, and not a report on its use. The research goal is to gauge interest in the medical imaging scientific community as to the usefulness and appropriateness of the tool in the review process, before extending further to research on its efficiency.

Method

Checklist elaboration

The elaboration of the checklist followed a three part process: (a) compilation of checklist items, based on numerous sources; (b) structuration of checklist elements; and (c) assessment through the paradigm of Verification, Validation and Evaluation (VVE).

Checklist compilation

The checklist has been compiled using (a) existing checklists, such as the Consolidated Standards of Reporting Trials (CONSORT) (22 criterias), the Standards for Reporting of Diagnostic Accuracy (STARD) (25 criterias), the Meta-Analyses of Observational Studies (MOOSE) (35 criterias) and the Health Technology Assessment (HTA) checklist of the International Network of Agencies for Heatlh Technology Assessment (INAHTA) (17 criterias); (b) guidelines, such as the Appraisal of Guidelines Research and Evaluation (AGREE) and the International Committee of Medical Journal Editors (ICMJE); (c) validation frameworks (Jannin et al., 2006) (27 criterias); and (d) editorial policy from peer-reviewed journals (e.g. *NeuroImage* (3 criterias), and *IEEE Transactions on Medical*

Imaging (6 criterias)). Additional review forms were studied from main international conferences in medical imaging. During this process we concatenated the checklists found in the literature, removed redundancy and parallelism, and ensured coherence, resulting in a set of 70 criterias.

Checklist structure

We regrouped criterias based on the distinction between form and function, with the understanding that recommendations for publication are essentially based on a combined assessment of both categories of criteria. We organized the review criterias according to the standard Introduction, Methods, Results, and Discussion (IMRAD) structure, noting that Methods includes aspects related to the study population, imaging data, and the methods themselves, and Discussion includes aspects related to the claims, innovation and impact of the study, as well as ethics.

Checklist verification, validation and evaluation

In general system methodological assessment, it is usual to differentiate the concepts of **Verification**, **Validation**, and **Evaluation** (VVE) (Balci, 2003) in the following way. *Verification* is the confirmation, through the provision of objective evidence, that specified requirements have been fulfilled (ISO9000:2000). It consists in assessing that the system is built according to its specifications. Validation is the confirmation, through the provision of objective evidence, that requirements for a specific intended use have been fulfilled (ISO9000:2000). It consists in assessing that the system actually fulfils the purpose for which it was intended. Finally, *Evaluation* consists in assessing that the system is accepted by the end user, adds value to the daily practice, and it is performant for a specific purpose. We have used the VVE paradigm to generate the peer-review checklist by submitting each of the 70 review criterias used for assessing the quality of the manuscript to VVE. For any one criteria, the Verification aspect consists in assessing that the criteria is clearly and non-ambiguously identified (i.e., described) in the manuscript. The Validation aspect consists in assessing that the choice made for the criteria is justified (i.e., correct), according to the clinical context and hypothesis for instance. And finally, the Evaluation aspect consists in

assessing that the choice made for the criteria is valuable (e.g., brings new knowledge, improves knowledge on a subject, or introduces a new relevant system or approach). In the checklist, three columns per criteria are respectively related to these VVE aspects. For some criterias, Validation and/or Evaluation aspects are not relevant and therefore not addressed.

The complete checklist is shown in Table 1. Suggestions for use are given in the following section.

Discussion

We have proposed a 70 criterias checklist to be used in the peer-review of a submitted manuscript to a medical imaging journal. Our primary goal is one of qualitative increase in the productivity and quality of result of the reviews.

The checklist should be viewed as a series of guidelines; an aide-memoire for reviewers. It is not meant as a mean of standardizing output: the latter still needs to be personalized and tailored to the individual manuscript.

When generating the checklist, we have removed redundant items and checked for consistency. It is primarily aimed at medical imaging manuscripts, and thus elements relevant for other fields have not been included; however, it can be readily tailored to other domains. The selection of checklist items is representative of our own bias; we welcome discussion and exchance from the reviewship at large.

Evaluation and dissemination

We intend this checklist to be a public, freely accessible tool. It is downloadable at the authors' websites (http://jannin.org/RCL) and we encourage its dissemination.

There has not been a formal study of the efficiency of the proposed checklist. The purpose of this manuscript is to present the tool and gather interest from the community of reviewers to, possibly, embark in such study. By doing so, the checklist itself and the review process could be improved and formalized.

Suggestions for use

We propose a simple review workflow to perform manuscript peer-review using the checklist (see Figure 1). We also strongly suggest reviewers that they verify, validate and evaluate their own reviews once completed. Criterias proposed by Benos (Benos, 2003) can be helpful in this regard (Table 2).

Finally, any kind of ponderation or weighting of individual checklist element has been purposefully left out of the checklist. Reviewers will either naturally or formally declare emphasis when reading and reviewing manuscript.

Finally, it will not have escaped reviewers reading this note, who are first and foremost authors of manuscript, that a good review checklist can be used conversely as a good manuscript design tool for improving the quality of your writing.

Acknowledgments

Role of the funding sources

Disclosures

No disclosures

Authors' contributions

- Guarantors of integrity of entire study, all authors;

- Study concepts and design, all authors;

- Literature research, S.D.;

- Methods, analysis and interpretation, all authors.;

- Manuscript preparation, S.D.; revision/review, all authors; and

- Manuscript definition of intellectual content, editing, and final version approval: all authors

There were no medical writers involved in the creation of this manuscript.

References

Appraisal of Guidelines Research and Evaluation, URL http://www.agreecollaboration.org, visited 01 March 2007

Balci O. "Verification, validation and certification of modeling and simulation applications". Proceedings of *35th conference on Winter simulation: driving innovation*, New Orleans, Louisiana. Winter Simulation Conference, 2003: 150-158.

Benos D.J., Kirk K.L and Hall J.E., "How to review a paper". *Advances in Physiology Education*, 2003:27(2); 47-52.

Consolidated Standards of Reporting Trials [CONSORT] Group, "CONSORT Statement". URL http://www.consort-statement.org, visited 02 July 2007.

Hook O., "Scientific Communications: History, electronic journals and impact factors". *Scandinavian Journal of Rehabilitation Medicine*, 1999:31(1); 3–7.

International Committee of Medical Journal Editors, "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication". URL http://www.icmje.org, visited 02 July 2007

International Network of Agencies for Health Technology Assessment, HTA checklist. URL http://www.inahta.org/inahta_web/index.asp, visited 01 March 2007

ISO 9000:2000, Quality management systems – Fundamentals and vocabulary. International Organization for Standardization, 2000.

Jannin P, Grova C, Maurer C., "Model for designing and reporting reference based validation procedures in medical image processing". *Int Journ. Comput. Assisted Radiol and Surg*. 2006:1(2); 1001-115.

Moher, D., Schulz K.F., and Altman, D.G. for the CONSORT Group, "Consolidated Standard of Reporting of Trials". URL http://www.consort-statement.org, visited 01 March 2007

Quality Of Reporting Of Meta-Analyses [QUOROM], "QUOROM Statement". URL http://www.consort-statement.org/Evidence/evidence.html#quorom, visited 02 July 2007

Standards for Reporting of Diagnostic Accuracy [STARD], "STARD guideline". URL http://www.consort-statement.org/stardstatement.htm, visited 01 March 2007

Tenopir, C., King, D. W. "Towards Electronic Journals: Realities for Scientists, Librarians, and Publishers". *Psychology,* 2000:11 (84).

REVIEWER CHECKLIST

JOURNAL   MANUSCRIPT NO   FIRST AUTHOR

TITLE

REVIEWER EXPERTISE   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
CONFLICT OF INTEREST   ☐

FINAL DECISION

Accept	☐	No / Minor revisions
Accept	☐	Major revisions
Reject	☐	Major revisions / Resubmit
Reject	☐	No further consideration
Reject	☐	Another journal - Please specify

MANUSCRIPT STYLE

	-	0	+
Manuscript alignment with journal aim and scope	-	0	+
Manuscript appeal to journal readers	-	0	+
Sufficient details to allow the results to be repeated	-	0	+
Title page with relevant information	-	0	+
Appropriate keywords	-	0	+
Different manuscript sections of appropriate length	-	0	+
Clarity of writing	-	0	+
Spelling and grammar level	-	0	+
Metric system units	-	0	+
Use of generic drug names	-	0	+
Raw data reported as mean (standard deviation) or median (range)	-	0	+
Error-free formulas and derivations	-	0	+
Statistics reported with name of test, degrees of freedom, and exact P value	-	0	+
Appropriate figures of sufficient quality with proper footnotes	-	0	+
Appropriate tables	-	0	+
Proper use of trade names, abbreviations and symbols	-	0	+
References included in accordance with journal style	-	0	+
No evidence of plagiarism	-	0	+

STUDY REVIEW	Is / Are identified	Is / Are justified	value(s)
INTRODUCTION			
Clinical or methodological context	- 0 +	- 0 +	- 0 +
Positioning with respect to literature	- 0 +	- 0 +	- 0 +
Study objectives	- 0 +	- 0 +	- 0 +
Study hypotheses	- 0 +	- 0 +	- 0 +
METHODS			
Study population			
Study type (retrospective or prospective)	- 0 +	- 0 +	
Data collection setting(s) and location(s)	- 0 +	- 0 +	
Information on participant recruitment, sampling, and allocation	- 0 +	- 0 +	
Description of study population, inclusion and exclusion criteria	- 0 +	- 0 +	
Clinical and demographic characteristics	- 0 +	- 0 +	
Flow of participants through each stage	- 0 +	- 0 +	
Final group numbers for analysis	- 0 +	- 0 +	
Reference standard	- 0 +	- 0 +	
Clinical assumptions on participants and data sets	- 0 +	- 0 +	
Medical imaging data			
Sequence and image parameters	- 0 +	- 0 +	
Scanner type, make, manufacturer	- 0 +	- 0 +	
Sources of imaging and data noise	- 0 +	- 0 +	
Other materials and devices	- 0 +	- 0 +	
Methods			
Input parameters to the method	- 0 +	- 0 +	
Units, cutoffs, parameters	- 0 +	- 0 +	
Formulas and algorithms	- 0 +	- 0 +	- 0 +
Implemented hardware and software	- 0 +	- 0 +	- 0 +
Number, training and expertise of raters	- 0 +	- 0 +	- 0 +
Outcome measures and methods	- 0 +	- 0 +	- 0 +
Sample size	- 0 +	- 0 +	
Expected result or model, considering sample size	- 0 +	- 0 +	- 0 +
Validation criterion	- 0 +	- 0 +	- 0 +
Validation objective	- 0 +	- 0 +	- 0 +
Type, number and characteristics of validation data sets	- 0 +	- 0 +	
Sensitivity analysis to parameters	- 0 +	- 0 +	- 0 +
Statistical test(s)	- 0 +	- 0 +	- 0 +
RESULTS			
Participants inclusion/exclusions	- 0 +	- 0 +	- 0 +
Result of statistical test(s)	- 0 +	- 0 +	- 0 +
Cross tabulation of test results by reference results	- 0 +	- 0 +	- 0 +
Estimates of accuracy and measures of statistical uncertainty	- 0 +	- 0 +	- 0 +
Measures of test reproducibility, if done	- 0 +	- 0 +	- 0 +
Ancillary analyses, including sensitivity testing	- 0 +	- 0 +	- 0 +
DISCUSSION			
Claims			
Clinical realism	- 0 +	- 0 +	- 0 +
Claims supported by data	- 0 +	- 0 +	- 0 +
Possible or actual bias, discrepancies	- 0 +	- 0 +	
Interpretation of results given hypotheses and sources of bias	- 0 +	- 0 +	- 0 +
Generalization of findings, alternative explanations	- 0 +	- 0 +	- 0 +
Innovation and impact			
Original concepts, new technology usage	- 0 +	- 0 +	- 0 +
Innovation: transformational, translational, incremental	- 0 +	- 0 +	- 0 +
Scientific and/or practical value of findings and results	- 0 +	- 0 +	- 0 +
Clinical applicability	- 0 +	- 0 +	- 0 +
Ethics			
Social, safety, ethical or economic issues	- 0 +	- 0 +	- 0 +
Ethics committee approval and informed consent for subjects	- 0 +	- 0 +	
Human study - in accordance with the Declaration of Helsinki	- 0 +	- 0 +	
Animal study - in accordance with the Guiding Principles	- 0 +	- 0 +	
Sources of funding and role of study sponsor(s)	- 0 +		
Contributorship, guarantorship, medical writer involvement	- 0 +		
Potential conflicts of interest	- 0 +		