PROMOTION RECOMMENDATION

The University of Michigan
School of Education

Elizabeth A. Davis, assistant professor of education, in the School of Education, is recommended for promotion to associate professor of education, with tenure, School of Education.

Academic Degrees:

Ph.D.	1998	Education in Mathematics, Science, and Technology	University of California, Berkeley
M.A.	1994	Education in Mathematics, Science, and Technology	University of California, Berkeley
B.S.E.	1989	Engineering and Management Systems	Princeton University

Professional Experience:

1998-present	Assistant Professor of science education, School of Education, University of Michigan
1993-1998	Curriculum and software designer and teaching assistant for 8th grade physical science class, Foothill Middle School, Walnut Creek, CA
1996-1997	Curriculum developer and session leader for workshop for new KIE project developers, KIE Summer Teacher Workshops

Summary of Evaluation:

Teaching:

Dr. Davis has taught a variety of courses in the School of Education and has been active in developing and coordinating aspects of the teacher education programs (undergraduate and graduate). These courses include Elementary Science Methods (ED 421 & ED 528), Development of Expertise in Science Teaching (ED 832); Learning Technologies in Science Education (ED 833), History and Philosophy of Science and Science Education (ED 830) and the professional development seminar for science education and learning technologies doctoral candidates. Dr. Davis has made deliberate and thoughtful use of technology in teaching her courses, thus bringing her research into the university classroom. As with her research, her teaching shows dedication and integration of theory and practice.

Dr. Davis has devoted considerable time and thought to the preparation and teaching of courses. Students' evaluations of her teaching are overall quite strong. The evaluations from the undergraduate and graduate science methods courses are not as strong as for other courses she has taught, although still average overall. The somewhat lower student evaluation of the methods courses might reflect the fact that these are required courses; in addition, her syllabi show that Dr. Davis is a reasonably demanding instructor. Dr. Davis has also served as advisor to several graduate students—6 MA and 5 PhD students in Science Education and Learning Technologies. She has served as a member of 11 dissertation committees for students (successfully completed); of these she was chair or co-chair of 2 committees. She is currently on 7 active dissertation committees.

A survey of former and current students, reported by Dr. Stone, program chair, yielded letters that were "uniformly glowing in their praise for Dr. Davis's teaching and for her 'extra efforts' on their behalf. The respondents cited her dedication to teaching and students, her ability to inspire confidence in students who were insecure about teaching science, and her willingness to spend time outside the classroom mentoring future professionals."

Research and Scholarship:

Dr. Davis works at the intersection of science education, the learning sciences, and teacher education. She describes her work as focused on science learning and learning to teach science. Her work reflects attention to epistemological aspects of understanding, communicating, and learning science. Her scholarship focuses particularly on teachers' learning to teach science. Dr. Davis designs technological resources, curricular materials, and instructional approaches, using principles that she has drawn from cognitive and educational research. She is currently engaged in a longitudinal study of teachers' learning of science teaching. Through this study, she is broadening her perspective on teacher learning and development by investigating how teachers define themselves in relation to work of teaching science and by testing ideas about how educative curricular materials can affect role definition and knowledge use. In her own words, she addresses "questions about the links among teachers' learning opportunities, their knowledge integration, their real-time use of knowledge in practice, and their students' learning." Her plans for future research build on her current work by addressing the development of expertise in science teaching.

Based on our review of Dr. Davis's publications and scholarly work and the recommendations of the external reviewers, the Promotion and Tenure Committee has determined that the quality of her work meets an exceptionally high standard. The Promotion and Tenure Committee believes that her research program shows a solid career trajectory toward addressing important questions related to teaching science. Further, we note the synergy between her research and her university teaching. Not only is she developing valuable conceptual frameworks for understanding teacher learning, but she also enacts these frameworks in the courses she teaches to teacher education candidates and graduate students interested in issues of teacher learning.

One indication of the impact and promise of Dr. Davis' scholarship is the presentation of the Presidential Early Career Award for Scientists and Engineers from President George W. Bush in 2002. As this award is characteristically bestowed upon a very small number of early career scientists and engineers, being awarded this honor as a result of her work in science education indicates the recognition of her work outside traditional disciplinary boundaries. In addition, Dr. Davis has received a prestigious early career award within her discipline (the Jan Hawkins Early Career Award for Humanistic Research in Learning Technology from Division C of the American Educational Research Association) as well as large competitive research grants from the National Science Foundation (for example, CAREER Award in 2001). The evaluation of Dr. Davis's scholarship by her Program Chair, Addison Stone, and the external reviewers was overall very positive. Dr. Stone summarized his evaluation by indicating that he sees her as a valuable asset to the Educational Studies program and the School of Education; he recommends that she be granted tenure and promotion to the rank of Associate Professor.

Our committee believes that Dr. Davis has an impressive record of publication, especially in terms of the quality of her research and published research reports. As a young researcher, she has received noteworthy recognition for her contributions to three fields. As we noted earlier, her research, which is at the intersection of these fields, has been published in top-ranked journals in each of these fields. In our estimation, this is a remarkable feat. We agree with the evaluation of the external reviewers that Dr. Davis's research holds the promise of very significant contributions in the future.

Selected Recent and Representative Publications

1. Davis, E. A. (2006). Preservice elementary teachers' critique of instructional materials for science. *Science Education.*
2. Davis, E. A., & Krajcik, J. (2005). Designing educative curriculum materials to promote teacher learning. *Educational Researcher, 34*(3), 3-14.
3. Davis, E. A. (2004). Knowledge integration in science teaching: Analyzing teachers' knowledge development. *Research in Science Education, 34*(1), 21-53.
4. Davis, E. A., Petish, D., & Smithey, J. (accepted pending revisions). Challenges new science teachers face. *Review of Educational Research.*
5. Davis, E. A. (2003). *Prompting middle school science students for productive reflection: Generic and directed prompts.* The Journal of the Learning Sciences, 12*(1), 91-142*

Service:

Dr. Davis has a strong record of service to the school, the university, and the profession. In the School of Education, she has been active in three units within Educational Studies (Science Education, Teacher Education, and Learning Technologies). She has helped to design and teach new courses in teacher education as well. Within the School, she has held positions on the Executive Committees of Educational Studies and the Combined Program in Education and Psychology (CPEP). She also served on an ongoing CPEP Search Committee for four years. She has served on the Graduate Affairs Committee and the Petition Committee for Undergraduate Teacher Education as well.

Her contributions to the profession have been considerable. She has served on the editorial board of two prestigious journals, including the *Journal of Learning Sciences* and she reviews for an additional seven journals. These include major journals in all three of her areas of scholarship (learning sciences, teacher education, and science education). She has taken on a leadership role in the International Conference for the Learning Sciences, including work on the doctoral consortium, program committees, and conference planning. She has been a reviewer of AERA proposals. She has served on the selection committee for Jan Hawkins Early Career Award in Humanistic Research in Learning Technologies, and she has served on review committees for The National Association for Research in Science Teaching (NARST) awards, the major professional organization in science education.

External Review:

All six of the external reviewers' evaluations were similarly positive and provided the same recommendation. One important aspect of the external reviewers' letters is the recognition that Dr. Davis is contributing significantly to scholarship in different fields, but with remarkably similar views of the significance of her work to each of these fields. We include comments from reviewers in Learning Sciences, Science Education, and Teacher Education here.

Reviewer A: "I certainly think Betsy should be promoted to Associate Professor with tenure. She is a very productive researcher and one of the leading members of the learning sciences community. I think she certainly would be granted tenure at ..., based on her record to date."

Reviewer B: "As a whole, her work shows a coherence, depth of thoughtfulness, and rigor that is rare for work that is so meaningful in addressing problems of educational practice and at the same time significantly contributes to the knowledge base on learning processes."

Reviewer C: "Dr. Davis has made important scholarly contributions in science education and has engaged in highly relevant ways with cutting edge developments in science teacher education and service contributions. My scholarly and professional judgments are that Dr. Davis is highly deserving of promotion with tenure to the rank of Associate Professor."

Reviewer D: "There is no doubt her studies contribute significantly to our knowledge regarding how students learn science and how teachers teach science. Thus, these studies contribute significantly to the attainment of the goal to improve learning materials and to our attempts to improve the methods used to professionalize science teachers both in pre-service as well as in-service initiatives."

Reviewer E: "She is a careful, meticulous researcher, investigating a set of generative questions about learning. I appreciate her scrupulous attention to data analysis, and her efforts both to make her analyses transparent and to entertain and explore alternate hypotheses for her findings. Her research is also clearly programmatic in nature; even as she has shifted populations, from middle school students to preservice teachers, she has continued to pursue a clear line of inquiry that builds on her early work on knowledge integration in science."

Reviewer F: "There is also--I might note briefly--a lovely integration in her teaching and scholarship."

Summary of Recommendation:

Dr. Davis's research is focused on the development of effective materials and techniques for improving the science instruction of early-career science teachers. Her work is based in cognitive theory and centered on issues of instructional design. Dr. Davis' research is distinguished by its longitudinal analysis of teacher learning (from preservice through the early years of teaching), its use of innovative web-based professional development software environments, and its solid grounding in cognitive science theory related to learning environments. Developed from her earlier doctoral work on the design of effective student learning environments (in particular, issues of knowledge integration and instructional scaffolding), Davis is particularly interested in the value of technological supports in learning to teach science, and the broader issue of the design of "educative curricula." Her work on these issues has been received with enthusiasm by her national colleagues, as is evidenced by her receipt of prestigious grants (an NSF Early Career Award) and honors (the Presidential Early Career Award for Scientists and Engineers and the Jan Hawkins Early Career Award for humanistic research in learning technology from Division C of the American Educational Research Association. The majority of her articles have appeared in major journals in her field, and her edited volume was published by one of the leading publishers in psychology and education. Her work has been funded by several grants, including most notably the NSF Early Career Award. She has also been an active presenter at national conferences, and eight of her papers have appeared in refereed conference proceedings volumes. Dr. Davis is a valuable member of the faculty, teaching a variety of courses in the School of Education and actively developing and coordinating aspects of the teacher education programs; her teaching evaluations have been excellent, and she is an effective doctoral advisor. It is with the support of the Promotion and Tenure Committee that I recommend the promotion of Elizabeth A. Davis to associate professor with tenure.

Deborah Loewenberg Ball, Dean
School of Education

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