

JEE Strategic Plan, 2005-2010: A Summary Report

In January 2003, the *Journal of Engineering Education* (JEE) took the first step toward its aspiration to become a world-class discipline-based (engineering) education research journal when it published a research-focused mission statement and associated review criteria (Lohmann, 2003). In the two years that followed, JEE took two more important steps. One was the publication of a special issue titled, "The Art and Science of Engineering Education Research," to more broadly announce and celebrate the journal's new focus (Lohmann, 2005a; Felder, Sheppard, and Smith, 2005) and the other was the publication of a strategic plan to guide and accelerate the journal's efforts to achieve its aspiration (Lohmann, 2005b; JEE Strategic Plan, 2005).

The strategic plan has been the journal's "North Star" for the past five years. Although we have published annual progress reports (Lohmann, 2006, 2007a, 2008a, 2009a, 2010), this report summarizes the major achievements of our five-year strategic plan. It also serves as the starting point to create JEE's next five-year strategic plan for 2011-2016.

THE JEE STRATEGIC PLAN IN BRIEF

The "JEE Strategic Plan, 2005-2010" (2005) is divided into three parts. First is a discussion of the journal's philosophy, vision, and mission, which if expressed in a single statement would be: the *Journal of Engineering Education* is more than a place to publish papers—it also serves to help build a vibrant community of scholars and practitioners dedicated to advancing engineering education through a sustainable cycle of education research and improvement of educational practice. The next two parts focus on two goals and ten strategies for achieving them. One goal focused largely on building a world-class journal by sharpening JEE's scope of publication, increasing the quality of reviews, and assuring timely manuscript processing. Strategies included publishing special issues to shape and encourage scholarly inquiry in topics critical to advancing engineering education, embracing broad representation among advisory board members, authors, editors, guest editors, and reviewers, cultivating a community of highly-qualified peer reviewers, and assuring timely and thoughtful reviews of manuscripts and the expeditious publication of accepted manuscripts. The second goal focused largely on building capacity in the engineering education community by broadening involvement in engineering education research, increasing access to the journal, and encouraging broad disciplinary and geographic collaborations. Strategies included offering symposia and workshops globally, implementing a new model for journal publication, initiating joint ventures with other journals, national, and international organizations and groups, and creating a sustainable engineering education research conference.

This report is divided into three parts. The first two parts summarize the principal efforts to address the two goals and the third part summarizes the impact of these efforts to achieve the journal's aspiration. The JEE editorial team is deeply indebted to the many individuals and organizations who helped the journal achieve so much of its strategic plan. Among them are the ASEE Board of Directors and the headquarters staff, the JEE Advisory Board and the JEE international partners, authors, reviewers, and readers, and many individuals from the engineering and education communities at-large.

BUILDING A WORLD-CLASS JOURNAL

Over the last five years, JEE has reviewed and revised many of its practices to assure it includes the appropriate engineering and educational expertise, experience, and diversity it needs, it communicates its expectations and requirements effectively with authors, reviewers, and readers, and it processes and publishes manuscripts in a timely fashion. Highlights of these efforts include the following.

- An eight-person Editorial Review Board was replaced by a fifty-person Advisory Board whose purpose is to provide advice on the content, implementation, and review of progress of the strategic plan and on other matters important to the success of the journal. Forty members are appointed by the editor and serve five-year non-renewable staggered terms. They are composed of a broad set of stakeholders, including engineering faculty, education researchers, learning scientists, academic administrators, industry representatives, and individuals drawn from engineering and/or education-related organizations. More recently the board includes representatives (liaisons) appointed by the ten international engineering education organizations that join in partnership in the publication of JEE. Presently, the board is composed of 15 women and 35 men (excluding liaisons, 14 women and 26 men). A sample of expertise, experience, and diversity of past and present board members includes: representation from 15 different countries of which 55.2 percent are Fellows and/or members of their country's national academy (engineering or education); 42.0 percent are engineering faculty; 17.2 percent, academic administrators (mostly engineering); 16.1 percent, education researchers/learning scientists; 13.8 percent, industry representatives; and 10.9 percent are from engineering and/or education-related organizations.
- At the start of the strategic plan, the journal had one editor and seven associate editors. In 2006, JEE revamped its editorial structure to assure that it benefited from the continuity of

seasoned editorial experience as well as the periodic infusion of new editorial leadership. The position of senior associate editor was created to recognize those associate editors with significant JEE editorial experience and to involve them more significantly in the implementation of the strategic plan, and the position of associate editor was repurposed to provide more opportunities for engineering education researchers and learning scientists to contribute to JEE on three-year non-renewable appointments. Since 2005 JEE has had 20 editors which has included 10 women and 10 men representing 4 countries, and whose expertise and experience has included engineering, liberal arts, and the learning sciences, with the latter being the area of most significant growth. The journal has also had 62 guest editors, 10 shepherded three special issues and 52 wrote 25 guest editorials. Collectively, they included 28 women and 34 men representing 6 countries and whose organizational affiliations included 45 academic institutions, 13 education-related organizations, and 4 companies.

- The JEE “Guide for Authors” is the primary means by which the journal communicates its expectations and requirements. It contains the journal’s mission statement, research areas, manuscript requirements and submission instructions, review criteria, review process, and other administrative matters. Many of these elements have been reviewed and refined in the last five years. For example, in 2006, the material on “Topics and Focus” was replaced with “Research Areas” based on the taxonomy proposed by the NSF-funded Engineering Education Research Colloquies (Special Report, 2006a, 2006b). The journal has also clarified that it welcomes qualitative research methods as much as quantitative methods (the latter being more familiar with engineering faculty members) and research reviews as much as research investigations (the latter again being the more frequent type of submission). Additionally, JEE discontinued publication of “Research Briefs” which encouraged papers based on preliminary findings to focus instead on full papers based on definitive results. More recently, in 2009, the journal adopted structured abstracts to communicate more clearly to authors what JEE considers important, facilitate peer review, and enhance the manuscript’s readability if published (Lohmann, 2009b). Especially important has been an ongoing emphasis for authors to make more clear how the research reported contributes to improved educational practice.
- JEE has cultivated a pool of nearly 900 reviewers with broad disciplinary, organizational, demographic, and international expertise and experience. For example, JEE revised its Web-based database to improve its ability to match reviewers to manuscripts and implemented processes to evaluate and monitor reviewer performance for timeliness, quality of review, and reviewer turnover, and it periodically revises its pool of reviewers accordingly. The result is a conscientious and diverse pool of reviewers; in 2009, 80.2 percent of the reviews were returned within one month, 48.6 percent were written by women and 51.4 percent by men from 23 countries, and 81.1 percent were rated satisfactory or better. About one-third (34.6 percent) of the reviewers had not previously reviewed for JEE. Further, JEE often exceeds its goal of at least three reviews per manuscript; in 2009, the average

number of reviews per manuscript was 3.9. Not surprisingly, the increased attention to the quality of peer review has resulted in an acceptance rate of about one in ten manuscripts submitted.

- While timely reviews are important, constructive, specific, and unbiased reviews are critical to manuscript improvement. JEE first published review criteria consistent with education research in 2003. These were extensively reviewed in 2007 and refined criteria were published in 2008. Today JEE has six criteria each with five-point Likert and anchored scales. Authors receive the review criteria scores and the narratives provided by the reviewers and the editors. In 2009, the average review contained 3,733 words, or the equivalent of four pages of text in JEE. This year, to further assure unbiased reviews, the journal adopted double-blind review to reinforce the importance of evaluating manuscripts on the merits of the research presented and not the researchers who performed it.
- The journal reviewed its manuscript processing operations and established guidelines for each major step in the process. The individual guidelines were used to establish two overall guidelines: (1) the editor would assess a submission for its suitability for peer review and inform the author within 14 days on 90 percent of the manuscripts submitted; and (2) for those submissions forwarded for peer review, the process of review would be completed within 90 days on 90 percent of the submissions. The performance of each editor and all editors collectively is monitored and shared with the editors on each manuscript, and the overall results shared with the readership in JEE’s annual progress reports. Last year, 98.7 percent of submissions were assessed for their suitability for peer review within 14 days and the average response time to the authors was 4.5 days. Further, 87.6 percent of submissions forwarded for peer review completed the review within 90 days and the average time to completion was 60.5 days. For accepted manuscripts published in 2009, the average time-to-publication (from submission to appearance in print) was 12.9 months.

BUILDING A GLOBAL COMMUNITY

Engineering education research is a rapidly growing cross-disciplinary field of scientific inquiry. Among JEE’s principal contributions to facilitate its growth are the following.

- In 2007, JEE launched an international engineering education research conference to promote high-quality scholarship in engineering education and its acceptance as a scholarly field of inquiry (Borrego, Froyd, and Knight, 2007; Lohmann, 2007b). Sixty-eight international researchers participated based on the peer reviewed papers submitted. The meeting was held in Honolulu, Hawaii and supported by the National Science Foundation and ASEE. The success of the event led to two more conferences, now called the “Research Symposium for Engineering Education” (REES). They were held in Davos, Switzerland (2008, 71 participants) and Palm Cove, Australia (2009, 68 participants). Together, these symposia were supported by the Australasian Association for Engineering Education, Center for the

Advancement of the Scholarship of Engineering Education of the U.S. National Academy of Engineering, *Journal of Engineering Education*, School of Engineering Education, Purdue University, and Engineering Learning Unit, University of Melbourne. Following the Palm Cove symposium, a nine-member international governing board was elected. The board subsequently created the Research in Engineering Education Network (REEN), an independent, international “forum in which quality research on engineering education is conducted, discussed, and disseminated” (REEN, 2010), of which one of their activities is to sponsor REES. The original conference has now become a symposium organized and sustained by the international community. The next REES is scheduled for 2011 in Madrid, Spain.

- Since 2005, JEE has participated in or sponsored over 70 international workshops, symposia, conferences, conference tracks, committees, and advisory boards to facilitate the inclusion of emerging scholars in engineering education research and their networking with senior scholars or to build stronger cross-disciplinary or inter-organizational awareness and linkages in the field. In addition to REES, JEE has also been a sponsor of the society conferences for the Australasian Association for Engineering Education, European Association for Research on Learning and Instruction, and International Society for the Learning Sciences. Some of these efforts have resulted in publications in JEE, such as the special report from the Engineering Education Research Colloquies (Special Report, 2006a, 2006b), a jointly published paper with the *European Journal of Engineering Education and Research in Higher Education of Engineering* (Jesiek, Borrego & Beddoes, 2010; Lohmann, 2010), and at least thirteen papers from the engineering education research symposia. JEE is also a founding member of the International Federation of Engineering Education Societies (IFEES, 2010).
- In 2008, JEE launched a new business model to broaden its international reach and deepen its regional relevance when it signed the first of now ten partnership agreements with other international engineering education organizations (Lohmann, 2008b). They are listed on the inside front cover and on the JEE Web site. The purpose of the agreements is threefold: (1) provide JEE as a benefit to members of their organizations (just as it is to ASEE members), (2) increase readers, authors, and reviewers from the partner organization and their geographic region, and (3) increase awareness between the partner organizations and ASEE of each other’s aspirations for possible future collaborations. Of particular note are two agreements that also provide for the publication of selected JEE articles in Chinese in *Research in Higher Education of Engineering* and in Korean in the *Korean Journal of Engineering Education* (Lohmann, 2010). More languages are under consideration.
- With the publication of JEE’s centennial issue in January 2011, the journal will have published three special issues since 2005 (Felder, Sheppard, and Smith, 2005; Lohmann, 2005a; Lohmann, 2008c; Sheppard, Pellegrino, and Olds, 2008; Baillie et al., 2011; Lohmann, 2011). While each addresses a different theme, they share a common goal: to help shape and encourage scholarly inquiry on topics critical to

advancing engineering education and engineering education research. Together over 43,000 complimentary copies of the first two special issues were distributed internationally with the support of ASEE, the ASEE Engineering Deans Council, and four industry sponsors: Autodesk, Dassault Systems, Infosys, and National Instruments (Lohmann, 2005a, 2008c). The upcoming special issue will commemorate JEE’s centennial year as the world’s oldest scholarly journal devoted to engineering education and celebrate the beginning of its second century of scholarship.

- JEE has also worked to assure broad global awareness of and access to JEE’s research beyond its subscribers. For example, JEE is now listed on four bibliographic research databases: EBSCOhost (Education Research Complete™ and Academic Search Complete™), EBSCO Discovery Service™, and Elsevier’s Scopus. Additionally, a monthly column titled, “JEE Selects: Research to Practice,” is published in *Prism*, ASEE’s society magazine, to spotlight JEE research and its impact on educational practice. Over 22 columns have appeared since the fall of 2007. The journal will also launch a new Web site in January 2011 that is designed to further enhance access to JEE research and the global community of engineering education research scholars and their networks.

ACHIEVING JEE’S ASPIRATIONS

Whether JEE has become a world-class discipline-based (engineering) education research journal is a judgment we leave to the engineering and education communities to decide; however, we offer the following observations.

- In 2005, JEE had approximately 4,000 subscribers representing about 70 countries, but mostly from North America (about 85 percent). Today the journal has nearly 11,000 readers representing nearly 80 countries and mostly from the rest of the world (about 60 percent). Within ASEE subscribers, subscriptions grew at a rate faster than the growth in ASEE membership. ASEE JEE subscriptions grew 38 percent since 2005 whereas ASEE membership grew 13 percent.
- Last year 600 authors from 37 countries submitted manuscripts. The distribution of disciplines represented was: engineering, 57.1 percent; learning sciences, 20.6 percent; sciences, 9.9 percent; liberal arts, 1.9 percent; and all other, 10.4 percent.¹ The distribution of women to men was 30.2 vs. 56.8 percent, respectively.² In 2005, those figures were 447 authors from 21 countries and the distribution of disciplines represented was: engineering, 56.3 percent; learning sciences, 9.5 percent; sciences, 7.0 percent; liberal arts, 9.4 percent; and all other, 17.8 percent. The distribution of women to men was 27.5 vs. 63.1 percent. Further, while the overall percent of multidisciplinary manuscripts remained stable, 43.8 percent in 2009 vs. 43.6 percent in 2005, the number including at least one learning scientist or educational researcher increased

¹“All other” includes disciplines such as medicine, law, and business, as well as those authors with non-disciplinary affiliations, e.g., administration, academic support, industry representatives.

²Does not add to 100 percent since the gender of some authors was not apparent from the materials submitted.

significantly, 30.2 percent in 2009 vs. 17.4 percent in 2005.³ Clearly, JEE is appealing to an increasingly diverse community of authors, and one that is recognizing the multidisciplinary, learning science-based nature of engineering education research. As a consequence, the character of the manuscripts published has also changed. For example, on average, an article published in the October 2002 issue, the last issue published before JEE repositioned to focus on education research in January 2003, was 5.6 pages and had 12.8 references of which 36.5 percent of the references cited archival journals (and of those only 1.6 percent were to education, educational psychology, or education research journals⁴). In this issue, those same metrics are: 16.3 pages, 56.6 references, and 47.0 percent to archival journals (of which 57.3 percent of those are to education, educational psychology, or education research journals). While such easily computed quantitative metrics do not fully capture the qualitative “character” of the manuscripts published, they do provide insights about the nature of the changes. The increased length of the papers and the increased number, diversity, and quality of references are largely due to authors more fully situating their work within the relevant bodies of knowledge, especially the learning sciences, more thoroughly explaining the research design and the methods employed, and more thoughtfully analyzing the results and their practical implications.

- JEE was the first journal, and still the only journal, in engineering education listed on both the Thomson-Reuters Science Citation Index (in the categories of Education, Scientific Disciplines and Engineering, Multi-disciplinary) and the Social Science Citation Index (in the category of Education and Educational Research). Its most recent five-year impact factor places JEE third out of 139 journals in its most competitive category of Education and Educational Research, or in the top 7.8 percent of 2,257 social science journals and 13.5 percent of 7,387 science journals.
- JEE was among the top 5 percent of nearly 21,000 international journals recently rated as “best in their field” by the Australian Research Council. It was the only journal in engineering education to receive the top rating, A*, and only one of six education journals to received the A* rating among those also listed in the category education and educational research on the Social Sciences Citation Index.⁵
- Two recent JEE papers have received honors. “Conceptual difficulties experienced by trained engineers learning educational research methods,” by Borrego (2007) won the 2007 Outstanding Research Publication by Division I (Education in the Professions) by the American Educational Research Association, and “Does Faculty Research Improve Undergraduate Teaching? An Analysis of Exist-

ing and Potential Synergies,” by Prince, Felder, and Brent (2007) was a 2008 finalist for the Scholarly Work in Teaching and Learning Award by McGraw-Hill/Magna Publications.

WHAT’S NEXT?

This fall my fellow editors and I are once again engaging the JEE Advisory Board and preparing our next strategic plan. As a reader of JEE, we would welcome your thoughts on the future directions for JEE. Please send them to: jlohmann@gatech.edu. Our next strategic plan will not only continue to chart our course to accelerate JEE’s role in rapidly advancing engineering education but also launch the journal into its second century of leadership in the field of scholarly inquiry of engineering education.

—Jack R. Lohmann

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³The more focused (sub)disciplines, e.g., mechanical engineering, physics, and educational psychology, were grouped into major categories of disciplines, i.e., engineering, science, learning sciences.

⁴Defined as those listed on the Thomson-Reuters Social Sciences Citation Index in the categories Education and Educational Research and Educational Psychology.

⁵The other peer journals were the *American Educational Research Journal*, *British Educational Research Journal*, *Harvard Educational Review*, *Oxford Review of Education*, and *Review of Educational Research*. For more information, see www.arc.gov.au/era/default.htm.

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