Computer-Supported Peer Review in Computer Science Education

Edward F. Gehringer
North Carolina State University
Department of Computer Science
Raleigh, NC 27695-8206
+1 919-515-2066
efg@ncsu.edu

Ferry Pramudianto
North Carolina State University
Department of Computer Science
Raleigh, NC 27695-8206
+1 919-513-0815
fferry@ncsu.edu

Yang Song
North Carolina State University
Department of Computer Science
Raleigh, NC 27695-8206
ysong8@ncsu.edu

Abstract

In the past few years, computer-supported peer review has been drawing increasing attention from educators and researchers. Although online peer-review systems have been implemented, research in their technological and educational aspects is just beginning. There still exist pedagogical and technical questions that must be answered to improve the current systems. This mini-conference aims to bring together a community of researchers currently interested and working on issues related to peer assessment, peer reviews, and self-assessment especially in the computer science education domain. It also aims to advance the field through closer international collaborations for prioritizing research directions, and avoiding redundant work in the peer-review community.

Keywords

peer review, peer assessment, crowd grading, learning analytics, active learning, natural language processing

Event URL

http://www.cspred.org

Significance and Relevance of the Event Topic/Purpose

Computer-supported peer review is drawing increasing attention from educators and researchers. It does more than just mimic face-to-face peer review, it improves upon it. It has been associated with gains for assessors, assesses, or both [1,2]. These gains can include increased levels of time on task and practice, coupled with a greater sense of accountability. It induces students to give extensive written feedback, which is typically more reflective than oral feedback. Peer feedback allows authors to experience multiple perspectives on their work, rather than the singular voice of a teacher [3]. For the instructor, it generates multiple performance measures that can be used to judge the class's progress. It can even suggest grades for students, based on an average of reviewer ratings, scaled by the calculated credibility of each reviewer.

Although dozens of online peer-review systems have been produced, research in their technological and educational aspects is just beginning. We can envision future systems that yield reliable scoring with limited instructor intervention, that can advise reviewers on how to produce a more effective review, and that can track the reliability of rubric criteria and offer suggestions for improving their validity. The peer-review process can enhance learning outcomes, to provide useful assessment in ill-structured domains, and in general, to enhance the formative feedback that students receive.

According to the authors' knowledge, there has not been many educational peer-review focused conferences or workshops. The only workshops related to the field have been PRASAE, which was held in conjunction with ICWL'14 [4] in 2014 and in conjunction with ICSLE in 2015, and CSPRED'10 (Computer-supported peer review in Education) [5]. Consequently, the research and community is this domain is rather scattered and thus has not fostered many close collaborations. We aim to advance this

research field by to bringing together a community of researchers currently interested and working on issues related to peer assessment, peer reviews, and self-assessment in the educational domain. We also would like to bring about closer international collaboration for research in order to avoid redundant work, and help the field to progress more rapidly.

The 2016 CSPRED workshop/mini-conference follows the previous CSPRED workshop held in conjunction with the Tenth International Conference on Intelligent Tutoring Systems (ITS 2010). The mini-conference drew about 30 participants with submissions in the form of full papers, short papers, and posters. Since then, the community of peer review researchers has grown, as evidenced by the respectable number of researchers who have been interested enough to join the program committee.

This mini-conference seeks answers to fundamental pedagogical questions such as, Does peer review allow instructors to share more responsibility with students? If so, instructors may find it easier to focus on individual students, but will nonetheless need to be kept abreast of the progress of others. How should students engaged in peer review be assessed as they study subject matter, and as they give and receive feedback? Is peer review an important practice in the student's chosen profession? If so, should the peer-review process employed in the classroom be adapted to the profession's norms, and how does this affect peer-review software? Does peer review yield information on learning processes that are concealed under traditional instruction?

Online peer review is notable for the sheer volume of feedback that it produces. After being used in untold thousands with millions of students, it has produced an extensive corpus of assessment information, which has rarely, if ever, been mined for what it can reveal about the peer-review process itself: What kind of/how extensive a rubric produces the largest volume of suggestions from reviewers? Do students behave differently when rating the artifacts presented to them than they do when ranking these artifacts? Can experience with thousands of rubrics be examined to discern fundamental principles of rubric design?

In addition, the workshop/mini-conference also seeks answers to the practical questions such as What are the best approaches to improving the inter-rater reliability and the quality of the feedback? Can approaches other than calibration (cf. Calibrated Peer Review™) be used effectively to train reviewers and improve their motivation? How can these approaches be combined and applied in different environments? Last but not least, we also seek answers to the technological questions such as: How can we apply intelligent technology such as data mining, natural-language processing, and machine learning to improve feedback quality and learning gains? How far can we generalize peer review systems into a common ontology? How can peer-review data visualizations be presented to instructors and students?

Intended Audience
As an inherently interdisciplinary topic, peer review stands to benefit from the perspectives of learning scientists, technologists, and instructors, as well as psychologists, anthropologists, statisticians, designers, and other interested parties. The workshop
calls for presentation of both early and mature research; technology demonstrations are also welcome.

Expertise of the Organizers
Edward F. Gehringer has published numerous papers on peer review and developed the Expertiza peer-review sytem. Ferry Pramudianto is a postdoctoral researcher working on peer review and peer assessment at North Carolina State University.

Rough Agenda for the Event
8:30 AM   Introduction
9:00 AM   Papers I (3 15-minute talks)
9:45 AM   Papers I Discussion

10:00 AM	Break
10:30 AM	Papers II (4 15- minute talks)
11:30 AM	Papers II & General Discussion
12:00 PM	LUNCH
1:30 PM	Papers III (3 10- minute talks)
2:00 PM	Papers III Discussion
2:15 PM	Papers IV (3 10-minute talks)
2:45 PM	Papers IV Discussion
3:00 PM	Break & Poster setup
3:30 PM	Posters
4:30 PM	Future of our community discussion
5:00 PM	End

Types of submissions
Papers (8 pages, ACM format) and posters (2 pages, ACM format)

Topics for submissions
Topics of interest to the workshop/mini-conference include, but are not limited to:
• Data mining of peer-review artifacts, including numeric ratings, free-form comments, and system logs
• Intelligent and adaptive support for students giving and receiving reviews, and for instructors of courses that involve peer review
• Assessment and student modeling of peer reviewers and authors, with or without a domain model
• Scaling and porting: peer review with lots of learners, in cross-age, cross-cultural, or international settings, in
• MOOCs, in distance learning, in informal learning, over long durations
• User interfaces: eliciting quality student input, rerepresenting student input (e.g., organizing and summarizing reviews for authors), providing feedback, etc.
• Causal and correlational relationships of peer review phenomena with outcomes of interest, including learning of
• subject matter and of skills, metacognition, affect, motivation, professionalization, etc.
• Democratizing and decentralizing instruction through peer review technologies
• Improving instructor awareness of student needs during peer-review exercises
• Promoting acceptance of peer-review technology with students, educators and administrators
• Theoretical and empirical analysis of peer review processes
• Best practices, pre-requisites and desiderata for peer-review exercises, technology, and research methods
• Domain-specific issues in peer review, including peer review across the curriculum, for well-defined and ill-defined domains and problems

Program Committee
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